

CAE Research Project Meeting Minutes

Thursday January 6, 2022

- Participants
 - o Dr. Waleed Farag (PI)
 - o Dr. Soundararajan Ezekiel (Co-PI)
 - o Zaryn Good
 - o Franklin May
 - o Ryan Gess
 - o Alicia Deak
- Meeting started at 11:00am.
- Unanimously approved minutes for meeting on December 23, 2021
- Main Points
 - o Discussed:
 - ALL
 - Titan freezing up when accessing through team viewer
 - o Dr. Ezekiel will ask Nate to fix
 - Wrapping up the data collection and analysis part of the project (one week)
 - Complete write-up using traditional IEEE methods 6-7 pages (one week)
 - Maria
 - Need to remove the NaN values to run through SVM
 - Met with alicia to get caught up on previous tasks
 - Alicia
 - Copy codes from titan to removeable drive
 - Use the temp files from IoT23 and create a smaller distribution for the DCNN
 - Zaryn
 - Run the smaller subset of the IoT23 dataset.
 - Franklin
 - Work with Zaryn on the DCNN report.
 - Alicia, Zaryn, Franklin will meet to discuss DCNN and the code
 - Update the report on the one drive, put abstract on one-drive
 - Ryan
 - Compare the datasets through various SVM kernels and in a file.
 - See Franklins for an example.
 - o Tasks:
 - ALL
 - Make sure everyone has access to NJ computer
 - o See maria for access codes
 - o See franklin for the process
 - Post codes in pdf on the one-drive, organize one-drive
 - All data collection should be completed by the next meeting

- Two papers discussed:
 - Comparison study of IoT anomaly detection for XGBoost versus traditional methods of SVM
 - DCNN as a viable method for anomaly detection of IoT devices
- Compare balanced accuracy against traditional accuracy for samples of the weighted and unweighted data
- Maria
 - Run through different SVM kernels, documenting metrics including cpu time, using .025, .05, .075 percent of the data
 - Organize OneDrive folder to contain any links (in a wordpad) of sites referenced. If possible include the papers referenced
- Alicia
 - Copy codes from titan to removeable drive
 - Use the temp files from IoT23 and create a smaller distribution for the DCNN
- Zaryn & Franklin
 - Meet to discuss process for the DCNN
 - Complete the abstract, update on the one-drive
 -
- Ryan
 - Compare the datasets through various SVM kernels and in a file.
 - See Franklins for an example.
- Adjournment at 11:50am.
- Next meeting will be held on Thursday January 13, 2022, 11:00am.

CAE Research Project Meeting Minutes

Wednesday January 12, 2022

- Participants
 - o Dr. Waleed Farag (PI)
 - o Dr. Soundararajan Ezekiel (Co-PI)
 - o Dr. Xin-Wen Wu
 - o Zaryn Good
 - o Ryan Gess
 - o Alicia Deak
- Meeting started at 1:00pm.
- Unanimously approved minutes for meeting on January 6, 2022
- Main Points
 - o Discussed:
 - ALL
 - Access to NJ computer
 - All data collection should be completed by the next meeting
 - Two papers discussed:
 - o Comparison study of IoT anomaly detection for XGBoost versus traditional methods of SVM
 - o DCNN as a viable method for anomaly detection of IoT devices
 - Nate is working on fixing the Titan
 - o Full uninstall/reinstall of Operating System might be necessary
 - Wrapping up the data collection and analysis part of the project (one week, extended due to technology issues)
 - Complete write-up using traditional IEEE methods 6-7 pages (will revisit timeline at the next meeting)
 - Maria & Alicia
 - Run through different SVM kernels, documenting metrics including cpu time, using .025, .05, .075 percent of the data
 - o Had to rerun all of the captures again to get the big dataset
 - o Once uploaded, will run SVM on TCNJ computer
 - Zaryn & Franklin
 - Meet to discuss process for the DCNN
 - Complete the abstract, update on the one-drive
 - Ryan
 - Compare the datasets through various SVM kernels and in a file.
 - Ryan cannot connect to TCNJ
 - o Tasks:
 - ALL
 - Compare balanced accuracy against traditional accuracy for samples of the weighted and unweighted data

- Wrapping up the data collection and analysis part of the project (one week, extended due to technology issues)
 - Complete write-up using traditional IEEE methods 6-7 pages (will revisit timeline at the next meeting)
 -
- Maria
 - Run IoT23 through SVM
- Alicia
 - Post codes in pdf on the one-drive, organize one-drive
 - Create a smaller distribution for the DCNN of TON and IoT23
- Zaryn
 - Run the smaller subset of the IoT23 dataset.
 - Run the smaller subset of TON
 - Ask Dr. Larry to get MATLAB onto the tcnj computer
- Ryan
 - Access the tcnj computer, see if it is local desktop or something else.
- Franklin and Ryan
 - Compare the datasets through various SVM kernels and in a file.
 - Find Benchmark to compare current results
- Adjournment at 2:05pm.
- Spring 2022 meeting will be held on Wednesdays 1130-1230, next meeting Wednesday Thursday January 13, 2022, 11:00am.

CAE Research Project Meeting Minutes

1/19/2022

- Participants
 - o Dr. Waleed Farag (PI)
 - o Dr. Soundararajan Ezekiel (Co-PI)
 - o Dr. Xin-Wen Wu
 - o Zaryn Good
 - o Ryan Gress
 - o Alicia Deak
 - o Maria Balega
 - o Franklin May
- Meeting started at 11:30 am.
- Unanimously approved minutes for meeting on January 12, 2022
- Main Points
 - o Discussed:
 - ALL
 - Division of three different IEEE papers
 - o Alicia and Maria: XGBoost and IoT23 with comparison to SVM/DCNN
 - o Ryan: TON-IoT with comparison to different algorithms
 - o Franklin: KDD dataset with comparison to different algorithms
 - Maria & Alicia
 - Ran IoT-23 sample through SVM, achieved accuracy of 95.9%
 - Preprocessed IoT-23 data again due to technical difficulties
 - Zaryn
 - Converted ToN-IoT into images and started running in DCNN
 - Franklin
 - Working on writeup for KDD, created graphs
 - Ryan
 - Ran benchmark dataset in SVM and algorithm works fine; isolated datasets for ToN-IoT and still getting error
 - o Tasks:
 - Maria
 - Continue running IoT-23 through SVM, keep increasing sample size of data
 - Alicia
 - Rerun XGBoost with new IoT-23 preprocessing to compare results
 - Send Zaryn IoT-23 split data
 - Zaryn
 - Convert IoT-23 into images and run through DCNN, continue running ToN-IoT through DCNN
 - Franklin
 - Continue writeup for KDD

- Ryan
 - Look into why SVM is giving the same results for ToN-IoT; go back to source of data
- Adjournment at 12:25 pm.
- Next meeting will be held on Wednesday January 26 at 11:30 am.

CAE Research Project Meeting Minutes

1/26/2022

- Participants
 - o Dr. Waleed Farag (PI)
 - o Dr. Soundararajan Ezekiel (Co-PI)
 - o Dr. Xin-Wen Wu
 - o Zaryn Good
 - o Ryan Gress
 - o Alicia Deak
 - o Maria Balega
 - o Franklin May
- Meeting started at 11:30 am.
- Unanimously approved minutes for meeting on January 19, 2022
- Main Points
 - o Discussed:
 - ALL
 - Use the same machine for each dataset so that execution time is comparable
 - Share results before meetings so feedback can be provided
 - Division of three different IEEE papers
 - o Alicia and Maria: XGBoost and IoT23 with comparison to SVM/DCNN
 - o Ryan: ToN-IoT with comparison to different algorithms
 - o Franklin: KDD dataset with comparison to different algorithms
 - Share incremental progress of papers
 - Maria
 - Ran IoT23 samples through SVM, achieved accuracy up to 96%
 - Alicia
 - Sent dataset to Zaryn, working on running IoT23 in XGBoost
 - Zaryn
 - Converted both ToN-IoT and IoT23 data into images, running through DCNN, IoT23 accuracy up to 86%, issue with ToN-IoT getting the same accuracy every time
 - Franklin
 - Working on writeup for KDD
 - Ryan
 - Changed preprocessing for ToN-IoT to fix the issue of getting the same result, accuracies up to 95% for XGBoost and SVM, getting false negatives with metrics
 - o Tasks:
 - Maria
 - Continue running IoT23 20% sample through SVM, work on report
 - Alicia

- Continue running IoT23 in XGBoost, use TCNJ machine
 - Zaryn
 - Continue running DCNN for ToN-IoT and IoT23, work with others to see how DCNN will be incorporated in papers
 - Franklin
 - Continue writeup for KDD, reach out to Alicia and Zaryn to discuss paper
 - Ryan
 - Send new preprocessing for ToN-IoT to Zaryn
 - Run NB to compare results with other algorithms/published paper
- Adjournment at 12:40 pm.
- Next meeting will be held on Wednesday February 2 at 11:30 am.

CAE Research Project Meeting Minutes

2/2/2022

- Participants
 - o Dr. Waleed Farag (PI)
 - o Dr. Soundararajan Ezekiel (Co-PI)
 - o Dr. Xin-Wen Wu
 - o Zaryn Good
 - o Ryan Gress
 - o Alicia Deak
 - o Maria Balega
 - o Franklin May
- Meeting started at 11:30 am.
- Unanimously approved minutes for meeting on January 26, 2022
- Main Points
 - o Discussed:
 - ALL
 - Use the same machine for each dataset so that execution time is comparable
 - Share results before meetings so feedback can be provided
 - Division of three different IEEE papers
 - o Alicia and Maria: XGBoost and IoT23 with comparison to SVM/DCNN
 - o Ryan: TON-IoT with comparison to different algorithms
 - o Franklin: KDD dataset with comparison to different algorithms
 - Share incremental progress of papers
 - Maria
 - Ran IoT23 20% sample through SVM, achieved accuracy up to 96%
 - Alicia
 - Ran IoT23 using XGBoost, balanced accuracy 75%, accuracy 99%
 - Zaryn
 - Met with everyone leading a paper to discuss the machine they are running on, working on DCNN for each dataset
 - Franklin
 - Working on paper, SVM and XGBoost results are finalized
 - Ryan
 - Using a subset of ToN-IoT dataset, accuracies are similar to a published paper
 - o Tasks:
 - Maria
 - Take 5% sample from each classification and run SVM
 - Alicia
 - Run IoT23 XGBoost using 4 classifications to be consistent with SVM, visualize results

- Zaryn
 - Continue running DCNN for KDD, IoT23, and ToN-IoT
- Franklin
 - Continue working on paper
- Ryan
 - Look into why XGBoost isn't working as good for ToN-IoT23 dataset
- Adjournment at 12:30 pm.
- Next meeting will be held on Wednesday February 9 at 11:30 am.

CAE Research Project Meeting Minutes

2/9/2022

- Participants
 - o Dr. Waleed Farag (PI)
 - o Dr. Soundararajan Ezekiel (Co-PI)
 - o Dr. Xin-Wen Wu
 - o Zaryn Good
 - o Ryan Gress
 - o Maria Balega
 - o Franklin May
 - o Ethan Foust
 - o Donald Miley
- Meeting started at 11:30 am.
- Unanimously approved minutes for meeting on February 2, 2022
- Main Points
 - o Discussed:
 - Maria
 - Ran balanced IoT-23 data through SVM and achieving accuracies up to 96% which is similar to unbalanced data, revised paper based on Dr. Farag's suggestions
 - Alicia
 - Created balanced data for IoT-23
 - Running into issues with XGBoost results
 - Zaryn
 - Working on DCNN
 - Franklin
 - Working on paper, revised paper based on Alicia and Dr. Wu's suggestions
 - Ryan
 - Comparing binary results from ToN-IoT XGBoost to published papers, not achieving accuracies as good as the published papers
 - Converted ToN-IoT dataset to images
 - o Tasks:
 - Maria & Alicia
 - Work on solving XGBoost issues and continue to work on paper
 - Zaryn
 - Continue to run DCNN, keep in touch with those writing papers
 - Franklin
 - Continue working on paper
 - Ryan
 - Continue working on XGBoost, running DCNN, and working on paper
- Adjournment at 12:20 pm.

- Next meeting will be held on Wednesday February 16 at 11:30 am.

CAE Research Project Meeting Minutes

2/16/2022

- Participants
 - o Dr. Waleed Farag (PI)
 - o Dr. Soundararajan Ezekiel (Co-PI)
 - o Dr. Xin-Wen Wu
 - o Zaryn Good
 - o Maria Balega
 - o Franklin May
 - o Ethan Foust
 - o Donald Miley
- Meeting started at 11:30 am.
- Unanimously approved minutes for meeting on February 9, 2022
- Main Points
 - o Discussed:
 - ALL:
 - Poster deadline approaching, each student writing a paper should create a poster, Dr. Ezekiel sent templates
 - GenCyber dates to keep in mind: March 26th, May 7th, June 13-17th
 - Maria & Alicia
 - Fixed XGBoost issue, ran IoT-23 using XGBoost and achieved results up to 99.98%
 - Working on IoT-23 paper, all XGBoost information is included
 - Zaryn
 - Working on training IoT-23 and KDD data then everything will be ready for testing
 - Franklin
 - Met with Ethan to discuss the project
 - Working on KDD paper, methodology is finished
 - o Tasks:
 - Maria & Alicia
 - Begin applying for and working on poster, continue working on IoT-23 paper and incorporating SVM and DCNN
 - Meet with Zaryn about DCNN
 - Zaryn
 - Meet with Donald to discuss the project
 - Continue training IoT-23 and KDD through DCNN and begin testing, reach out to Ryan about his status on DCNN for ToN-IoT
 - Franklin
 - Begin applying for and working on poster, continue working on KDD paper and working on results/ conclusion sections
 - Ethan

- Meet with Ryan to get informed about his progress with the paper and ToN-IoT, keep in touch with Dr. Ezekiel
- Adjournment at 12:10 pm.
- Next meeting will be held on Wednesday February 23 at 11:30 am.

CAE Research Project Meeting Minutes

2/23/2022

- Participants
 - o Dr. Waleed Farag (PI)
 - o Dr. Soundararajan Ezekiel (Co-PI)
 - o Dr. Xin-Wen Wu
 - o Zaryn Good
 - o Maria Balega
 - o Franklin May
 - o Donald Miley
- Meeting started at 11:30 am.
- Unanimously approved minutes for meeting on February 16, 2022
- Main Points
 - o Discussed:
 - Maria, Franklin & Alicia
 - Met to discuss outline of poster/visualizations for IUP Scholars Forum
 - Maria
 - Working on finalizing IoT-23 abstract to submit
 - Alicia
 - Created visualizations for IoT-23 and KDD posters
 - Zaryn
 - Working on training IoT-23 and KDD data
 - Franklin
 - Working on finalizing KDD abstract to submit
 - o Tasks:
 - Maria
 - Meet with Zaryn about DCNN
 - Work on paper and poster for IoT-23, submit abstract to IUP Scholars Forum
 - Alicia
 - Run SVM to produce visualizations for posters
 - Begin work on Ryan's poster and work with others
 - Zaryn
 - Continue training IoT-23 and KDD through DCNN and begin testing, reach out to Ryan about his status on DCNN for ToN-IoT
 - Franklin
 - Work on paper and poster for KDD, submit abstract to IUP Scholars Forum
 - Ethan & Donald
 - Meet with Ryan to get informed about his progress with the paper and ToN-IoT
- Adjournment at 12:00 pm.

- Next meeting will be held on Wednesday March 2 at 11:30 am.

CAE Research Project Meeting Minutes

3/2/2022

- Participants
 - o Dr. Waleed Farag (PI)
 - o Dr. Soundararajan Ezekiel (Co-PI)
 - o Zaryn Good
 - o Maria Balega
 - o Franklin May
 - o Donald Miley
 - o Alicia Deak
 - o Ryan Gress
- Meeting started at 11:30 am.
- Unanimously approved minutes for meeting on February 23, 2022
- Main Points
 - o Discussed:
 - Maria
 - Submitted IoT-23 abstract to IUP Scholar's Forum, working on poster
 - Met with Zaryn to discuss DCNN for IoT-23 poster/paper
 - Alicia
 - Met with Donald to discuss ToN-IoT, created SVM visualizations for posters
 - Ryan is sending notes/writeups for ToN-IoT
 - Zaryn
 - Need to fix classifications for IoT-23, meeting with Alicia about statistics for DCNN
 - Ryan is sending finalized preprocessing for ToN-IoT
 - Franklin
 - Working on finalizing KDD abstract to submit based on Dr. Wu's comments, working on poster
 - Donald
 - Met with Alicia to discuss the project, Ryan is sending papers regarding ToN-IoT work
 - o Tasks:
 - Maria
 - Continue working on paper and poster for IoT-23
 - Zaryn
 - Continue running DCNN for IoT-23, KDD, and ToN-IoT and keep in touch with others regarding posters/papers
 - Franklin
 - Submit KDD abstract by March 4th, continue working on paper and poster for KDD
 - Alicia & Donald

- Work on and submit abstract for ToN-IoT by March 4th
 - Donald
 - Meet with Ryan to discuss ToN-IoT tasks
- Adjournment at 12:00 pm.
- Next meeting will be held on Wednesday March 9 at 11:30 am.

CAE Research Project Meeting Minutes

3/9/2022

- Participants
 - o Dr. Waleed Farag (PI)
 - o Dr. Soundararajan Ezekiel (Co-PI)
 - o Zaryn Good
 - o Maria Balega
 - o Franklin May
- Meeting started at 11:30 am.
- Unanimously approved minutes for meeting on March 2, 2022
- Main Points
 - o Discussed:
 - Maria
 - Finishing up XGBoost and SVM sections of IoT-23 paper, waiting for DCNN to incorporate in paper and poster
 - Alicia
 - Converted ToN-IoT dataset into images, running through DCNN
 - Zaryn
 - Finalizing results for IoT-23 and KDD, VGG-19 and ResNet performing the best
 - Showed Alicia how to run DCNN
 - Franklin
 - Working on KDD paper, sent a copy to Dr. Wu
 - o Tasks:
 - Maria
 - Continue working on paper and poster for IoT-23, waiting on results for DCNN
 - Alicia
 - Continue running ToN-IoT through DCNN
 - Zaryn
 - Continue finalizing results and making visualizations for IoT-23 and KDD regarding DCNN, reach out to Franklin and Maria regarding papers/posters
 - Franklin
 - Continue working on paper and poster for KDD, waiting on results for DCNN
- Adjournment at 12:00 pm.
- Next meeting will be held on Wednesday March 23 at 11:30 am.

CAE Research Project Meeting Minutes

3/23/2022

- Participants
 - o Dr. Waleed Farag (PI)
 - o Dr. Soundararajan Ezekiel (Co-PI)
 - o Dr. Xinwen Wu
 - o Zaryn Good
 - o Maria Balega
 - o Franklin May
 - o Alicia Deak
 - o Emily Himes
 - o Donald Miley
 - o Kamir Walton
- Meeting started at 11:30 am.
- Unanimously approved minutes for meeting on March 9, 2022
- Main Points
 - o Discussed:
 - Maria
 - IoT-23 poster is finished and ready to submit, working on IoT-23 paper
 - Alicia
 - Finishing up ToN-IoT poster, met with others throughout the week to work on posters
 - Ran all 5 nets for ToN-IoT, results are matching with published paper
 - Zaryn
 - Working on adding different metrics in Matlab for DCNN
 - Franklin
 - Finalizing KDD poster with suggestions
 - o Tasks:
 - Maria
 - Continue working on paper and submit poster for IoT-23, need to incorporate DCNN in paper
 - Alicia
 - Continue working on ToN-IoT poster to submit, continue working on ToN-IoT paper
 - Zaryn
 - Continue working on adding different metrics for DCNN and finalizing results for papers
 - Franklin
 - Continue working on paper and submit poster for KDD, need to incorporate DCNN in paper
- Adjournment at 12:15 pm.
- Next meeting will be held on Wednesday March 30 at 11:30 am.

CAE Research Project Meeting Minutes

3/30/2022

- Participants
 - o Dr. Waleed Farag (PI)
 - o Dr. Soundararajan Ezekiel (Co-PI)
 - o Dr. Xinwen Wu
 - o Zaryn Good
 - o Maria Balega
 - o Franklin May
 - o Alicia Deak
 - o Emily Himes
 - o Donald Miley
 - o Kamir Walton
- Meeting started at 11:30 am.
- Unanimously approved minutes for meeting on March 23, 2022
- Main Points
 - o Discussed:
 - Maria & Alicia
 - Working on revisions and making adjustments to IoT-23 paper
 - Alicia
 - Working on ToN-IoT paper, outline is done
 - Zaryn
 - Finalizing DCNN results for IoT-23, added different metrics to compare with SVM and XGBoost
 - Franklin
 - Need to meet with Zaryn to incorporate results in KDD paper
 - o Tasks:
 - Maria & Alicia
 - Continue working on IoT-23 paper, work on literature review and incorporating DCNN
 - Alicia
 - Continue working on ToN-IoT paper
 - Zaryn
 - Work on creating images/graphs of results, meet with Alicia and Maria to help with IoT-23 paper
 - Franklin
 - Continue working on KDD paper, meet with Zaryn about DCNN
- Adjournment at 12:10 pm.
- Next meeting will be held on Wednesday April 6 at 4:00 pm.

CAE Research Project Meeting Minutes

4/6/2022

- Participants
 - o Dr. Waleed Farag (PI)
 - o Dr. Xinwen Wu
 - o Zaryn Good
 - o Maria Balega
 - o Franklin May
 - o Emily Himes
 - o Donald Miley
- Meeting started at 4:00 pm.
- Unanimously approved minutes for meeting on March 30, 2022
- Main Points
 - o Discussed:
 - Maria & Alicia
 - Working on IoT-23 paper
 - Zaryn
 - Met with others about DCNN, working on graphics for IoT-23 and KDD
 - Franklin
 - Plan to meet with Zaryn to add results in KDD paper
 - Donald
 - Met to discuss the next phase of project with other students
 - o Tasks:
 - Maria & Alicia
 - Continue working on IoT-23 paper, work on literature review and incorporating DCNN
 - Alicia
 - Continue working on ToN-IoT paper and helping others with their papers
 - Zaryn
 - Work on creating images/graphs of results for KDD and IoT-23 papers, continue working with others on their papers
 - Franklin
 - Continue working on KDD paper, meet with Zaryn about DCNN
- Adjournment at 4:20 pm.
- Next meeting will be held on Wednesday April 13 at 11:30 pm.

CAE Research Project Meeting Minutes

4/13/2022

- Participants
 - o Dr. Waleed Farag (PI)
 - o Dr. Soundararajan Ezekiel (Co-PI)
 - o Dr. Xinwen Wu
 - o Zaryn Good
 - o Maria Balega
 - o Franklin May
 - o Donald Miley
 - o Kamir Walton
- Meeting started at 11:30 am.
- Unanimously approved minutes for meeting on April 6, 2022
- Main Points
 - o Discussed:
 - ALL
 - IUP Scholar's Forum Awards luncheon is Thursday April 21st at 11:30 am
 - Maria & Alicia
 - Working on DCNN and literature review of IoT-23 paper
 - Zaryn
 - Planning to meet with others to finalize DCNN for IoT-23 and KDD papers
 - Franklin
 - Revising paper based on Dr. Wu suggestions, need to meet with Zaryn about DCNN
 - Kamir & Donald
 - Working on ordering supplies for testbed
 - o Tasks:
 - Maria & Alicia
 - Continue working on IoT-23 paper, work on literature review and incorporating DCNN, meet with Zaryn about DCNN
 - Alicia
 - Continue working on ToN-IoT paper and helping others with their papers
 - Zaryn
 - Work on helping with DCNN for KDD and IoT-23 papers
 - Franklin
 - Continue working on KDD paper, meet with Zaryn about DCNN
 - Kamir & Donald
 - Continue finding/ordering supplies for testbed, need to identify manufacturer
- Adjournment at 12:00 pm.

- Next meeting will be held on Wednesday April 20 at 11:30 am.

CAE Research Project Meeting Minutes

4/20/2022

- Participants
 - o Dr. Waleed Farag (PI)
 - o Dr. Soundararajan Ezekiel (Co-PI)
 - o Dr. Xinwen Wu
 - o Zaryn Good
 - o Maria Balega
 - o Franklin May
 - o Kamir Walton
 - o Alicia Deak
 - o Emily Himes
 - o Jino Ramson
- Meeting started at 11:30 am.
- Unanimously approved minutes for meeting on April 13, 2022
- Main Points
 - o Discussed:
 - ALL
 - IUP Scholar's Forum Awards luncheon is Thursday April 21st at 11:30 am
 - Maria & Alicia
 - Met with Zaryn to add DCNN to IoT-23 paper, sent draft to Dr. Farag
 - Alicia
 - Working on ToN-IoT paper
 - Zaryn
 - Helped Maria with DCNN for IoT-23, sent Franklin results but still need to send more information for KDD paper
 - Franklin
 - Met with Zaryn, working on adding DCNN results
 - Kamir & Donald
 - Working with Dr. Ramson & Dr. Pearlstein to get suggestions on what supplies to order for testbed
 - o Tasks:
 - Maria & Alicia
 - Continue working on IoT-23 paper, work on organizing/rearranging parts
 - Alicia
 - Continue working on ToN-IoT paper and helping others
 - Zaryn
 - Continue working with Franklin, help with IoT-23 paper if needed
 - Start working with Kamir and Donald
 - Franklin
 - Continue working on KDD paper, work on comparison of results and making revisions based on Dr. Wu suggestions

- Kamir & Donald
 - Continue looking into supplies to order for testbed based on suggestions
- Adjournment at 12:10 pm.
- Next meeting will be held on Wednesday April 27 at 11:30 am.

CAE Research Project Meeting Minutes

4/27/2022

- Participants
 - o Dr. Waleed Farag (PI)
 - o Dr. Soundararajan Ezekiel (Co-PI)
 - o Dr. Xinwen Wu
 - o Zaryn Good
 - o Maria Balega
 - o Franklin May
 - o Kamir Walton
 - o Alicia Deak
 - o Emily Himes
 - o Jino Ramson
- Meeting started at 11:30 am.
- Unanimously approved minutes for meeting on April 20, 2022
- Main Points
 - o Discussed:
 - Maria
 - Updated references for IoT-23 paper, added graphic with the help of Emily
 - Alicia
 - Working on ToN-IoT paper and helping with IoT-23 paper
 - Zaryn
 - Meeting with Franklin about DCNN, met with Kamir and Donald about testbed
 - Franklin
 - Working on KDD paper, meeting with Zaryn to finish DCNN writeup
 - Kamir & Donald
 - Working with Dr. Ramson & Dr. Pearlstein to finalize what supplies to order for testbed
 - o Tasks:
 - Maria & Alicia
 - Continue working on IoT-23 paper, work on organizing/rearranging parts
 - Alicia
 - Continue working on ToN-IoT paper and helping others
 - Zaryn
 - Meet with Franklin to add writeup to KDD
 - Franklin
 - Work on adding DCNN writeup to KDD paper, train Emily when available
 - Kamir & Donald & Zaryn
 - Work to finalize what supplies to order for testbed, look into ordering extension cord & HDMI cord for TV in 305

- Adjournment at 12:15 pm.
- Next meeting will be held on Monday March 9 at 10:30 am.

CAE Research Project Meeting Minutes

5/9/2022

- Participants
 - o Dr. Waleed Farag (PI)
 - o Dr. Soundararajan Ezekiel (Co-PI)
 - o Dr. Xinwen Wu
 - o Maria Balega
 - o Alicia Deak
 - o Jino Ramsen
 - o Emily Himes
 - o Kamir Walton
 - o Nathan Metzger
- Meeting started at 10:30 am.
- Unanimously approved minutes for meeting on April 27, 2022
- Main Points
 - o Discussed:
 - Maria
 - Edited conclusion for IoT-23 paper, made plan for finishing up paper by this week
 - Alicia
 - Outlined ToN-IoT paper, still running and collecting data
 - Sent feedback to Franklin regarding KDD paper
 - Kamir & Donald
 - Ordered testbed supplies except for the Raspberry Pi, Dr. Farag has some in his office
 - Need to get keys for accessing 305
 - o Tasks:
 - Maria
 - Continue finalizing IoT-23 paper, send updated version to Dr. Farag
 - Alicia
 - Continue working on ToN-IoT paper and helping Franklin and Maria with their papers
 - Franklin
 - Continue working on KDD paper and incorporating suggestions from Dr. Wu
 - Kamir, Donald, Zaryn & Nathan
 - Test that supplies ordered are working correctly once they arrive, meet with Dr. Ramsen to discuss details about testing sensors
- Adjournment at 11:20 am.
- Next meeting will be held on Tuesday, May 17 at 11:00 am.

CAE Research Project Meeting Minutes

5/17/2022

- Participants
 - o Dr. Waleed Farag (PI)
 - o Dr. Soundararajan Ezekiel (Co-PI)
 - o Dr. Xinwen Wu
 - o Emily Himes
 - o Kamir Walton

- Meeting started at 11:00 am.
- Unanimously approved minutes for meeting on May 9th, 2022
- Main Points
 - o Discussed:
 - Alecia
 - Will focus on paper, awaiting feedback
 - Maria
 - Sent most recent version of paper; Dr. Farag will be giving feedback
 - Dr. Ezekiel
 - Received three boxes, expecting two more shipments, awaiting response from Nathan.
 - Kamir
 - Will be able to continue working up to June 1st
 - Emily
 - Will be reaching out to offer any help
 - o Tasks:
 - Kamir
 - Email Nathan and text Donald
 - Dr. Ezekiel
 - Continue recruiting students
 - Dr. Wu and Dr. Ezekiel
 - Will be reaching out and discussing with students
 - o Documentation, specification, testing
 - o What protocol are and are not working

- Adjournment at 11:35 am.
- Next meeting will be held on Wednesday, May 25 at 12:00 pm.

CAE Research Project Meeting Minutes

5/25/2022

- Participants
 - o Dr. Waleed Farag (PI)
 - o Dr. Soundararajan Ezekiel (Co-PI)
 - o Dr. Xinwen Wu
 - o Alicia Deak
 - o Emily Himes
 - o Zaryn Good
 - o Kamir Walton
 - o Nathan Metzger (joined later)

- Meeting started at 12:00 pm.
- Unanimously approved minutes for meeting on May 17th, 2022
- Main Points
 - Components should be tested soon
 - Cannot test anything without interface through Raspberry Pi
 - Awaiting response from Nathan confirming arrival of components, testing
 - o Discussed:
 - Alecia
 - Will send updated work
 - Sent Dr. Wu's Franklin's work, still need more details
 - Update on Maria's work: almost done with her work
 - Zaryn's part should be completed
 - Zaryn
 - Will be able to continue
 - Was updated by Kamir about 2nd phases
 - Will provide logistical support remotely
 - Kamir
 - Reached out to Nate, hasn't gotten back personally
 - Today was last meeting, will no longer be available after June 1st
 - Dr. Ezekiel
 - Discussed need to update Excell sheet of parts on Dropbox; will try contacting Nathan
 - Suggests checking how much memory's needed, can update afterwards
 - Emily
 - Will be joining Nate in second phase
 - Gencyber:
 - 5 students confirmed for participation
 - o Awaiting confirmation from AB, Clara, and Jara
 - o Will be recruiting more students if possible, want at least 10
 - Nathan

- Packages have been opened, yet to input into inventory
- o Tasks:
 - Dr. Ezekiel
 - Will email chairperson about Nate and Emily's access to building
 - Will email Jino about meeting for testbed development
 - Franklin, Maria, Alecia
 - Completing papers
 - Nathan
 - Update if missing components, must alert company of missing packages ASAP
 - Receive Raspberry Pi from Dr. Farag
 - Confirm whether or not Raspberry Pi can be updated
- Adjournment at 12:30 pm (initial meeting), 12:50 (Meeting with Nate).
- Next meeting will be held on Monday, June 6th at 12:00 pm.

CAE Research Project Meeting Minutes

6/6/2022

- Participants
 - o Dr. Waleed Farag (PI)
 - o Dr. Soundararajan Ezekiel (Co-PI)
 - o Dr. Xinwen Wu
 - o Emily Himes
 - o Zaryn Good

- Meeting started at 12:00 pm.
- Unanimously approved minutes for meeting on May 25th, 2022
- Main Points
 - Discussed student confirmed student involvement for GenCyber
 - Vincent, Emily, Jordan, Alec (all days except Friday), Drew (Ezekiel session), Zaryn (first three days), AB (?), Clara (helping as volunteer), Jared (working with HR)
 - Nate and Zaryn have experience with Raspberry Pi
 - Shifting focus to GenCyber
 - Organizing students
 - Testing modules (Dr. Ezekiel)
- o Discussed:
 - Zaryn
 - Can provide remote logistical support for testbed progress; can also join in person
 - Dr. Wu
 - Getting updates from Franklin and Alecia on papers
 - Emily
 - Updated progress made with testbed on Thursday
 - o Components tested
 - o Headers soldered to Arduino boards
 - o Working on scheduling next meetup
- o Tasks:
 - Dr. Ezekiel
 - Will reach out to Malcolm and/or Megan for GenCyber
 - Assign students to GenCyber sessions tonight
 - Get updates from Nate and Jino, meet with Nate, Jino, and Emily
 - All students working GenCyber
 - Get familiar with camp content of sessions
 - Emily
 - Scan over GenCyber D2L
 - Continue working with Nathan
 - Dr. Farag, Dr. Ezekeil, Dr. Wu

- Send material to George and Wendy for Jeopardy/Puzzles
- Adjournment at 12:50
- Next meeting will be held on Monday, June 20th at 10:00 am .

CAE Research Project Meeting Minutes

8/19/2022

- Participants
 - o Dr. Waleed Farag (PI)
 - o Dr. Soundararajan Ezekiel (Co-PI)
 - o Dr. Xinwen Wu
 - o Dr. Jino Ramsen
 - o Drew Rado
 - o Emily Himes
 - o Nathan Metzger

- Meeting started at 6:30 pm

Main Points

- Emphasis on completing steps one and two of IoT phase 2s
- Step 2: Setting up of Thingsboard for data storage and data visualization
- New students being trained will have tasks delegated to them
 - o Sky
 - o Hector
 - o Zach

Tasks:

- Drew:
 - o Can set up Thingsboard in 305 sometime next week
- Emily
 - o Find appropriate libraries for setting up Arduino boards' Wi-Fi
 - o Work on pushing data to Thingsboard
- Nate:
 - o Meet with Sky and other students to delegate tasks

Adjournment at 7:25

Next meeting will be held on Friday, August 26, at 6:30 pm

CAE Research Project Meeting Minutes

8/26/2022

- Participants
 - o Dr. Waleed Farag (PI)
 - o Dr. Soundararajan Ezekiel (Co-PI)
 - o Dr. Xinwen Wu
 - o Dr. Jino Ramsen
 - o Emily Himes
 - o Hector Linarez
 - o Meghan Schlipp
 - o Nathan Metzger
 - o Sky Semone
 - o Zach Keyser
 - o Zaryn Good

- Meeting started at 6:30 pm
- Unanimously approved minutes for meeting on August 19th, 2022

Main Points

- Data will be downloaded via CSV file
- Current goal: connect all sensors to Thingsboard
- Then use collected data for algorithms from phase one
- If data can be successfully visualized via Thingsboard, all that's left to do in this part is interfacing the other sensors
- Dr. Ezekiel
 - o Has appointed Drew as project lead and Emily as sub lead
 - o Sent email about AC repair in 305; work order has been submitted
 - o Wi-Fi issue will be resolved by Hector's work with IT department
 - o Requests that there always be at least one student in 305 most of the time; requests access to a list of students' hours and when they'll be able to be reached in 305
- Dr. Wu
 - o Encourages project progress, suggests having a meeting from 305 to display what work's been done (hardware, Thingsboard, etc.); it would be good to report this progress to the sponsor agency
 - Sometime next week?
- Hector:
 - o Confirms that Arduinos can be connected to Wi-Fi
 - o Confirms that hard drive can be provide, however help desk ticket must be submitted by faculty member
 - o SSD card can be bought new, as well
- Dr. Ramsen:
 - o Currently working of list for second phase
 - Extension of components

- Intends to send more information over the weekend; can allocate more tasks to students
- Emily:
 - Reminds everyone to make sure they use the [When2Meet link](#) provided in the email sent by Drew to list their availability
 - Requests creation of an IUP email address for IoT
 - Can be used to sign up for Thingsboard
 - Can have permission to create Microsoft Teams, which would greatly help with organization and communication
 - Update on pushing data to Thingsboard:
 - RGB sensor produces readings
 - Arduino can connect to Wi-Fi
 - Was able to get a start on connecting sensor to Thingsboard, will need to work on representing data and creating dashboards

Tasks:

- Drew:
 - Continue overseeing tasks as project lead
 - Receive work from Nathan
 - Work on setting up Teams
- Emily:
 - Continue to work with pushing data to Thingsboard
 - Loop readings
 - Create different dashboards on Thingsboard
 - Switch to professional (Maker) version of Thingsboard
 - Can start trial; after that it's ~\$10/month
 - Work on setting up Teams
- Sky:
 - Help Emily with the above
 - Assist with hardware
- Nate:
 - Can pop in during lunch breaks
 - Can give tasks to Drew
- Zaryn
 - Finalizing work from first phase
 - Will work to integrate self back into project
- Hector:
 - Oversee Wi-Fi connectivity for Arduinos
 - IT work
 - See that help desk tickets are submitted
 - Work with IT to obtain an IUP email for the IoT group
 - Must have permission to create Microsoft Teams
- Meghan, Zach
 - Brush up on data analytics, [the IoT project](#), [Thingsboard documentation](#)

- Feel free to reach out with any questions
- Await docs and more onboarding information as they're created

Adjournment at 7:10

Next meeting will be held on Friday, September 2, at 6:00 pm via Dr. Farag Zoom room

CAE Research Project Meeting Minutes

9-2-2022

- Participants
 - Dr. Waleed Farag (PI)
 - Dr. Soundararajan Ezekiel (Co-PI)
 - Dr. Jino Ramsen
 - Meghan Schlipp
 - Emily Himes
 - Nathan Metzger
 - Sky Semone
 - Zaryn Good
 - Maria Balega
- Meeting started at 6:00 pm
- Unanimously approved minutes for meeting on August 26th, 2022

Main Points:

- Students presented a PowerPoint of the week's work
- Dr. Ezekiel:
 - Emphasizes having progress reports for Fridays and strictly following Dr. Ramson's instructions
 - Wants to organize meeting with Dr. Ramson to explain project
- Dr. Farag:
 - Emphasizes focusing on objective of getting data to Thingsboard
- Dr. Ramson:
 - Wants graphs showing that Arduinos are working and transmitting correct data
 - Have dashboard for each node, widgets for the data
 - UART for Every boards

Tasks:

- Everyone:
 - **Get data pushed to Thingsboard**
 - Set up dashboards with widgets to visualize data

Adjournment at 7:20

Next meeting will be held on Friday, September 9, at 6:00 pm

CAE Research Project Meeting Minutes

9-9-2022

- Participants
 - Dr. Waleed Farag (PI)
 - Dr. Soundararajan Ezekiel (Co-PI)
 - Dr. Xinwen Wu
 - Dr. Jino Ramsen
 - Meghan Schlipp
 - Emily Himes
 - Zachary Keyser
 - Sky Semone
 - Zaryn Good
 - Maria Balega
- Meeting started at 6:00 pm
- Unanimously approved minutes for meeting on September 2nd, 2022

Main Points:

- Drew will be able to join meetings starting next week
- Discussed GenCyber
- Discussed possible solutions for being able to use the local installation of Thingsboard in 305
- Students presented progress from previous week
 - Drew, Emily, and Sky were able to interface three sensors (RBG, sound level meter, and weather) to Thingsboard and produce graphs in a dashboard
- Zach
 - Finished paperwork, will start working in 305 starting the week of the 12th
- Jino
 - Suggests interfacing multiple sensors to singular Arduinos, and have one Arduino board for each node
- Maria
 - Worked on getting sensor to Thingsboard; was experiencing difficulty finding the appropriate libraries for the code. Will continue this work next week
- Hector
 - Worked on assigned sensor
- Meghan
 - Continued research on Trendz Analytics and edge computing

Tasks:

- Goal is to have all sensors connected to Thingsboard by next meeting
- Hector, Nate, Drew
 - Figure out internet/network solution
- Maria

- Revise paper
- Maria and Zaryn
 - Begin passing on knowledge of previous work from phase one
- Sky and Emily
 - Connect sensors to 33 IoT boards; get connected to Thingsboard
- Emily
 - Start using Thingsboard Maker
- Sky
 - EKG readings

Adjournment at 7:15

Next meeting will be held on Friday, September 16, at 6:00 pm

CAE Research Project Meeting Minutes

9-16-2022

- Participants
 - Dr. Waleed Farag (PI)
 - Dr. Soundararajan Ezekiel (Co-PI)
 - Dr. Xin-Wen Wu
 - Dr. Jino Ramsen
 - Meghan Schlipp
 - Emily Himes
 - Zachary Keyser
 - Nathan Metzger
 - Drew Rado
 - Sky Semone
 - Zaryn Good
 - Maria Balega
 - Hector Linarez
- Meeting started at 6:00 pm
- Unanimously approved minutes for meeting on September 9th, 2022

Main Points:

- Started meeting with reporting on progress
 - Drew discussed the combined ThingsBoard dashboard
 - Sky provided a live demonstration to prove that sensors
 - Internet issues were resolved and approved by IT while Sky/Drew/Emily were in the room. We expect no more issues. We had one approved router that could work, mapped the correct MAC address solved the issues.
- Dr. Ramson talked next: “great job”
 - Now that all sensors are connected, move on to grouping sensors by function
 - Create a dashboard for each use case: these were discussed in previous weeks
 - Move on to ThingsBoard professional: more control and ability to download data.
 - Drew confirmed that downloading data requires Professional version.
 - Confirmed intentions that downloaded data will be needed for ML algorithms that were created in the
 - Dr. Farag mentioned using a second dashboard for the “seconds” of each sensor and place it in a different location.
- Dr. Farag stressed that we need to start aggregating data, TB Maker subscription should be purchased immediately.
- Dr. Wu wanted to make sure that the data was synchronized properly for all devices. Network parameters should also be recorded in the final dataset.
- Dr. Ramson asked about custom packets of data.
- Dr. Wu mentioned that the first part of the project had labelled anomalous/non-anomalous data and this should be considered when collecting data
- Dr. Farag mentioned that we might not need all of the sensors hooked up.
 - RGB, ECG, water quality may not be relevant.
 - Dr. Ezekiel suggested focusing on only the necessary sensors that may be relevant to the “smart-home” model that the project

- Temp, humidity, sound, air quality were determined to be the most critical.
- Agreed that we should we should get more boards: Dr. Ramson suggested getting 5 more for developing. Sky will purchase these on Amazon
- Tasks:
 - Maria and Zaryn
 - Start assembling the new IoT data to get something like the old IoT data. Can our data be preprocessed? How?
 - Get CSV files and be able to use it for past algorithms
 - Emily and Megan:
 - Investigate ThingsBoard capabilities.
 - Help Sky program the Arduino.
 - Drew, Sky, Nate
 - Hook up the rest of the boards using the new configurations
 - Make better ThingsBoard Dashboards.
 - Hector and Zach
 - Help out with TB and programming.
 - Megan
 - Worked on getting recommended software to work: more research into this.
 - Getting started on Titan.
 - EVERYONE:
 - Be in communication with Dr. Ramson for additional information and tasks.

Adjournment at 7:22

Next meeting will be held on Friday, September 23, at 6:00 pm

CAE Research Project Meeting Minutes

9-23-2022

- Participants
 - Dr. Waleed Farag (PI)
 - Dr. Xin-Wen Wu
 - Meghan Schlipp
 - Emily Himes
 - Zachary Keyser
 - Drew Rado
 - Sky Semone
 - Zaryn Good
 - Maria Balega
- Meeting started at 6:00 pm
- Unanimously approved minutes for meeting on September 16th, 2022

Main Points:

- Progress report
 - Drew got ThingsBoard Maker to work. This will allow data collection... full integration with the rest of the project will start next Monday.
 - Sky, Emily, Zach, and Meghan worked on getting all sensors to work according to the discussed configurations
 - A1: temp/humidity/sound
 - A2: CO,CO2,O2.dust
 - Zaryn and Maria gave the rest of the group the data used in the previous part of the research/ explained it.
 - Meghan learned about the DCNN and installed the ThingsBoard Edge and explored its potential
- Discussion points
 - Dr. Wu brought up the importance of preprocessing the data; how do we make our data comparable to the data used in the first part of the study?
 - Drew will start working on this
 - Talk about how we will get all data required to make a comparable dataset.
 - Set up Wireshark for network data
 - Try to get as much data as possible on the Arduino
- Tasks:
 - Maria and Zaryn
 - Once data comes in, verify it, preprocess it if it will work, and start applying algorithms
 - Emily, Meghan, Hector, Zach, Sky
 - Get access to new ThingsBoard account and make dashboards for the sensors
 - Collect and save data
 - Start working on the other required fields needed for the dataset
 - Drew, Nate
 - Keep working on Thingsboard, investigate data collection procedures

Adjournment at 6:35

Next meeting will be held on Friday, September 30, at 6:00 pm

CAE Research Project Meeting Minutes

9-30-2022

- Participants
 - Dr. Waleed Farag (PI)
 - Dr. Xin-Wen Wu
 - Dr. Soundararajan Ezekiel
 - Drew Rado
 - Emily Himes
 - Hector Linarez
 - Maria Balega
 - Meghan Schlipp
 - Sky Semone
 - Zach Keyser
 - Zaryn Good
- Meeting started at 6:00 pm
- Unanimously approved minutes for meeting on September 23th, 2022

Main Points:

- Progress report
 - Drew got ThingsBoard Maker to work and shared how to use it with the team
 - Sky configured the Arduinos as mentioned by Dr. Ramson, fixing problems with the UART bus and the 5V-to-3.3V data conversion. Two copies of each node were made.
 - Maria worked on the IEEE paper
 - Emily focused on the GenCyber promotional video and also helped with configuring Arduinos.
- Discussion points
 - Dr. Ezekiel suggested using TinkerCAD to simulate sensor data since there was no other data yet collected.
 - It's time for midterms, so keep reasonable work/research/studying expectations.
- Tasks:
 - Emily
 - Finish up gen-cyber video
 - Maria and Zaryn
 - Once data comes in, verify it, preprocess it if it will work, and start applying algorithms
 - Maria should continue to work on the IEEE paper
 - Meghan, Hector, Zach
 - Learn how to use TinkerCAD and determine how it can best be used to create sensor data.
 - Look into what network parameters can be reported by the Arduinos and add this to the data sent to ThingsBoard
 - Drew, Nate, Sky, Emily, anyone else
 - Utilize the new paid version of ThingsBoard
 - Determine the capabilities of Wireshark in collecting network data needed to recreate datasets used in part one of the study
 - Explore what network parameters can be reported by the Arduinos and add this to the data sent to ThingsBoard

Adjournment at 6:30

Next meeting will be held on Friday, October 7, at 6:00 pm

CAE Research Project Meeting Minutes

10-7-2022

- Participants
 - Dr. Waleed Farag (PI)
 - Dr. Xin-Wen Wu
 - Dr. Soundararajan Ezekiel
 - Dr. Jino Ramson
 - Drew Rado
 - Emily Himes
 - Maria Balega
 - Meghan Schlipp
 - Nathan Metzger
 - Sky Semone
 - Zach Keyser
 - Zaryn Good
- Meeting started at 6:00 pm
- Unanimously approved minutes for meeting on September 30th, 2022

Main Points:

- Progress report
 - Maria and Zayrn: looked at data that Drew sent.
 - Drew and Meghan started using Wireshark to get the IoT23 datafields
 - Drew showed the sample sensor data
 - Also showed the wireshark data
 - Sky tried getting network data on the Arduino, but it was short of what Wireshark was capable of
 - Instead worked to get sensors working with TB
 - Zach, Hector worked on TinkerCAD
 - Zach defined sensors and retrieved data, but had issues saving data.

Discussion points

- Dr. Ramson mentioned using additional algorithms for packaging the data if the data is bad.
 - If we are primarily focused on using the network and packet data, maybe ignore this.
 - Focus on data collection, get 2-3 weeks of data
 - Make sure all sensors are collecting accurate data
 - Sky verified that sensors have been getting reasonable, but we need to make sure it stays this way, since our sensors have not been tested for long periods of time.
- Dr. Ezekiel wanted to make sure that TinkerCAD models correlate to the ones that we have configured now
 - Maybe use infrared sensors for in-home use/ expand TinkerCAD with this as well
 - Make smoke, gas, pressure, etc “at-home” sensors
 - If we cannot find a way of saving data, we should not continue with TinkerCAD
- Dr. Farag asked if there are any other sensors to consider for an in-home IoT ensemble/smart building.
 - Dr. Wu mentioned that this should be enough sensors to capture the network data but adding more sensors would give us more raw data.
 - Dr. Ramson said this was a small testbed, but it should work for now

- Maybe verify the sensor values, look for tools to do this
- Tasks:
 - Maria and Zaryn
 - Once data comes in, verify it, preprocess it if it will work, and start applying algorithms
 - Show Meghan relevant scripts on Titan, and how the machine learning things work
 - Drew, Nate, Sky, Emily, Meghan
 - Determine the capabilities of Wireshark in collecting network data needed to recreate datasets used in part one of the study.
 - Format the Wireshark data exactly like IoT data
 - Drew
 - Order sensor calibration materials and a USB hub
 - Nate
 - Set up SSH on titan and other ubuntu computer
 - Meghan, Hector, Zach
 - See if you can get TinkerCAD to save data
 - .

Adjournment at 7:00

Next meeting will be held on Friday, October 14th at 6:00 pm

CAE Research Project Meeting Minutes

10-14-2022

- Participants
 - Dr. Waleed Farag (PI)
 - Dr. Soundararajan Ezekiel
 - Dr. Xin-Wen Wu
 - Drew Rado
 - Maria Balega
 - Meghan Schlipp
 - Zach Keyser
 - Zaryn Good
 - Hector Linarez
- Meeting started at 6:00 pm
- Unanimously approved minutes for meeting on October 7th, 2022

Main Points:

- Progress report
 - Maria and Zaryn:
 - Met with Meghan and showed her scripts on Titan
 - Sent Drew more information about IoT-23 data
 - Began working on editing KDD paper
 - Drew, Meghan, and Emily:
 - Ordered calibration sensor and working to get all sensors calibrated, USB hub works great
 - Sensors are very sensitive, need to work on issues with sensors disabling
 - Got most of data using Wireshark and need to figure out how to extract it into csv format
 - Nate
 - Something is off with distribution of ubuntu on Titan
 - Hector and Zach
 - Found that data cannot be extracted from TinkerCAD
- Discussion points
 - Dr. Ezekiel mentioned to send a message to Jino about sensors disabling
 - Need to figure out what we should do to protect data, so we don't come to a wrong conclusion
 - Change password to Titan and reset it to restrict access
- Tasks:
 - Maria and Zaryn
 - Once data comes in, verify it, preprocess it if it will work, and start applying algorithms
 - Reach out to Franklin and work on editing KDD paper
 - Drew, Nate, Sky, Emily, and Meghan
 - Continue collecting data and work on extracting it from Wireshark to look exactly like previous IoT data
 - Drew
 - Order backup sensors
 - Hector, Zach
 - Help out with fixing Titan issues and sensor issues

Adjournment at 6:50

Next meeting will be held on Friday, October 21st at 6:00 pm

CAE Research Project Meeting Minutes

10-21-2022

- **Participants**
 - Dr. Waleed Farag (PI)
 - Dr. Xin-Wen Wu
 - Drew Rado
 - Emily Himes
 - Hector Linarez
 - Maria Balega
 - Sky Semone
 - Zach Keyser
 - Zaryn Good
- Meeting started at 6:00 pm
- Unanimously approved minutes for meeting on October 14th, 2022

Main Points:

- **Progress report**
 - Sky updated the code for the Arduino boards and fixed all nodes to a permanent board.
 - Zaryn made progress on the KDD paper and talked to Alicia and Franklin about paper, and will try to get it done for next week
 - Maria worked with Drew and Sky to get Wireshark data. Worked with Meghan to get her up to speed on current work.
 - Drew showed the Wireshark data
 - Drew showed the sample sensor data and mentioned some of the issues with it
 - Also showed the sample Wireshark data.
 - Sky tried getting network data on the Arduino, but it was short of what Wireshark was capable of
 - Instead worked to get sensors working with TB.
 - Started making custom calibration and fixed stalling UART communications
 - Emily reviewed the previous part of the project to make sure our current work will merge with it properly.
 - Nathan and Drew helped fix titan, GNOME settings, RAID storage, and other outstanding issues.
 - Hector and Zach will be working with Sky and Drew to get more tasks for the future.

Discussion points

- Wireshark data
 - Dr. Wu mentioned that the connection state is important and that we should look into it more.
 - Label field should be included for now; all should be benign for now
 - Packet data should be determined and included
 - This should be done by next week
- Anomalous Data
 - We should start thinking about how this will be accomplished
 - Look at original papers and consult with Maria.
 - Manually create anomalies for now

- **Tasks:**
 - Maria and Zaryn
 - Once data comes in, verify it, preprocess it if it will work, and start applying algorithms
 - Show Meghan relevant scripts on Titan, and how the machine learning things work.
 - Drew, Nate, Sky, Emily, Meghan, Hector, Zach
 - Determine the capabilities of Wireshark in collecting network data needed to recreate datasets used in part one of the study.
 - Format the Wireshark data exactly like IoT data
 - Python preprocessing program, perhaps include ways of creating anomalies artificially
 - Drew and Nate
 - Make sure Titan is in good working order once development of sensor code is completed.
 - Emily: research anomalous data, and the IoT datasets.

Adjournment at 6:45

Next meeting will be held on Friday, October 28th at 6:00 pm

CAE Research Project Meeting Minutes

10-28-2022

- **Participants**
 - Dr. Waleed Farag (PI)
 - Dr. Xin-Wen Wu
 - Dr. Ramson
 - Drew Rado
 - Emily Himes
 - Meghan Schlipp
 - Sky Semone
 - Zach Keyser
 - Zaryn Good
- Meeting started at 6:00 pm
- Unanimously approved minutes for meeting on October 21th, 2022

Main Points:

- **Progress report**
 - Drew started exploring Zeek instead of WireShark to make data collection.
 - We are looking into this to get a more accurate dataset
 - Zaryn made progress on his paper and will meet with Meghan next week, they shared reading materials.
 - Nate finished up working with Titan: solved many of the problems. Planned on a full upgrade during winter break while people are using it.
 - Keep Dr. Ezekiel updated while making changes to his computer.
 - Sky worked on isolating issues with data acquisition with gas sensors
 - Increased mean run time from a few hours to over a day.
 - Jino gave advice on checking loops and other structures that could be causing issues.
 - Emily has spent time on organizing the OneDrive and reviewing the content.
 - Meghan looked at the SVM and XGBoost code.
 - Zachary started with learning linux so he can use Titan
 - Hector and Zach will be working with Sky and Drew to get more tasks for the future.

Discussion points

- Using Zeek like they did for the IoT-23 data
 - Right now there is issues with the install.
 - Once installed, replicate the data required.
 - Dr. Ramson mentioned how TCP works, and that we should take a better look at how the Arduino data transmission corresponds to the WireShark data.
 - Possibly work on decryption
 - After capturing the data, makes sure the data makes sense.
- Injection of attacks
- Contact Dr. Ezekiel if you have issues. Try to utilize collaboration as we are a big team.
 - Contact professors when you have an issue.
- Jino and Dr. Ezekiel asked about the status of data collection
 - We have been collecting data with the sensors
 - Drew showed network data: 200,000 packets from 1 device.

- **Tasks:**
 - Maria and Zaryn
 - Once data comes in, verify it, preprocess it if it will work, and start applying algorithms
 - Show Meghan relevant scripts on Titan, and how the machine learning things work.
 - Drew, Nate, Sky, Emily, Meghan, Hector, Zach
 - Utilize Zeek and Wireshark for data acquisition
 - Report all interim problems to team leads so we can resolve outstanding issues.
 - Update the current data collection file and give it to Maria for testing.
 - Emily: research anomalous data, and the IoT datasets.

Adjournment at 6:55

Next meeting will be held on Friday, November 5th at 6:00 pm

CAE Research Project Meeting Minutes

11-04-2022

- **Participants**
 - Dr. Waleed Farag (PI)
 - Dr. Xin-Wen Wu
 - Drew Rado
 - Emily Himes
 - Hector Linarez
 - Meghan Schilpp
 - Maria Balega
 - Sky Semone
 - Zach Keyser
- Meeting started at 6:00 pm
- Unanimously approved minutes for meeting on October 28th, 2022

Main Points:

- **Progress report**
 - Zaryn finished paper, but needs to update Dr. Wu on this progress.
 - Drew found that using Wireshark is great for capturing data, and then using Zeek to process the data to be exactly like the IoT-23 data.
 - Needs to filter out the IoT boards from his personal network data, since it's running on his network.
 - Current dataset about 150 lines of captured network data.
 - Sky worked on Arduinos: Fixed problems with the boards bricking up, but there are still issues with data calibration returning.
 - Made python scripts for formatting/importing data.
 - Hector was working on Arduinos with Sky and started looking into data visualization and reviews the Part One ML algorithms.
 - Zach was helping Sky with Arduinos
 - Meghan looked to ML scripts used in the previous part.
 - Emily did an overhaul of the OneDrive and organized lots of the important documents that people on the team should read.

Discussion points

- Now that Drew is collecting data, focus on running the collected data through the Part-One algorithms.
 - Arduinos are now more stable and able to be reset remotely, so we no longer have to manually reset them in Room 305
 - Dr. Wu mentioned that we should document our preprocessing steps for future use
 - Make sure its on the OneDrive
 - Emily was working on documentation so, review documents there
- **Tasks:**
 - Drew/Nathan
 - Work on Zeek
 - Find ways to inject anomalies
 - Sky
 - Look into python data visualization tools
 - Think about ways to inject anomalies

- Meghan
 - Continue learning about SVM/DCNN and other ML processes
 - Use these for the new Zeek dataset.
- Emily
 - Continue working on the OneDrive
 - Learn ML procedures from part 1
- Maria/Zaryn
 - Start working with the new data (small dataset for now)
 - Update Meghan
- Drew/Hector
 - Look into how to create anomalies in Arduino network data

Adjournment at 6:35

Next meeting will be held on Friday, November 11th at 6:00 pm

CAE Research Project Meeting Minutes

11-11-2022

- **Participants**
 - Dr. Waleed Farag (PI)
 - Dr. Xin-Wen Wu
 - Drew Rado
 - Emily Himes
 - Hector Linarez
 - Meghan Schilpp
 - Maria Balega
 - Sky Semone
 - Zach Keyser
 - Zaryn Good
- Meeting started at 6:00 pm
- Unanimously approved minutes for meeting on November 4th, 2022

Main Points:

- **Progress report**
 - Drew took 5 hours of data collection which resulted in 2300 lines of data. It was preprocessed removing his personal devices
 - Make sure number of data is correct
 - Are IP addresses correct
 - Nate has no updates
 - Sky mentioned that “hacking” the board is not recommended with the current configuration on IUP’s wifi. Worked on getting the new data to run with the XGBoost scripts from part one.
 - Meghan was meeting with Sky and Maria as they figured out XGBoost modifications.
 - Emily was working on OneDrive and reviewing documents for future presentations and reports.
 - Maria got the data to run on XGBoost, submitted paper.
 - Zaryn worked on paper, met with Maria and others for ML advice. Sent completed draft to Dr. Wu.
 - Zach and Hector met with Sky and determined that it was not safe to hack Arduino devices. Started researching synthetic data creation and the types of anomalies from the IoT-23 dataset.

Discussion points

- Primary focus was to get larger more representative dataset.
- Dr Ezekiel mentioned the following suggestions regarding creating the anomalous data and ML training:
 - Using VAE
 - Use a synthetic dataset
 - Train the model with our data
 - If the result it still bad, change parameters
- Dr. Farag and Dr. Ezekiel mentioned to Sky that this new dataset should be used on its own, and not with other datasets like the IoT23 set.
- Continue documentation, writing down procedures for how tasks are accomplished.

- **Tasks:**
 - Zaryn
 - Work with Dr. Wu on paper. Once data is present, run data through DCNNs
 - Sky
 - Meet with Dr. Ezekiel to make sure data collection methods are valid.
 - Process/generate synthetic data for the “anomalous” cases.
 - Hector/Zach
 - Work with Sky to create synthetic data and review data-viz tools in Python.
 - How will anomalous data work?
 - Drew
 - Collect more data and verify the IP addresses are correct. Review the pcap files.
 - Contribute to documentation efforts
 - Sky
 - Think about ways to inject anomalies, make sure data viz and processing tools are ready.
 - Meghan
 - Continue learning about SVM/DCNN and other ML processes with Maria and Zayrn
 - Use these for the new Zeek dataset.
 - Emily
 - Review OneDrive materials
 - Work on documentation
 - Maria/Zaryn
 - Start working with the new data (small dataset for now)
 - Update Meghan on procedures

Adjournment at 6:35

Next meeting will be held on Friday, November 11th at 6:00 pm

CAE Research Project Meeting Minutes

11-18-2022

- **Participants**
 - Dr. Xin-Wen Wu
 - Dr. S. Ezekiel
 - Drew Rado
 - Emily Himes
 - Hector Linarez
 - Maria Balega
 - Sky Semone
 - Zaryn Good
- Meeting started at 6:00 pm
- Unanimously approved minutes for meeting on November 11th, 2022

Main Points:

- **Progress report**
 - Drew and others created an isolated network at IUP to optimize data collection without the interference of other data.
 - 19 hour data capture: 3 million lines of data, 2900 lines after post processing
 - MQTT responses need to be filtered correctly to get several hundred thousand lines.
 - Drew also worked on re-creating the malicious data generation from the original IoT-23 dataset. This involves having a malicious raspberry pi, with a bot-net on the same network.
 - Drew solved the issue of filtering IP addresses by the isolated network.
 - Drew took 5 hours of data collection which resulted in 2300 lines of data. It was preprocessed removing his personal devices
 - Make sure number of data is correct
 - Are IP addresses correct
 - Sky helped Drew accomplish the above, and also started configuring all other devices with code that will simulate IoT devices.
 - Researched other protocols with Arduino/raspberry pi/ server configuration.
 - Maria ran last weeks data and got the predicted 100% result, now she is waiting for the new data.
 - Emily was working on Documentation with Drew.
 - Zaryn is waiting on the datasets, he helped Maria.

Discussion points

- Primary focus is getting complete new dataset.
- Using the IoT23 data as a baseline for this next step of research
 - Drew is creating a botnet, inspired by the methods of this dataset.
 - Maria mentioned that about 90% of the data was malicious, horizontal port scan with d-dos were the most common types of attacks.
 - Dr. Wu mentioned that we may need to create a multiclass dataset with several types of attacks.
- Dr. Ezekiel met with Sky and Drew to give his input on the status of the research
 - Drew presented these changes

- Focus on gathering data in a way similar to the studies under investigation in the first part.
 - Dr. Wu mentioned that an index for our research progress would be nice to make things easier to access.
- **Tasks:**
 - Zaryn/Maria
 - Once data is present, run data through DCNNs
 - Help Sky, Drew, etc with interpreting this new data.
 - Sky/Drew
 - Collect new data and make sure it is comparable to the IoT-23 / part-one datasets
 - Emily
 - Review OneDrive materials
 - Work on documentation
 - Zach/Hector can help out Sky and Drew

Adjournment at 6:35

Next meeting will be held on Friday, November 25th at 6:00 pm

CAE Research Project Meeting Minutes

11-25-2022

- **Participants**
 - Dr. Farag (PI)
 - Dr. S. Ezekiel
 - Dr. Wu
 - Drew Rado
 - Emily Himes
 - Hector Linarez
 - Sky Semone
 - Zach Keyser
- Meeting started at 6:00 pm
- Unanimously approved minutes for meeting on November 18th, 2022

Main Points:

- **Progress report**
 - Drew fixed the small number of data by using advanced flags for Zeek processing the PCAP data.
 - Made another data collection sample.
 - Explored alternative “log” files with Sky, determined that maximizing UDP protocols is a good idea.
 - Sky created a UDP version of the sensor acquisition code
 - Also made a code so that enables Arduinos to talk to each other (instead of the main server)
 - Drew and Emily worked on documentation
- **Discussion points**
 - Dr. Wu mentioned that paper with Zaryn needs revisions
 - Dr. Ezekiel was unable to contact Alicia on her previous writing progress: This work should be continued by another student if possible.
 - Zach and Hector will continue to assist as needed
- **Tasks:**
 - Zaryn/Maria
 - Once data is present, run data through DCNNs
 - Help Sky, Drew, etc with interpreting this new data.
 - Sky/Drew
 - Collect new data and make sure it is comparable to the IoT-23 / part-one datasets.
 - Work on “malicious” type data.
 - Emily
 - Review OneDrive materials
 - Work on documentation while new research is being completed
 - Zach/Hector can help out Sky and Drew

Adjournment at 6:35

Next meeting will be held on Friday, December 2nd at 6:00 pm

CAE Research Project Meeting Minutes

12-2-2022

- **Participants**
 - Dr. Farag (PI)
 - Dr. S. Ezekiel
 - Dr. Wu
 - Drew Rado
 - Emily Himes
 - Hector Linarez
 - Maria Balega
 - Sky Semone
 - Zach Keyser
 - Zaryn Good
- Meeting started at 6:00 pm
- Unanimously approved minutes for meeting on November 25th, 2022

Main Points:

- **Progress report**
 - Drew and Sky modified all of the sensors to use UDP, with a listening device acting like a data collection server.
 - Was able to make this as we talked about in the previous meeting
 - Currently running data collection.
 - Predicted that we will have 100,000's of lines of data collected over the weekend
 - Maria has been working on her paper, and has also been working with Alicia to finish up that work
 - Reported that Alicia should be done with the paper soon, and has been running her code for verification
 - Zaryn helped Maria with writing.
 - Emily has distilled the meeting minutes into a comprehensible document that can be used to explain our data.
 - Hector researched how to capture network data
 - Zach researched other programs that can be used for network data
- **Discussion points**
 - Dr. Farag mentioned that there were 4 classifications for IoT23 data, and that it would be great to have the malicious data contained in our final dataset.
 - Dr. Wu found a few journals/conferences that might be relevant to our research
 - IEEE infoCon
 - International Journal of Comp Sci...
 - Dr. Farag reminded that we should expand our documentation on the IoT testbed including examples of everything, photos, etc.
- **Tasks:**
 - Sky and Drew will work on malicious data
 - Zaryn should finish up writing paper with Dr. Wu, incorporating the changes he requested.
 - Maria should keep in contact with Alicia and get ready for ML data.
 - Emily should continue working with Drew on documentation.
 - Hector and Zach should continue looking into gathering network data and helping out as needed

Adjournment at 6:35

Next meeting will be held on Friday, December 9th at 6:00 pm

CAE Research Project Meeting Minutes

12-9-2022

- Participants
 - Dr. Farag (PI)
 - Dr. S. Ezekiel
 - Dr. Wu
 - Drew Rado
 - Emily Himes
 - Maria Balega
 - Zach Keyser
 - Zaryn Good
- Meeting started at 6:00 pm
- Unanimously approved minutes for meeting on December 2, 2022

Main Points:

- **Progress report**
 - Drew presented the data7.pcap file, which contained a day's worth of data collection.
 - He has started collecting malicious data and has been able to collect around 1050 packets per hour
 - Maria worked on finalizing her paper, and reached out to Alecia for a follow-up on her paper
 - Alecia was rerunning the program due to an error with a missed parameter
 - Dr. Ezekiel will reach out to Alecia for a follow-up
 - Emily met up with Drew to discuss documentation
 - Dr. Farag will be in touch to give format requirements/templates
 - Zach researched bot nets for Drew
 - Zaryn worked on revising his paper, and plans to turn it in no later than Sunday the 11th at noon.
- **Discussion points**
 - Drew was planning to filter malicious data from benign by IP address
 - Dr. Ezekiel suggested plotting two columns of data in Excel to visualize the data and calculate mean, standard deviation, and variance
 - Adding more sensors and/or decreasing the buffer time will produce more data
 - Can double the data that's collected if the server sends back a response
 - Maria confirmed that the IoT23 dataset collected data sent to and from the server
 - Dr. Ezekiel suggests decreasing buffer time to a fraction (1/4) of a second
 - Student access to Stright during winter break:
 - Dr. Farag has sent a request to the dean, who is aware that students will be using Stright over the break
 - Dean suggests bringing own heater and ensuring that it is shut off upon leaving the building
 - During weekdays of next week, the building should be unlocked, otherwise Dr. Farag and Dr. Ezekiel will be around to unlock the building if need be
 - Discussed new date and time for next meeting (see below)
- **Tasks:**
 - Drew: Send data to Maria and Zaryn for processing, document what's being worked on, and discuss what's to be done next with Zaryn and Maria
 - Maria: Preprocess the data
 - Zaryn: Finish up paper, submit to Dr. Wu
 - Zach: Continue helping out as needed
 - Emily: Continue with documentation, organizing OneDrive

Adjournment at 6:30

Next meeting will be held on Thursday, December 15th at 2:00 pm

CAE Research Project Meeting Minutes

12-15-2022

- Participants
 - Dr. Farag (PI)
 - Dr. S. Ezekiel
 - Dr. Wu
 - Drew Rado
 - Emily Himes
 - Maria Balega
 - Zach Keyser
- Meeting started at 2:00 pm
- Unanimously approved minutes for meeting on December 9, 2022

Main Points:

- **Progress report**
 - Drew has been able to collect more data after he and Sky lowered the buffer time as mentioned last meeting; however, not as much malicious data has been collected as hoped
 - Drew believes this is due to the botnet being too sophisticated to be detected, and is currently looking for a new one via Build Your Own Botnet and Malware Zoo, two GitHub repositories
 - Sky helped with malware research in addition to helping lower the buffer time
 - Zach also researched new malware
 - Maria has preprocessed some benign data and is waiting for more malicious data. Has also gotten more information from Alecia regarding the paper she's working on.
- **Discussion points**
 - Dr. Wu has received Zaryn's paper; however, some work needs to be done to its formatting before it can be submitted
 - Maria will help with this, and Dr. Wu will be emailing Maria with detailed instructions
 - Drew believes that the best course of action will be to create our own botnet
 - The testbed has been moved to Drew's house
 - Drew opened multiple ports on the host computer, which allows much more data to be collected
 - Photos of testbed should be added to documentation
 - Will move meeting times to 3:00 pm instead of 2:00 pm
- **Tasks:**
 - Drew, Sky, Zach: Research and select a method of malware injection that produces more malicious data than the one currently in place
 - Maria: continue the work with Zaryn's paper and preprocess/process data as it is received from Drew.
 - Emily: continue working on documentation

Adjournment at 6:30

Next meeting will be held on Thursday, December 22nd at 3:00 pm

CAE Research Project Meeting Minutes

12-22-2022

- Participants
 - Dr. Farag (PI)
 - Dr. S. Ezekiel
 - Dr. Wu
 - Drew Rado
 - Emily Himes
 - Maria Balega
 - Sky Semone
 - Zaryn Good
- Meeting started at 3:00 pm
- Unanimously approved minutes for meeting on December 15th, 2022

Main Points:

- **Progress report**
 - Drew got BYOB web-gui working and did a live demonstration.
 - Drew's latest dataset had 350,000 data points and is collecting more
 - He is working on collecting more malicious data
 - Dr. Farag mentioned that we should have a balanced dataset with equal parts malicious/benign this means we either need to collect more benign, or cut down the malicious data.(binary 1million/1million data split)
 - Sky is back after missing the last two meetings.
 - Helped Drew with updating the Arduino code for the last few weeks.
 - Zaryn is back from vacation, talked to maria about the paper.
 - Maria was working on the paper writeup
 - Emily was working on documentation
 - Dr. Farag said to make sure all of our content is on the OneDrive, since Emily is doing a great job at organizing/improving it.
- **Discussion points**
 - Data visualization: Dr. Ezekiel that data visualization and statistical analysis are important for the final report.
 - Dr. Farag said that data visualization will be an important part of the study and this should be explored while data collection is going on.
 - Dr. Wu is currently reviewing the paper and said that current changes look much better
 - He has some other minor changes that will make the final version of the paper much better.
 - Update on TON IoT dataset paper: Dr. Ezekiel has had no communication with Alicia, but she sent some material to Maria.
 - If she does not respond, it should be assigned to someone else
 - **Meeting time updates!**
 - Next meeting: Thursday the 5th at 2PM.
 - The following meeting will be Wednesday 11th during the common hours.
 - Remember to put in hours on eTime for the next week since there will be no meeting.
- **Tasks:**
 - Drew: continue collecting malicious data
 - Sky: finish up python malicious data code and help Drew implement it
 - Work on stats/data viz codes if time permits
 - Zaryn and Maria: work on paper
 - Emily: continue working on documentation and OneDrive organization.
 - Adjournment at 3:35

Next meeting will be held on Thursday, Jan 5th at 2:00 pm

CAE Research Project Meeting Minutes

1-5-2023

- Participants
 - Dr. Farag (PI)
 - Dr. S. Ezekiel
 - Dr. Wu
 - Drew Rado
 - Emily Himes
 - Maria Balega
 - Sky Semone
 - Zaryn Good
- Meeting started at 2:00 pm
- Unanimously approved minutes for meeting on December 22th, 2022

Main Points:

- **Progress report**
 - Maria run the 2-malicious+benign dataset and got 99.25 classification accuracy for SVM and the XGBoost had 99.84.
 - Maria also worked on paper.
 - Zaryn is converting new data for processing in DCNN in Matlab.
 - Drew's update:
 - Worked on collecting data most of the break
 - Also has 4 pages of content for the paper.
 - Bot attack script did not work and its questionable whether any more powerful script would mess with IUP's network
 - Sky presented frequency data showing that while our dataset has lots of repeated data, so does the original IoT23 dataset.
- **Discussion points**
 - Dr. Ezekiel noted that the ML results from Maria are unusually high accuracy for the SVM. We should look into who this is... it was in the 80-percentile for the iot-23 dataset.
 - Drew wondered if the two classifications of malicious data was enough since the botnet attack is not looking promising.
 - Simple dataset:
 - Drew suggested adding actual sensors
 - He will try connecting some personal devices to see how they influence data
 - Dr. Farag and Ezekiel mentioned that we do not have much time to make these changes, but if it works it should be included
 - Documentation:
 - Emily and Drew have been working on it
 - Others should join in data visualization
- **Tasks:**
 - Drew: continue collecting malicious data and investigate connecting other devices
 - Sky: Help Drew if needed and analyze new data, Work on stats/data viz codes if time permits
 - Zaryn and Maria: work on paper, run new data once Drew gets it.
 - Emily: continue working on documentation and OneDrive organization.
 - Adjournment at 2:40

Next meeting will be held on Thursday, Jan 11th at 11:10AM

CAE Research Project Meeting Minutes

1-11-2023

- Participants
 - Dr. Farag (PI)
 - Dr. S. Ezekiel
 - Dr. Wu
 - Drew Rado
 - Emily Himes
 - Sky Semone
 - Zaryn Good
- Meeting started at 11:10 AM
- Unanimously approved minutes for meeting on January 5th, 2022

Main Points:

- **Progress report**
 - Drew set up an IP web-camera as an additional sensor in our IoT system. Data collection went well, but noted that there was a period of time with a large amount of data points.
 - This should be investigated for next week before we use this data
 - 1400 data points per hour from the camera
 - Sky worked on stats and data viz python code for new plots
 - Maria worked on formatting the paper
 - Zaryn trained a DCNN and saw very high results, over 99% for all possible trainings
 - This verifies that we need to diversify the dataset.
 - Emily continued working with Drew to collect and organize results and other documents.
- **Discussion points**
 - Dr. Ezekiel mentioned that he wanted to see a time-dependent version of the data, like Sky plotted last time.
 - Dr. Farag reminded that we should all be keeping documenting our progress as we go, as this will be very useful for the papers in progress.
 - Dr. Wu asked if we plan to have a description of our sensors and our experimental setup? Details should include...
 - Hardware
 - What the dataset consists of
 - Pictures and charts of everything
 - Drew mentioned that he could make wiring diagrams for our Arduino sensor boards.
- **Tasks:**
 - Drew: continue collecting malicious data
 - Sky: help Drew collect data and analyze data once its collected
 - Zaryn and Maria: work on paper,
 - Emily: continue working on documentation and OneDrive organization.

Adjournment at 11:45 AM. Next meeting will be held on Thursday, Jan 18th at 11:10 AM

CAE Research Project Meeting Minutes

1-18-2023

- Participants
 - Dr. Farag (PI)
 - Dr. S. Ezekiel
 - Dr. Wu
 - Drew Rado
 - Emily Himes
 - Maria Balega
 - Sky Semone
- Meeting started at 11:10 pm
- Unanimously approved minutes for meeting on January 11th, 2022

Main Points:

- **Progress report**
 - Zaryn was not present but reported to Maria that he ran the DCNN and made a few graphs.
 - Maria was meeting with Dr. Ezekiel and Alicia with TON paper.
 - Also working on the sensor paper
 - Sky finalized data visualization scripts and uploaded to OneDrive.
 - This consists of “nicer” versions of all plots presented over Zoom.
 - Helped Drew with data acquisition
 - Drew a sample of data with the sensors and cameras that generated 20k likes of data.
 - The diversity of the sample data set has improved
 - Much of the camera traffic was DNS requests, which are not counted.
 - We will need roughly 5 days of continuous data collection to re-generate our 100k of benign data, as well as more time for the malicious.
 - Drew updated visuals in the paper he is writing and continued writing
 - Emily continued documentation
- **Discussion points**
 - ***Note there is a new Zoom link.***
 - This project should be finished up in February.
 - All students watch out for correspondence from Emily on documentation.
- **Tasks:**
 - Drew: continue collecting data with the camera updates. Finish up the paper (expected with weekend)
 - Sky: help Drew with new data if needed.
 - Zaryn and Maria: continue working on paper and be on hold for new data expected this week.
 - Emily: continue working on documentation and OneDrive organization.
 - Adjournment at 11:50 AM

Next meeting will be held on Thursday, Jan 25th at 11:10 AM

CAE Research Project Meeting Minutes

1-25-2023

- Participants
 - Dr. Farag (PI)
 - Dr. S. Ezekiel
 - Dr. Wu
 - Drew Rado
 - Zach Keyser
 - Emily Himes
 - Hector Linarez
 - Maria Balega
 - Sky Semone
 - Zaryn Good
- Meeting started at 11:10 AM
- Unanimously approved minutes for meeting on January 18th, 2022

Main Points:

- **Progress report**
 - Zaryn updated the DCNN plots for the different splits of data (60/40,70/30,80/20)
 - Drew ordered new sensors which arrived later in the week.
 - Started data collection using these new sensors.
 - Resolved many of the issues with data collection that have slowed down progress.
 - Sky started working on network connectivity plots that Drew requested.
 - Also helped Drew with data collection.
 - Looked over Maria code on Zelda, noticed that Maria's results might be
 - Maria ran SVM/XGBoost with new benign and old malicious data.
 - 66% XGBoost and 96% SVM
 - Also worked on paper with Maria and Alicia.
 - Emily continued working on documentation.
- **Discussion points**
 - Dr. Ezekiel wanted us to clean up 305 and make sure that everything is organized.
 - Store 3d printer somewhere and see if computers on the floor work or not
 - Make sure all computers are labelled and working
 - We need to make sure all documentation and a complete description of the testbed are being finalized soon.
 - Come up with abstracts for the upcoming spring presentations for the next week.
- **Tasks:**
 - Drew: re-run lateral port capture with new hardware. Update network hierarchy diagrams.
 - Sky: help Drew collect data and analyze data once its collected. Finish Drew's connectivity graphs.
 - Zaryn and Maria: wait for new data and run results.
 - Emily: try to get sensor and testbed doc and complete description out by next meeting. Meet with Drew for updated network charts, etc.
 - Hector and Zach: help Emily with testbed documentation and organize 305.

Adjournment at 11:45 AM. Next meeting will be held on Thursday, Feb 1st at 11:10 AM

CAE Research Project Meeting Minutes

2-1-2023

- Participants
 - Dr. Farag (PI)
 - Dr. S. Ezekiel
 - Dr. Wu
 - Drew Rado
 - Zach Keyser
 - Emily Himes
 - Hector Linarez
 - Maria Balega
 - Sky Semone
 - Zaryn Good
- Meeting started at 11:10 AM
- Unanimously approved minutes for meeting on January 25th, 2022

Main Points:

- **Progress report**
 - Drew and Sky have collected 80,000 lines of benign data and all malicious data.
 - RAM on data collection computer was upgraded so it no longer crashes (this problem caused us several days of data to be lost.)
 - Restarted data collection to get remaining data.
 - Sky worked on data visualization.
 - Zaryn helped Maria with graphs.
 - Maria has been working on revising paper with Dr. Wu.
 - Emily has been working on documentation and shared a work log for the team to use to describe what they did between meetings.
 - Hector: Organized 305, worked on publication list with Maria.
 - Zach: helped Emily with diagrams and also organized 305.
- **Discussion points**
 - Once data collection is over, make sure cables in room 305 are arranged so people don't trip on it.
 - While Emily is working on documentation, include recent work and figures in the "Shared IoT Work Log" that Emily shared in Teams.
 - Dr. Ezekiel reminded us that we must account for all hardware by the end of the
- **Tasks:**
 - Drew: continue with benign data collection, try to get it completed by Friday.
 - Sky: help Drew collect data and analyze data once its collected. Finish Drew's connectivity graphs.
 - Zach and Sky can work together to make diagrams for how the whole IoT 33 Arduino nodes are configured.
 - Drew and Sky should be compiling documentation.
 - Zaryn and Maria: run results with existing data and wait for new data and run results.
 - Emily: try to get sensor and testbed doc and complete description out by next meeting. Meet with Drew for updated network charts, etc.
 - Hector: include more details in the publication spreadsheet.

Adjournment at 11:50 AM. Next meeting will be held on Thursday, Feb 8th at 11:10 AM

CAE Research Project Meeting Minutes

2-8-2023

- Participants
 - Dr. Farag (PI)
 - Dr. Wu
 - Drew Rado
 - Zach Keyser
 - Emily Himes
 - Maria Balega
 - Sky Semone
 - Zaryn Good
- Meeting started at 11:10 AM
- Unanimously approved minutes for meeting on Feb 1, 2023.

Main Points:

- **Progress report**
 - Drew finish data collection and shared it with everyone.
 - Shared paper with Sky for review
 - Started cleaning 305.
 - Did research on PCs that can benefit the project.
 - Sky worked on data visualization and investigated stats on the new data.
 - Started helping Drew on the final write-up.
 - Maria presented results for XGBoost (99.98%) and SVM (94.6%). Also continued work on the paper.
 - Zaryn finished image conversion and presented AlexNet testing accuracy for the different train/test splits. Also helped Maria.
 - Emily uploaded version 2 of documentation.
 - Zach: made updated schematic diagrams
- **Discussion points**
 - Clean up 305 and finish organizing the testbed so it can be used easily in the future.
 - We should emphasize in the write-up that we have built a test-bed and dataset that is comparable to the IoT23 dataset in many ways.
 - Discussing why we did this and what the benefits are/ what we gained in the process is very essential to good writing.
 - Discuss why DCNN is so much slower for training and compare the time results of all of our methods.
- **Tasks:**
 - Drew: work on the visuals and diagrams for the final write-up
 - Sky: finish up data viz with new data, read over Drew's paper
 - Zaryn: continue training DCNNs, helping with write-ups as needed.
 - Maria: work on writeup
 - Emily: continue work on documentation.
 - Zach: finalize schematics with help from Drew and Sky.

Adjournment at 12:00. Next meeting will be held on Thursday, Feb 15th at 11:10 AM

CAE Research Project Meeting Minutes

2-15-2023

- Participants
 - Dr. Farag (PI)
 - Dr. Wu
 - Dr. Ezekiel
 - Drew Rado
 - Zach Keyser
 - Emily Himes
 - Zaryn Good
- Meeting started at 11:10 AM
- Unanimously approved minutes for meeting on Feb 8, 2023.

Main Points:

- **Progress report**
 - Drew made progress with cleaning 305, continued working on his paper, and is researching updating OptiPlexes to more mainstream devices
 - Currently looking for related works to include in paper
 - Sky and Drew created conn plots for benign and malicious data
 - Maria sent results as Excel file to Teams
 - Zaryn met with Maria to work on paper, and is running dataset through DCNNs
 - Zach has continued working on sensor diagrams for the testbed and has helped Hector with his Excel sheet of journals
 - Hector has been working on his Excel sheet and has helped Zach with his diagrams
 - Dr. Wu discussed getting results into the paper with Maria
 - Emily has continued with documentation and will continue to get results and graphics from other team members
- **Discussion points**
 - Drew and Sky will be investigating the sensors' code
 - Previously, the issue was that one sensor stopped after a few days, but it was discovered that eventually all sensors stop after a about a week of data collection
 - Maria found that SVM results were hardly changing between different testing/training splits
 - Dr. Ezekiel suggests that if the results are not changing that something is wrong, and that they should be run at a 50/50 split to see if the pattern continues
 - Zaryn would like to return to AlexNet and ResNet
 - ResNet is performing worse than expected at around 70% and AlexNet is running much better than expected at around 90%
 - VGG-16, VGG-19, and GoogLeNet are running as expected
 - MATLAB can allow multiple GPUs for better performance--this can be looked into
 - Zach demonstrated his diagram for one of the sensors, Drew confirmed that it reflects what's in the testbed
- **Tasks:**
 - Drew: continue work in 305 and with paper, explain layout of 305 to Zach and Emily for diagramming, and come up with budget for replacing OptiPlexes
 - Drew and Sky: continue investigating code, visualization, paper
 - Zaryn: continue investigating those two DCNN architectures and help Maria with paper as needed
 - Maria: continue work on writeup
 - Emily: continue work on documentation and take picture of 305 set up for doc

- Zach: continue work with diagrams, upload diagrams to OneDrive, help Hector with Excel
- Hector: continue work with Journal Excel workbook
- Zach and Emily: create diagram of 305 for documentation based on Drew's explanation

Adjournment at 12:00. Next meeting will be held on Thursday, Feb 22nd at 11:10 AM

CAE Research Project Meeting Minutes

2-22-2023

- Participants
 - Dr. Ezekiel
 - Dr. Wu
 - Drew Rado
 - Zach Keyser
 - Emily Himes
 - Maria Balega
 - Sky Semone
 - Zaryn Good
- Meeting started at 11:10 AM
- Unanimously approved minutes for meeting on Feb 15, 2023.

Main Points:

- **Progress report**
 - Drew ordered computer parts and recollected DDOS data.
 - Sky reconfigured sensors to reset when a transmission error occurs (these have been stalling data collection over long periods of time)
 - Made new data analysis tools to address the strange SVM/XGBoost results.
 - Started helping Drew on the final write-up.
 - Helped Maria and Zaryn to diagnose problems with ML results.
 - Zaryn modified weights and biases on DCNN models and saw a significant improvement in results. Trained most DCNNs for previous dataset.
 - Maria: determined computation time of algorithms for paper and verified data for XGBoost/SVM
 - Emily: made a floorplan of Room 305, continued with documentation.
 - Zach: worked on floorplan diagram.
- **Discussion points**
 - Dr. Farag wanted a poster for each 1.) Drew and 2.) Zaryn/Maria's paper.
 - Drew needs clarification on the scope of his poster so it does not overlap content with Maria and Zaryn.
 - Friday March 3rd is the deadline for the Scholars Forum. It takes place on April 5th.
 - Ask for help with these if needed and remember to focus on visuals.
 - Make sure room 305 stays clean as people tour our facilities.
- **Tasks:**
 - Drew: analyze data and send it out to everyone, continue working on paper
 - Sky: finish up data viz with new data, continue reading over Drew's paper
 - Zaryn: continue training DCNNs with new upcoming data, helping with write-ups as needed.
 - Maria: work on paper and continue training XGBoost/SVM as new data comes.
 - Emily: continue work on documentation.
 - Zach: finalize schematics with help from Drew and Sky.

Adjournment at 11:45. Next meeting will be held on Wednesday, March 1st at 11:10 AM

CAE Research Project Meeting Minutes

3-01-2023

- Participants
 - Dr. Ezekiel
 - Dr. Wu
 - Zach Keyser
 - Emily Himes
 - Maria Balega
 - Sky Semone
 - Hector L.
- Meeting started at 11:45 AM
- Unanimously approved minutes for meeting on Feb 22, 2023.

Main Points:

- **Progress report**
 - Drew wrote a second version of the IoT paper and reconfigured the Room 305 network for data collection.
 - Started building new computer in 305.
 - Also recollected DDoS data to include multiple ports in the attack and gave data to Maria.
 - Sky ran stats on the new data and found that only 2 ports were being included in the final dataset
 - Helped Drew with data collection and the contributed to his paper write up.
 - Improved stats scripts and created visuals that are on OneDrive.
 - Showed that Arduino code updates helped restart issues for the sensors.
 - Zaryn continued running DCNN and contributing to paper.
 - Maria: updated the paper with Dr. Wu (paper is almost ready) and showed that new DDoS dataset has similar outcome to the last one.
 - Emily: continuing documentation.
 - Hector and Zach: helped Drew in 305.
- **Discussion points/Comments**
 - Room 305 looks much better and the new computer Drew assembled looks good.
 - Last Saturday, students met with Dr. Ezekiel and Jino to determine how the research should progress.
 - Reminder that the scholar's forum submission is due on Friday.
 - We should all meet with each other so we are familiarized with how other parts of the
- **Tasks:**
 - Drew: submit scholars forum abstract by Friday (focusing on IoT testbed, with Dr. Ezekiel advising.) Update Dr. Wu on report.
 - Maria: take the lead on the Scholars Forum poster and collaborate with Zaryn (3-dataset paper). Work on paper and continue training XGBoost/SVM as new data comes.
 - Zach and Hector: Meet with Dr. Ezekiel and learn more about the data collection process.
 - Sky: finish up data viz with new data, continue reading over Drew's paper.
 - Zaryn: continue training DCNNs with new upcoming data, helping with write-ups as needed.
 - Emily: continue work on documentation.

Adjournment at 11:45. Next meeting will be held on Wednesday, March 1st at 11:10 AM

CAE Research Project Meeting Minutes

3-08-2023

- Participants
 - Dr. Ezekiel
 - Dr. Wu
 - Zach Keyser
 - Maria Balega
 - Sky Semone
 - Emily
 - Hector
- Meeting started at 11:15 AM
- Unanimously approved minutes for meeting on Mar 1, 2023.

Main Points:

- **Progress report**
 - Maria: started the scholars forum poster. Proofread paper.
 - Drew worked on publication draft and poster. Set up new computer and explored ways of making the network more complex with Sky.
 - Focus creating smaller attacks, like the IoT 23 dataset.
 - Changing various parameters of the attacks will provide more variability.
 - Sky proofread Drew's paper and shared plotting code with Emily.
 - Spent time looking into the diversity within various IoT-23 collections compared to the combined dataset.
 - Zaryn: has no updates.
 - Emily: working on documentation and data viz with Sky.
- **Discussion points/Comments**
 - After the meeting, everyone should be aware of how our data collection is done, and how they can help.
 - Drew gave a summary of how our data is collected and preprocessed for the ML algorithms.
 - The new IoT23 computer is done but still needs computer applications on it.
 - In the meeting, we unanimously agreed that the next meeting should be on March 22nd.
- **Tasks:**
 - Drew: continue on data collection research, working on Scholars forum poster.
 - Maria: Work on paper and continue training XGBoost/SVM as new data comes.
 - Zach and Hector: Helping Drew with assigned tasks.
 - Sky: finish up data viz with new data, continue reading over Drew's paper and explore the proposed methods for data collection.
 - Zaryn: should finish up DCNN results for Dr. Wu.
 - Emily: continue work on documentation and looking at Sky's python code.

Adjournment at 11:45. Next meeting will be tentatively held on Wednesday, March 22nd at 11:10 AM

CAE Research Project Meeting Minutes

3-22-2023

- Participants
 - Dr. Farag
 - Dr. Ezekiel
 - Zach Keyser
 - Maria Balega
 - Drew Rado
 - Zaryn Good
 - Emily Himes
 - Hector Linarez
 - Sky Semone
 - Kurtis Johnson
 - Bryce Salyers
 - Samuel Rocco
- Meeting started at 11:15 AM
- Unanimously approved minutes for meeting on Mar 8, 2023.

Main Points:

- **Progress report**
 - Maria: working on the Scholar's Forum poster and finalizing IEEE Access paper.
 - Drew: working on revising paper with Skys revisions.
 - Modified DDoS data, issues with randomization to attack ports.
 - Going to modify the router to multiple subnets to create more diversity.
 - Sky: worked on revising Drew's paper and helping with poster.
 - Zaryn: sent DCNN results to Maria and sent information to Drew.
 - Emily: met with Sky about data visualization and working on GenCyber.
 - Zach: worked with Drew to learn about data collection.
 - Hector: working on updating excel sheet of potential journals.
- **Discussion points/Comments**
 - Report progress before meetings and push forward to finalize this project.
 - Goal to finish project before finals week.
 - Students graduating need to hand over their work to new students who will take over.
 - IUP Scholar's Forum poster due Friday.
- **Tasks:**
 - Drew: continue working on data collection, work on Scholar's Forum poster, and revising paper.
 - Maria: Work to finalize paper and send to Dr. Wu, help with poster, continue training XGBoost/SVM as new data comes.
 - Sky: continue working on data visualization with new data, continue helping with Drew's paper and data collection.
 - Zaryn: work on helping with Scholar's Forum poster.
 - Emily: continue working on documentation and working with Sky on data visualization.
 - Zach: continue helping Drew with assigned tasks.
 - Hector: continue looking into journals.

Adjournment at 11:45. Next meeting will be tentatively held on Wednesday, March 29th at 11:10 AM

CAE Research Project Meeting Minutes

3-31-2023

- Participants
 - Dr. Farag
 - Dr. Ezekiel
 - Dr. Wu
 - Zach Keyser
 - Drew Rado
 - Zaryn Good
 - Emily Himes
 - Hector Linarez
 - Sky Semone
 - Kurtis Johnson
 - Samuel Rocco
- Meeting started at 11:10 AM
- Unanimously approved minutes for meeting on March 22, 2023.

Main Points:

- **Progress report**
 - Drew: Scholars poster was completed, started new data collection.
 - Maria: worked on poster with Drew.
 - Zaryn: finished up DCNN runs and then edited Scholars Forum poster. Reconfigured network as discussed in previous meetings.
 - Sky: plotting code to make it more readable.
 - Emily: worked on documentation, received notes from Drew.
 - Zach: researching source materials, openWRT.
 - Hector: updated journal list.
 - Kurtis: talked to Jared to get an introduction to the project.
- **Discussion points/Comments**
 - REMINDER: meeting next week with be on Friday at 11:10, April 7th.
 - Everyone should review documentation and let Emily know if something is missing, and add it to her OneDrive folder so it can be included.
- **Tasks:**
 - Drew: continue working on data collection, onboard new students.
 - Maria: training XGBoost/SVM as new data comes.
 - Sky: edit paper with Dr. Wu
 - Help Drew with data collection.
 - Finish up main plotting codes.
 - Make sure new students are onboarded.
 - Zaryn: wait for new data, then start DCNN runs again.
 - Emily: continue working on documentation and working with Sky on data visualization. Follow up on Zoom meetings ending after ~half hour.
 - Zach: continue helping Drew with assigned tasks, specifically openWRT for networking and data collection.
 - Hector: meet with Sky to discuss data visualization.
 - Kurtis: schedule a meeting with Drew, Sky, Maria, Zaryn in 305. Confirm summer plans with Dr. Farag once they are finalized.

Adjournment at 11:50. Next meeting will be tentatively held on Wednesday, April 7th at 11:10 AM

CAE Research Project Meeting Minutes

4-07-2023

- **Participants**
 - Dr. Ezekiel
 - Dr. Wu
 - Dr. Farag
 - Emily Himes
 - Kurtis Johnson
 - Samuel Rocco
 - Sky Semone
 - Zaryn
 - Zach
- Meeting started at 11:10 AM
- Unanimously approved minutes for meeting on March 29, 2023.

Main Points:

- **Progress report**
 - Drew collected data (despite computer crashing during the main collection). Post processing occurred on Friday morning.
 - Onboarded new members.
 - Also recollected DDoS data to include multiple ports in the attack and gave data to Maria.
 - Drew worked with Sky and Emily on the paper write up.
 - Maria: made a folder and guide for onboarding so all of her material in on the OneDrive once she leaves.
 - Zaryn: Onboarded new students on DCNN and Titan, and gave an overview of the IoT project.
 - Emily: working with Drew on paper, met with Sky with data viz stuff.
 - Sky helped Drew with data collection and met with new people on training with the existing tools.
 - Sam: trying to get familiar with tools for IoT project.
 - Kurtis: trying to get familiar with tools for IoT project.
 - Zachary: helping Drew and Sky with data viz (network graph) to improve existing tools, learning the networking structure of 305.
- **Discussion points/Comments**
 - Room 305 should be cleaned up for display to visiting guests on Tuesday.
 - Onboarding new students should include live demos of using the code. Zaryn and others should coordinate times for this to happen.
- **Tasks:**
 - Sam: Write new implementation of SVM/XGBoost, compare to the results Maria got.
 - Drew: Will finish up parsing the data and processing it. Continue writing paper
 - Maria: take the lead on the Scholars Forum poster and collaborate with Zaryn (3-dataset paper). Work on paper and continue training XGBoost/SVM as new data comes.
 - Zach and Hector: Meet with Dr. Ezekiel and learn more about the data collection process.
 - Sky: finish up data viz with new data, continue reading over Drew and Dr. Wu's paper. Assisting Zach with data viz stuff as he improves scripts.
 - Zaryn: continue training DCNNs with new upcoming data, helping with write-ups as needed.
 - Emily: continue work on documentation.
 - Sam, Kurtis: look into OpenWRT for networking configurations.

Adjournment at 11:45. Next meeting will be held on Wednesday, April 12th at 11:10 AM

CAE Research Project Meeting Minutes

4-14-2023

- Participants
 - Dr. Wu
 - Dr. Farag
 - Drew Rado
 - Kurtis Johnson
 - Samuel Rocco
 - Sky Semone
 - Maria Balega
- Meeting started at 11:10 AM
- Unanimously approved minutes for meeting on April 7th, 2023.

Main Points:

- **Progress report**
 - Sam downloaded machine learning tools, and started learning how SVM/XGBoost can be used in these studies.
 - Kurtis reviewed ML tools
 - Drew finished data collection and handed the data from Sky. 90GB of data.
 - Instead of having different subnets, these will be simulated in post for simplicity.
 - Added to the paper and made corrections
 - Sky made corrections to Dr. Wu's paper and met with Drew about data collection. Also continued to organize files on new computer in 305.
 - Zaryn is making a guide to the DCNN.
 - Emily continued working on documentation and editing IoT testbed paper.
 - Maria is helping with onboarding with SVM, XGBoost.
- **Discussion points/Comments**
 - Onboarding form should be filled out here:
 - Dr. Wu mentioned that before we leave, all results should be included in the paper, so they can be shared with the remaining members of the team (regarding IoT testbed paper.)
- **Tasks:**
 - Sam: Write new implementation of SVM/XGBoost, compare to the results Maria got.
 - Kurtis and Sam: meet with Zaryn to learn how to use DCNN
 - Drew: Lead onboarding and follow through with data once Sky generates the new dataset. Meet with Emily for testbed paper.
 - Sky: post-process data and help onboard. Continue editing paper.
 - Sam, Kurtis, and Drew: come up with a plan to share OpenWRT knowledge since it is very important to this project.
 - Zaryn: Continue working on DCNN guide
 - Emily: work on paper and the IoT-testbed paper.
 - Maria: onboarding and wait for new IoT dataset.

Adjournment at 11:55. Next meeting will be held on Wednesday, April 19th at 11:10 AM

CAE Research Project Meeting Minutes

4-19-2023

- **Participants**
 - Dr. Farag (PI)
 - Dr. Wu
 - Dr. Ezekiel
 - Drew Rado
 - Emily Himes
 - Kurtis Johnson
 - Samuel Rocco
 - Sky Semone
 - Maria Balega
 - Zachary Keyser
- Meeting started at 11:10 AM
- Unanimously approved minutes for meeting on April 14th, 2023.

Main Points:

- **Progress report**
 - Sam will start on a new implementation on the SVM/XGBoost soon.
 - Kurtis reviewed ML tools and learned more about the projects. Helped Sky identify some parts of the DCNN that were confusing
 - Drew processed data with Sky
 - Continued with onboarding – met with Curtis.
 - Made dataviz guide through Wireshark
 - Sky continued onboarding
 - Preprocessed new data
 - Fixed Matlab pre-trained model issue, so they are now on Titan.
 - Continued proofreading the IoT paper.
 - Maria and Zaryn kept onboarding new students and were awaiting new data from Drew and Sky
 - Emily continued documentation.
 - Zach reviewed dataviz and network tools.
- **Discussion points/Comments**
 - Dr. Ezekiel mentioned that we should utilize Room 305 as much as possible and try to make plans to achieve the weekly goals.
- **Tasks:**
 - Sam: Write new implementation of SVM/XGBoost, compare to the results Maria got.
 - Drew: Lead onboarding and keep facilitating the transfer of knowledge as people leave
 - Sky: post-process data and help onboard. Continue editing paper.
 - Sam, Kurtis, and Drew: come up with a plan to share OpenWRT knowledge since it is very important to this project.
 - Zaryn: Continue working on DCNN guide and process new data
 - Emily: work on paper and the IoT-testbed paper.
 - Maria: process new IoT dataset.
 - Zach: keep working on dataviz and network stuff

Adjournment at 11:40. Next meeting will be held on Wednesday, April 26th at 11:10 AM

CAE Research Project Meeting Minutes

4-26-2023

- **Participants**
 - Dr. Farag (PI)
 - Dr. Wu
 - Dr. Ezekiel
 - Drew Rado
 - Emily Himes
 - Kurtis Johnson
 - Samuel Rocco
 - Sky Semone
 - Maria Balega
 - Zaryn Good
 - Lynn Munro
- Meeting started at 11:10 AM
- Unanimously approved minutes for meeting on April 19th, 2023.

Main Points:

- **Progress report**
 - Sam did some research on XGBoost but did not get a chance to code anything.
 - Drew continued writing IoT paper, is waiting on final revisions from Sky
 - Continued with onboarding.
 - Pre-processed new dataset, and will send it to Maria and Zaryn soon.
 - Sky continued onboarding
 - Preprocessed new data with 2 DDOS collections instead of 8.
 - Worked on new revision of paper with Dr. Wu.
 - Kurtis: attended meeting with Maria, and studied openWRT.
 - Zaryn: began running DCNN on new data from last week.
 - Worked on making a guide for onboarding and DCNN
 - Maria: ran ML methods on new dataset: XGBoost 66% and SVM 99%
 - Emily: worked on documentation.
 - Lynn: reviewed Flower and ML methods.
- **Discussion points/Comments**
 - Make sure that new students can fully operate the tools that we've developed.
 - No meeting next week, and meeting times are subject to change and will be decided in the next few weeks.
 - May 5th will be the last day to collect hours for the spring semester.
 - Departing students should record a Zoom guide and send the link to Dr. Farag, and place it on the One-Drive.
- **Tasks:**
 - Sam: Write new implementation of SVM/XGBoost, compare to the results Maria got.
 - Drew: Lead onboarding and keep facilitating the transfer of knowledge as people leave. Finalize writing
 - Sky: post-process data and help onboard. Continue editing paper and meet with Dr. Wu to finalize the paper.
 - Sam, Kurtis, and Drew: come up with a plan to share OpenWRT knowledge since it is very important to this project.
 - Zaryn: Continue working on DCNN guide and process new data
 - Emily: work on paper and the IoT-testbed paper.
 - Maria: process new IoT dataset.
 - Zach: keep working on dataviz and network stuff

Adjournment at 11:50. Next meeting will be TBA, with no meeting next week.

CAE Research Project Meeting Minutes

05-09-2023

- Participants
 - Dr. Waleed Farag (PI)
 - Dr. Soundarajan Ezekiel
 - Dr. Xin-Wen Wu
 - Jitu Nath
 - Niranchana Radha Krishnan
 - Larry Pearlstein
 - Drew Rado
 - Jared Giesen
 - Kurtis Johnson
 - Samuel Rocco
 - Lynn Munro
- Meeting started at 10:00am
- Unanimously approved minutes for meeting on April 26th, 2023

Main Points:

- **Progress report**
 - Kurtis, Sam – Learning the algorithms and how to process the datasets.
 - Drew – Processed the new malicious dataset, reviewed the data and discussed odd results, made visual graphs to display the findings in the data.
- **Discussion points**
 - The data is most likely presenting itself with low accuracy because the IP addresses used in the set are not IP addresses on the network.
 - This shows that XGBoost most likely relies on IP addresses more than SVM when processing data.
 - It would be best to move forward with the project as we have been and recollect the Malicious dataset using legitimate IP addresses on the network.
- **Tasks:**
 - Drew: prepare a new dataset using a pool of known IP addresses on the network and send it to Kurtis for processing
 - Kurtis: process the new dataset and present results

Adjournment at 1:00pm

Next meeting will be held on Friday, May 19th at 9:00am

CAE Research Project Meeting Minutes

05-19-2023

- **Participants**
 - Dr. Waleed Farag (PI)
 - Dr. Soundarajan Ezekiel
 - Drew Rado
 - Jared Giesen
 - Kurtis Johnson
 - Samuel Rocco
 - Lynn Munro
 - Nathan Metzger
- Meeting started at 9:00 am
- Unanimously approved minutes for meeting on May 9th, 2023

Main Points:

- **Progress report**
 - Drew – Worked on a script to automate malicious attack as well as finishing an additional benign data collection to include the new computer.
 - Kurtis – Re-ran all datasets to see if they produced the same results and confirmed they were not a one time situation.

Discussion points

- The power outage halted the malicious data collection and running the new data.
 - We need to get in contact with Zaryn to get the most recent data collection.
 - The script to automate malicious data collection need to be tested this week to confirm it works
 - Data visualization charts need to be created to confirm our results are correct.
- **Tasks:**
 - Sam: Finish Python script for data visualization
 - Drew: Finish running the data for the last collection, contact Sky and finish research paper
 - Kurtis: Run the data that Drew collects

Adjournment at 9:35pm

Next meeting will be held on Friday, May 25th at 11:00am

CAE Research Project Meeting Minutes

05-25-2023

- Participants
 - Dr. Waleed Farag (PI)
 - Dr. Soundarajan Ezekiel
 - Drew Rado
 - Jared Giesen
 - Kurtis Johnson
 - Samuel Rocco
 - Lynn Munro
- Meeting started at 11:00 am
- Unanimously approved minutes for meeting on May 19th, 2023

Main Points:

- **Progress report**
 - Drew –
 - Finished both automation scripts
 - Finishing up documentation for IoT
 - Kurtis –
 - Reconfigured MATLAB license
 - Re-ran all datasets with new dataset
 - Discovered new issues with XGBoost
 - Sam –
 - Finished visualization scripts for python

Discussion points

- All attack automation scripts were finished
 - Malicious datasets were re-collected and prepared for processing
 - Almost all results were similar on the new dataset except for XGBoost's performance
 - XGBoost is outputting a different accuracy between 66% to 99% randomly with new dataset and 50% to 75% for the old dataset, further investigating is needed
- **Tasks:**
 - Drew: Finish documentation and send to Farag for review
 - Kurtis: Continue to look at XGBoost parameters to fix accuracy issues
 - Sam: Review and learn Drew's tasks
 - Lynn: Review and learn Drew's tasks

Adjournment at 11:45pm

Next meeting will be held on Friday, May 31st at 11:00am

CAE Research Project Meeting Minutes

05-31-2023

- Participants
 - Dr. Waleed Farag (PI)
 - Dr. Soundarajan Ezekiel
 - Drew Rado
 - Jared Giesen
 - Kurtis Johnson
 - Samuel Rocco
 - Lynn Munro
 - Nathan Metzger
- Meeting started at 11:00 am
- Unanimously approved minutes for meeting on May 25th, 2023

Main Points:

- **Progress report**
 - Drew –
 - Working on IoT test bed paper
 - Collected new benign data set and shared with Kurtis
 - Put documentation of data capture and lab on all 305 machines
 - Kurtis –
 - Ran XGBoost on new data and determined random_state parameter is causing variability between runs
 - Ran SVM with similar high accuracy results
 - Sam –
 - Reviewed Drew's documentation for data capture
 - Lynn –
 - Reviewed Drew's documentation for data capture

Discussion points

- Kurtis needs to explore the issues with XGBoost and SVM performance. Other students will familiarize themselves with Drew's documentation.
- **Tasks:**
 - Drew: Finalize the IoT paper
 - Kurtis: Work on XGBoost and SVM parameters with Dr. Ezekiel
 - Sam: Continue gaining familiarity with Drew's documentation but focus on ARMZTA

Adjournment at 11:45am

Next meeting will be held on Tuesday, June 6th at 10:00am

CAE Research Project Meeting Minutes

06-06-2023

- **Participants**
 - Dr. Waleed Farag (PI)
 - Dr. Soundarajan Ezekiel
 - Dr. Xinwen Wu
 - Drew Rado
 - Jared Giesen
 - Kurtis Johnson
 - Samuel Rocco
 - Nathan Metzger
- Meeting started at 10:00 am
- Unanimously approved minutes for meeting on May 31st, 2023

Main Points:

- **Progress report**
 - Drew –
 - Working on IoT test bed paper
 - Kurtis –
 - Tried one hot encoding preprocessed data but this produced too much data to be usable
 - Tried changing ratio of Benign to DDoS to Port scan data to 1:1:1 but this did not improve accuracy of XGBoost
 - Sam –
 - No updates, busy with GenCyber preparation
 - Jared –
 - No updates, busy with GenCyber preparation
 - Nathan –
 - No updates, busy with GenCyber preparation
 - Lynn –
 - Left project

Discussion points

- Need to figure out inconsistent performance of XGBoost
- Consider using K-mean clustering to visualize data
- **Tasks:**
 - Drew: Finalize the IoT paper
 - Kurtis: Add Drew's documentation to ARMZTA folder for Jared.
 - Contact Maria for XGBoost help
 - Continue looking into XGBoost parameters
 - Work on K-mean clustering

Adjournment at 10:35am

Next meeting will be held on Monday, June 19th at 9:00am

CAE Research Project Meeting Minutes

06-28-2023

- Participants
 - Dr. Soundarajan Ezekiel
 - Dr. Xinwen Wu
 - Jared Giesen
 - Kurtis Johnson
 - Samuel Rocco
 - Nathan Metzger
- Meeting started at 11:30 am
- Unanimously approved minutes for meeting on June 18th, 2023

Main Points:

- **Progress report**
 - Drew –
 - Working on IoT test bed paper
 - Kurtis –
 - Helped Maria with IEEE Access paper
 - Ran XGBoost and SVM on KDD, TON, and IoT23 data sets on Titan for efficiency comparison
 - Ran XGBoost on five datasets testing different parameters on 4080 machine
 - Tested train/test splits, max_depth, and eta (learning rate)
 - Ran SVM on five datasets testing different parameters on 4080 machine
 - Tested train/test splits, C, gamma, and different kernels
 - Sam –
 - Ran TON, KDD, and data captures through tSNE for visualization
 - Jared –
 - Working on getting remote connection into 305 machines
 - Learning DCNN and Matlab from Zaryn's tutorial
 - Nathan –
 - Visualized data sets with k means clustering and PCA
- **Discussion points**
 - Finish up respective tasks testing parameters of algorithms and visualizations on all data sets
 - Everyone needs to focus on DCNN to quickly preprocess and train all networks on all data sets
- **Tasks:**
 - Everyone: Learn DCNN by reviewing Zaryn's tutorial
 - Drew: Finalize the IoT paper
 - Kurtis:
 - Finish running SVM on datasets
 - Run XGBoost and SVM on IoT23 dataset
 - Sam:
 - Run tSNE on the three data sets in Maria's paper
 - Jared:
 - Set up remote connection to 305 machines
 - Nathan:
 - Reconfigure PCA data visualization

Adjournment at 12:00 pm

Next meeting will be held on Wednesday, July 5th at 11:00am

CAE Research Project Meeting Minutes

07-05-2023

- Participants
 - Dr. Soundararajan Ezekiel
 - Dr. Xinwen Wu
 - Jared Giesen
 - Kurtis Johnson
 - Samuel Rocco
 - Nathan Metzger
 - Shari Hoch
- Meeting started at 11:00 am
- Unanimously approved minutes for meeting on June 28th, 2023

Main Points:

- **Progress report**
 - Drew –
 - Working on IoT test bed paper
 - Kurtis –
 - Still running DCNN on Titan for Maria
 - Converted all datasets to images for use in training DCNN
 - Completed DCNN training and testing on TON and KDD datasets
 - Currently running DCNN on 4080 machine on test bed data sets
 - Sam –
 - Running DCNN on mean TON data set
 - Working on t-SNE for IoT23 dataset
 - Jared –
 - Primarily working on ARMZTA
 - Nathan –
 - Working on user account issues for all machines to enable remote access
- **Discussion points**
 - Need to fix Titan to run all four graphics cards
 - Learn and implement PCA to recast datasets
 - Look at YOLO algorithm and consider implementing if time allows
 - For the next meeting, Dr. Wu teaches around 11 am and Sam, Nate, and Jared have a uSoar meeting 10:00 – 11:30 am on Wednesday. Consider setting the meeting for Tuesday or Thursday.
- **Tasks:**
 - Drew: Finalize the IoT paper
 - Kurtis:
 - Finish running DCNN on datasets
 - Sam:
 - Fix t-SNE for IoT23 data set
 - Jared:
 - Nathan:
 - Reconfigure PCA data visualization

Adjournment at 11:30 pm

Next meeting will be held on Thursday, July 13th at 11:00am

CAE Research Project Meeting Minutes

07-13-2023

- Participants
 - Dr. Waleed Farag (PI) (excused)
 - Dr. Soundararajan Ezekiel
 - Dr. Xinwen Wu
 - Jared Giesen
 - Kurtis Johnson
 - Samuel Rocco
 - Nathan Metzger
- Meeting started at 11:00 am
- Unanimously approved minutes for meeting on July 5th, 2023

Main Points:

- **Progress report**
 - Drew –
 - Working on IoT test bed paper
 - Kurtis –
 - Completed running DCNN on Titan for Maria
 - Completed training and testing of DCNN on test bed data capture 5-30
 - Currently running DCNN on test bed data capture 4-20
 - Met with Adam for help on configuring machines to utilize GPU in MATLAB
 - Dealing with issues with MATLAB on 4080 machine
 - Sam –
 - Fixed t-SNE to address memory issue
 - Completed training of DCNN on median TON dataset
 - Jared –
 - Primarily working on ARMZTA
 - Nathan –
 - Working on extracting image features from trained nets
- **Discussion points**
 - Contact Drew for updates on IoT paper
 - Track computational complexity for all algorithms
 - Efficiency is an important factor in project since we want near-instant response
 - Went over DCNN fusion steps from Dr. Ezekiel
- **Tasks:**
 - Drew: Finalize the IoT paper
 - Kurtis:
 - Finish running DCNN on last dataset
 - Work on DCNN fusion steps
 - Sam:
 - Convert Dr. Ezekiel's notes to soft copy for documentation
 - Work on DCNN fusion steps
 - Jared:
 - Convert Dr. Ezekiel's notes to soft copy for documentation
 - Nathan:
 - Extract image features from all trained nets

Adjournment at 11:40 pm

Next meeting will be held on Thursday, July 20th at 11:00am

CAE Research Project Meeting Minutes

07-20-2023

- **Participants**
 - Dr. Waleed Farag (PI) (excused)
 - Dr. Soundararajan Ezekiel
 - Dr. Xinwen Wu
 - Jared Giesen
 - Kurtis Johnson
 - Samuel Rocco
 - Nathan Metzger
- Meeting started at 11:00 am
- Unanimously approved minutes for meeting on July 13th, 2023

Main Points:

- **Progress report**
 - Drew –
 - Working on IoT test bed paper
 - Kurtis –
 - Completed running DCNN on test bed data capture 4-20
 - Running DCNN on Titan on TON and KDD datasets for Maria
 - Met with Adam for help on DCNN fusion
 - Sam –
 - Created soft copies of DCNN Fusion notes
 - Jared –
 - Primarily working on ARMZTA
 - Nathan –
 - Working on extracting image features from trained nets
 - Working on DCNN fusion
- **Discussion points**
 - Contact Drew for updates on IoT paper
 - We are keeping the next meeting on Thursday due to U-Soar on Wednesday
 - We need to fix inconsistencies in Maria's paper regarding DCNN results
 - One figure refers to Resnet101 while all others do not
- **Tasks:**
 - Drew: Finalize the IoT paper
 - Kurtis:
 - Focus on running DCNN for Maria due to time sensitivity
 - Sam:
 - Fix Maria's DCNN KDD figure in paper
 - Jared:
 - Redraw Maria's DCNN figure
 - Nathan:
 - Extract image features from all trained nets
 - Work on fusion

Adjournment at 11:40 pm

Next meeting will be held on Thursday, July 27th at 11:00am

CAE Research Project Meeting Minutes

07-27-2023

- Participants
 - Dr. Waleed Farag (PI)
 - Dr. Soundararajan Ezekiel
 - Dr. Xinwen Wu
 - Jared Giesen
 - Kurtis Johnson
 - Samuel Rocco
 - Nathan Metzger
- Meeting started at 11:00 am
- Unanimously approved minutes for meeting on July 20th, 2023

Main Points:

- **Progress report**
 - Drew –
 - Shared new version of IoT Testbed paper, waiting on feedback
 - Kurtis –
 - Retested DCNN on TON dataset for Maria to get full metrics
 - Working on wavelet scattering for dataset visualization
 - Sam –
 - Finished fixing Maria's KDD figure
 - Working on soft copies of Dr. Ezekiel's work plans
 - Working on dataset and preprocessing documentation
 - Jared –
 - Working on soft copies of Dr. Ezekiel's work plans
 - Recreated Maria's KDD figure in Excel
 - Nathan –
 - Extracted image features and completed DCNN fusion for data capture 5-30
 - Ran SVM on fused features
- **Discussion points**
 - Document all work and methods in one file to allow for quick reference/ease-of-onboarding new team members
 - Update everyone when revised paper or results are available with location in OneDrive
 - Put all results and documentation on the shared OneDrive, not locally
 - K-means clustering helps explain why our data captures result in consistently high results on all algorithms
 - May want to modify data capture process later to improve variability of data
- **Tasks:**
 - Drew: Finalize the IoT paper
 - Kurtis:
 - Reach out to Maria for raw IoT23 dataset and preprocessing scripts
 - Work on wavelet scattering for all datasets
 - Organize OneDrive and copy all results to USB drive
 - Sam:
 - Finish soft copies and dataset documentation
 - Find and update overall IoT documentation file containing methods and tools
 - Jared:

- Nathan:
 - Continue performing DCNN fusion on all datasets

Adjournment at 12:20 pm

Next meeting will be held on Thursday, August 3rd at 11:00am

CAE Research Project Meeting Minutes

08-03-2023

- Participants
 - Dr. Waleed Farag (PI)
 - Dr. Soundararajan Ezekiel
 - Dr. Xinwen Wu
 - Jared Giesen
 - Kurtis Johnson
 - Samuel Rocco
 - Nathan Metzger
- Meeting started at 11:00 am
- Unanimously approved minutes for meeting on July 27th, 2023

Main Points:

- **Progress report**
 - Drew –
 - Working with Dr. Ezekiel on revising testbed paper
 - Kurtis –
 - Started preprocessing IoT23 dataset
 - Helped Maria with fixing a figure on paper
 - Put all ML results and scripts on OneDrive, USB
 - Sam –
 - Finished documentation of data sets and preprocessing
 - Looking into overall IoT documentation to update with new work
 - Jared –
 - No updates
 - Nathan –
 - Completed DCNN fusion with SVM on all datasets
- **Discussion points**
 - Concerns with data captures being too simple, investigate getting better captures
 - Drew's paper focuses on building the IoT test bed to generate data but should include algorithm results to determine its utility
 - Need to include IoT23 as one of the datasets to compare to earlier work/testbed performance
 - Fusion results are not significantly better than original DCNN results
 - Results should be included in report but not a published paper
 - Dr. Ezekiel will work with Sam on overall documentation of the latest work including datasets, visualization, algorithms, results, etc.
- **Tasks:**
 - Drew: Finalize the IoT paper
 - Kurtis:
 - Work with Maria to finalize TON results for paper
 - Run DCNN on KDD for Maria
 - Finish IoT23 preprocessing and run on all algorithms
 - If time allows work on wavelet scattering; contact Adam for help
 - Sam:
 - Find and update overall IoT documentation file containing methods and tools
 - Jared:

- Nathan:
 - Write short documentation on fusion methodology and results
 - Check Titan hard drives, extra drives and make sure they are mounted correctly

Adjournment at 11:50 am

Next meeting will be held on Thursday, August 10th at 11:00am

CAE Research Project Meeting Minutes

08-10-2023

- Participants
 - Dr. Waleed Farag (PI)
 - Dr. Soundararajan Ezekiel
 - Dr. Xinwen Wu
 - Jared Giesen
 - Kurtis Johnson
 - Samuel Rocco
 - Nathan Metzger (absent)
- Meeting started at 11:00 am
- Unanimously approved minutes for meeting on August 3rd, 2023

Main Points:

- **Progress report**
 - Drew –
 - Planning to meet with Dr. Ezekiel to review testbed paper this weekend
 - Kurtis –
 - Preprocessed IoT23
 - Completed running XGBoost, SVM, DCNN on IoT23 with different parameters
 - Completed DCNN training/testing on KDD for Maria
 - Sam –
 - Working on overall IoT project documentation
 - Working on dataset documentation
 - Jared –
 - No updates
 - Nathan –
 - Resolved issue with Epimetheus (4080 machine) freezing/crashing
 - Resolved issue with Titan overheating
- **Discussion points**
 - Drew pointed out previous studies on identifying malicious network traffic
 - Most studies point to high accuracy when classifying packets as malicious/benign
 - Received and setup new Lambda Vector machine on Wednesday, Aug 9
- **Tasks:**
 - Everyone:
 - Keep 305 and 306 clean for visitors
 - Drew:
 - Finalize the IoT paper
 - Kurtis:
 - Work on wavelet scattering; contact Adam for help
 - Document findings, algorithms, code
 - Work with Sam, Nate, Jared to document individual work
 - Review Maria's paper, specifically Section 8 results
 - Compare her results to new results and document
 - Sam:
 - Update overall IoT documentation file containing methods and tools
 - Document individual work to add to overall documentation

- Finish dataset documentation
- Jared:
 - Document previous work to add to overall documentation
- Nathan:
 - Write short documentation on fusion methodology and results
 - Check Titan hard drives, extra drives and make sure they are mounted correctly
 - Visualize IoT23 with K-means clustering

Adjournment at 11:30 am

Next meeting will be held on Wednesday, August 16th at 1:00 pm

CAE Research Project Meeting Minutes

08-16-2023

- Participants
 - Dr. Waleed Farag (PI)
 - Dr. Soundararajan Ezekiel
 - Dr. Xinwen Wu
 - Jared Giesen (absent, excused)
 - Kurtis Johnson
 - Samuel Rocco
 - Nathan Metzger
- Meeting started at 1:00 pm
- Unanimously approved minutes for meeting on August 10th, 2023

Main Points:

- **Progress report**
 - All—
 - Met with Dr. Ezekiel to review work and plan final steps
 - Drew—
 - Met with Dr. Ezekiel to revise testbed paper
 - Met with team to catch up on summer work
 - Discussed how to better document work
 - Set up shared Kanban board for better organization going forward
 - Kurtis—
 - Tested wavelet scattering on MATLAB sample code
 - Working on overall IoT documentation with Sam
 - Sam—
 - Working on overall IoT project documentation
 - Completed dataset documentation draft
 - Jared—
 - No updates
 - Nathan—
 - Set up and configured second Lambda Vector machine in 306
 - Completed DCNN Fusion documentation
 - Completed DCNN Fusion on IoT23
 - Researching how to benchmark all machines
- **Discussion points**
 - Look into why IoT23 data set results are significantly worse
 - Include justification
 - Team needs to complete overall documentation with results and interpretation
- **Tasks:**
 - Everyone:
 - Keep 305 and 306 clean for visitors
 - Drew:
 - Finalize the IoT paper
 - Kurtis:
 - Document findings, algorithms, code
 - Review Maria's paper, specifically Section 8 results
 - Compare her results to new results and document

- Implement wavelet scattering for all datasets
- Sam:
 - Update overall IoT documentation file containing methods and tools
 - Document individual work to add to overall documentation
- Jared:
 - Document previous work to add to overall documentation
- Nathan:
 - Revise documentation of fusion methodology and results
 - Include references
 - Visualize IoT23 with K-means clustering

Adjournment at 1:45 pm

Next meeting will be held on Tuesday, August 22nd at 10:00 am

CAE Research Project Meeting Minutes

08-22-2023

- Participants
 - Dr. Waleed Farag (PI)
 - Dr. Soundararajan Ezekiel
 - Dr. Xinwen Wu
 - Jared Giesen
 - Kurtis Johnson
 - Samuel Rocco
 - Nathan Metzger
- Meeting started at 10:00 am
- Unanimously approved minutes for meeting on August 16th, 2023

Main Points:

- **Progress report**
 - All—
 - Drew –
 - None, on vacation
 - Kurtis –
 - Working on overall IoT documentation with Sam
 - Working on dataset and algorithm documentation
 - Sam –
 - Working on overall IoT project documentation
 - Jared –
 - No updates
 - Nathan –
 - Revised fusion documentation
 - Ran k-means clustering on new IoT23 dataset
- **Discussion points**
 - Project needs to wrap up as we approach end-of-month deadline
 - We are expecting new students to join the research team this semester who will require help from current members
 - They will need familiarity with how work is done, programs, algorithms, datasets, machines, etc.
- **Tasks:**
 - Everyone:
 - Drew:
 - Finalize the IoT paper
 - Kurtis:
 - Document findings, algorithms, code
 - Review Maria's paper, specifically Section 8 results
 - Compare her results to new results and document
 - Sam:
 - Update overall IoT documentation file containing methods and tools
 - Jared:
 - Nathan:

Adjournment at 11:00 pm

Next meeting will be held on Tuesday, September 6th at 11:20 am

CAE Research Project Meeting Minutes

09-06-2023

- Participants
 - Dr. Waleed Farag (PI)
 - Dr. Soundararajan Ezekiel
 - Dr. Xinwen Wu
 - Drew Rado
 - Jared Giesen
 - Kurtis Johnson
 - Samuel Rocco
 - Shari Hoch
- Meeting started at 11:20 am
- Unanimously approved minutes for meeting on August 22nd, 2023

Main Points:

- **Progress report**
 - All—
 - Drew —
 - Completed revisions on paper from Dr. Ezekiel
 - Kurtis —
 - Working on algorithm and results documentation
 - Sam —
 - Working on overall IoT project documentation
 - Jared —
 - No updates
- **Discussion points**
 - Shari should schedule to meet with current members for onboarding
 - Include scripts in appendix of documentation instead of just file location
 - Kurtis' algorithm doc path: /2020-CAE-C-Research-Project/IoT-Project-Algorithm Methods and Results.docx
 - Word document detailing each algorithm, parameters, tutorials, and results
 - Drew's testbed doc path: /2020-CAE-C-Research-Project/Drew/MainDocumentation/
 - HTML-based documentation of testbed setup
 - Sam's overall doc path: /2020-CAE-C-Research-Project/Emily/Documentation Versions/IoT Documentation-Ver4.docx
- **Tasks:**
 - Everyone:
 - Help with onboarding Shari
 - Drew:
 - Finalize the IoT paper
 - Kurtis:
 - Finish algorithm and results documentation by September 18
 - Sam:
 - Update overall IoT documentation by next week
 - Jared:
 - Shari:
 - Schedule meetings with Sam, Kurtis, and Drew

Adjournment at 12:05 pm

Next meeting will be held on Monday, September 11th at 11:20 am

CAE Research Project Meeting Minutes

09-11-2023

- Participants
 - Dr. Waleed Farag (PI)
 - Dr. Soundararajan Ezekiel
 - Dr. Xinwen Wu
 - Drew Rado
 - Jared Giesen
 - Kurtis Johnson (Absent)
 - Samuel Rocco (Absent)
 - Shari Hoch
- Meeting started at 11:20 am
- Unanimously approved minutes for meeting on Sept. 6th, 2023

Main Points:

- **Progress report**
 - All—
 - Drew —
 - Completed revisions on paper from Dr. Ezekiel
 - Reviewed IoT documentation to ensure information is accurate and up to date
 - Jared —
 - No updates
- **Discussion points**
 - Shari should schedule to meet with current members for onboarding
 - Include scripts in appendix of documentation instead of just file location
 - Kurtis' algorithm doc path: /2020-CAE-C-Research-Project/IoT-Project-Algorithm Methods and Results.docx
 - Word document detailing each algorithm, parameters, tutorials, and results
 - Drew's testbed doc path: /2020-CAE-C-Research-Project/Drew/MainDocumentation/
 - HTML-based documentation of testbed setup
 - Sam's overall doc path: /2020-CAE-C-Research-Project/Emily/Documentation Versions/IoT Documentation-Ver4.docx
- **Tasks:**
 - Everyone:
 - Help with onboarding Shari
 - Drew:
 - Upload version four of the IoT paper.
 - Kurtis:
 - Finish algorithm and results documentation by September 18
 - Shari:
 - Schedule meetings with Sam, Kurtis, and Drew

Adjournment at 12:40 pm

Next meeting will be held on Tuesday, Sept. 19th at 4:00 pm