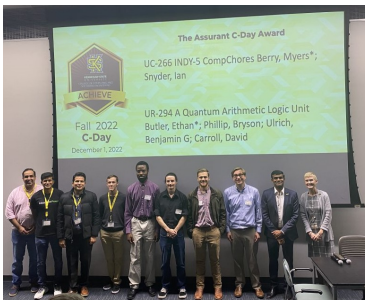
Fall 2022 C-Day Winners

Assurant Awards



- **UC-266 INDY-5 CompChores** by Berry, Myers, Snyder, Ian
  Abstract: Getting anyone motivated to complete chores can be a chore itself! To solve this issue, our team is using Dart and Flutter to build a desktop application that pits roommates, family members, and siblings against one another to complete chores for points. The purpose of this program is to simulate competition between users in order to motivate users to complete tasks amongst the living space. To complete this task, our program will provide a place where users can create a family, create an account, join a family, create chores, complete chores, check chore history, view the family scoreboard, and view how many chores they have completed. Users will be able to change chore points based on difficulty, estimated time of completion, and priority. There will also be a way for users to check chore history in order to know which chores were completed by each person. The family will have a main homepage which will show the top three scores within the family, the chores with the highest priority, and the family ID in which users can share with one another to allow others to join the family. Then for more detail there will be a chore page, a scoreboard page, and a settings page to change account information or leave a family. All of these pages and features will allow users to create an environment amongst their peers that is not only productive but is also fun!
  Department: Computer Science
  Supervisor: Prof. Sharon Perry
  Topics: Software Engineering
  Presentation | Poster | More Information

- **UR-294 A Quantum Arithmetic Logic Unit** by Butler, Ethan, Phillip, Bryson, Ulrich, Benjamin G, Carroll, David
  Abstract: This paper demonstrates that a quantum version of a classical Arithmetic Logic Unit (ALU) can be implemented on a quantum circuit. It would perform the same functions as the classical ALU, with the possibility of adding quantum functions in conjunction. To create the quantum ALU, we utilized IBM's Qiskit Python package and JuypterLab. We also used the IBM Quantum Lab to run the circuit. We believe that a quantum ALU has the potential to be faster than its classical counterpart and the ability to calculate quantum specific operations. The simple classical functions translated to a quantum circuit show a promising future for the development of a full quantum ALU with unique quantum operations.
  Department: Computer Science
  Supervisor: Senior Project Course Instructor: Prof. Sharon Perry; Project Owner: Dr. Dan Lo
  Topics: Other (explain in the comments section)
  Presentation | Poster | More Information

Undergraduate Research

- **1st Place: UR-269 Towards Bounding the Behavior of Deep Neural Networks** by Borowski, Richard,
  Abstract: Advances in Artificial Intelligence (AI), particularly in the form of deep neural networks, have revolutionized a diverse range of fields. As neural networks become more pervasive, the need to understand the boundaries of their behavior is becoming increasingly important. For example, can we formally guarantee that an autonomous

vehicle will not violate traffic laws, such as reaching excessive speeds? Towards the goal of bounding the behavior of a neural network, we propose how to bound the behavior of individual neurons by incrementally tightening formal bounds on it. We further provide a case study on classifying handwritten digits to illustrate the utility of our algorithm in terms of bounding the behavior of an individual neuron.
Department: Computer Science
Supervisor: Dr. Arthur Choi
Topics: Artificial Intelligence
Presentation | Poster | More Information

- **2nd Place: UR-285 OPERATION ENDURING FREEDOM: Improving Mission Effectiveness by Identifying Trends in Successful Terrorism** by Shaver, Dalton A,
Abstract: This research examines how the characteristics of terrorist attacks predict the chance of an attack succeeding, where an attack is defined as successful if the intended attack type is carried out. Data from The Global Terrorism Database (https://www.start.umd.edu/gtd) was analyzed across three geographical missions within Operation Enduring Freedom: Trans-Sahara, Horn of Africa, and the Philippines. The three models were able to distinguish between successful and unsuccessful attacks at 78.74%, 82.11%, 74.25%, respectively. Using predicted probabilities of success obtained from each logistic regression model, the medians were plotted to compare the characteristics of terrorist attacks across missions. The coefficients for each model were analyzed to compare the odds of success for each variable level to the odds of success of the reference level for that variable. Lastly, the coordinates for successful and unsuccessful attacks as classified by the dataset was plotted to explore spatial patterns in regional maps. Many insights were gathered through analyzing Operation Enduring Freedom missions. It is shown that terrorists are substantially successful in their aims to terrorize the general populace. Attacks targeting private citizens, tourists, non-governmental organizations, and food or water supply, have the largest probability of success for the Trans-Sahara and Horn of Africa regions. Suicide attacks in the Philippines raise the chance of success, in contrast to the other two missions. The predicted probability of success when explosives and firearms are used in the Philippines is lower than the Trans-Sahara and Horn of Africa mission areas. Additionally, the odds of an attack succeeding when it involves a barricade incident

with hostages is 10,491 times greater the odds of an attack succeeding when it involves bombings. By determining the specific characteristics of attacks that produce the highest probabilities of success, the effectiveness of Operation Enduring Freedom can be improved by focusing counter-terrorism training and operations on the features that predict successful attacks.
Department: Data Science and Analytics
Supervisor: Prof. Susan Hardy - Main Advisor, Dr. Gene Ray - Consultant Meeting, Dr. Austin Brown - Consultant Meeting
Topics: Data/Data Analytics
Presentation | Poster | More Information

- **3d Place UR-295 Data Collection in Parkinson's VR** by Weingarten, Neil E, McConnell, Ian
  Abstract: This submission is meant to show an addition to a Parkinson's simulation within VR where there are now different methods of data collection that are collected in-game. These data points are tracked and logged during gameplay, and are meant to allow researchers to make more effective use of the simulation as a tool for data collection. An example demo of the game and example files that were generated during gameplay are provided.
  Department: Software Engineering and Game Design and Development
  Supervisor: Dr. Joy Li
  Topics: Games
  Presentation | Poster | More Information

Undergraduate Capstone

- **1st place: UC-249 Hemorrhage** by Respess, Daniel M, Brewer, Antonio S, Tran, Kenny, Li, Sandy, Watson, Rick B
  Abstract: Hemorrhage is a fast-paced FPS action game with a focus on risky gameplay and dodging enemy attacks. Fight your way through hordes of grotesque creatures and make it to the end! The player starts with limited health but can steal more from killing enemies. Then, you can unleash this stored-up health to deal massive damage to your foes! Will you choose to be an unkillable tank? Or a brutal glass cannon?
  Department: Software Engineering and Game Design and Development
  Supervisor: Dr. Joy Li
  Topics: Games
  Presentation | Poster | More Information

- **2nd Place UC-274 RESTful Robots** by Young, Jack I, Comella, Derek M, Thomas, Sarah, Loveless, Andrew
  Abstract: The UXA-90 Robots have been sitting idle at Kennesaw State University for years. The only documentation provided were factory manuals, and there was nothing additional found online. The first step was to conduct a risk assessment and report the results to Professor Perry and Dr. Pei. The objective of the risk assessment was to determine the viability of the robots and the feasibility of three different senior project teams using them for a project. Once the risk assessment was completed and reported it was determined that all three teams could proceed with their senior projects. However, it was recommended that this team, SP-1 RED, develop a robot handling and training program and conduct training and certification of all other members of the other teams. The training and certification was conducted from September 14th through September 15th and documented online with a documentation website for all

teams to reference. The robots have the ability to move, walk, see (through a webcam), hear and speak (using built in speakers and microphones). The robots consist of: * An internal mini-PC running Ubuntu 14.04 LTS * Serial-over-USB communication ports * SAM interface motor control boards * RF remote control * USB HD webcam * Internal microphone and speakers The goal of this team, SP-1 RED is to increase the accessibility and usability of the UXA-90 robot including a REST API, documentation and training.
Department: Computer Science
Supervisor: Prof. Sharon Perry
Topics: Software Engineering
Presentation | Poster | More Information

- **3d Place: UC-296 Cybersecurity Park** by Weingarten, Neil E, Hendrick, JaDante, Nowokunski, Kylie, Crawford , Tyler
  Abstract: Cybersecurity Park is an educational VR game intended for middle-school-age children that aims to demonstrate a wide range of cybersecurity concepts to the players. Such concepts include hacking ethics and types of hackers, cryptography, Trojan Horse / ransomware viruses, and authentication and authorization. These concepts are split into various mini-games that the player can freely navigate to from the hub they spawn in. For example, in the mini-game showcasing the Trojan Horse concept, players play as a knight defending a castle from evildoers. Visitors will approach the castle and ask access into the castle, and, based on the actions by the visitors, the player will choose whether or not to allow access into the castle. The player acts as a firewall, and the visitors act like applications requesting access into a computer. If a bad visitor/application is let into the castle (representing a computer), then the castle will begin to catch fire. This one of six mini-games present within this game, and video demonstrations of some of these mini-games are provided.
  Department: Software Engineering and Game Design and Development
  Supervisor: Dr. Joy Li - Supervisor, Course Instructor; Dr. Yan Huang - Owner
  Topics: Games
  Presentation | Poster | More Information

Graduate Research

- **1st place: GR-284 Automated Vulnerability Detection in Source Code Using Deep Neural Networks** by Akter, Mst Shapna
  Abstract: One of the most important challenges in the field of a software code audit is the presence of vulnerabilities in software source code. Every year, more and more software flaws are found, either internally in proprietary code or revealed publicly. These flaws are highly likely exploited and lead to system compromise, data leakage, or denial of service. C and C++ open-source code are now available in order to create a large-scale, machine-learning system for function-level vulnerability identification. We assembled a sizable dataset of millions of open-source functions that point to potential exploits. We created an efficient and scalable vulnerability detection method based on deep neural network models that learn features extracted from the source codes. To remove the pointless components and shorten the dependency, the source code is first converted into a minimal intermediate representation. We keep the semantic and syntactic information using state-of-the-art word embedding algorithms. The embedded vectors are subsequently fed into convolutional neural networks to classify the possible vulnerabilities. Furthermore, we proposed a new neural network model which seems to overcome issues associated with traditional neural networks. To measure the performance, we used evaluation metrics such as f1 score, precision, recall, accuracy, and total execution time.
  Department: Computer Science
  Supervisor: Dr. Dan Lo
  Topics: Artificial Intelligence
  Presentation | Poster | More Information

- **2nd Place: GR-273 BUILDING A CHATBOT** by Gottam, Varun, Chepyala, Sathwik, Saimpu, Sai Mohit, Yalavarthi , Venkata Sai krishna, Buddiga, Nikhil Sai
  Abstract: A chatbot is now a part of many online applications like Health Care, Education, E-commerce, etc. It made the conversation between the customers and the service providers much more convenient as the chatbot can answer most of the queries without human intervention from the website side. This saves a lot of time and work.
  Department: Computer Science
  Supervisor: Dr.. Dan Lo

Topics: Artificial Intelligence
Presentation | Poster | More Information

- **3d Place GR-241 On Training Explainable Neurons** by Kennedy, Lance,
  Abstract: Neural networks have become increasingly powerful and commonplace tools for guiding decision-making. However, due to the black-box nature of many of these networks, it is often difficult to understand exactly what guides them to a certain prediction, making them dangerous to use for sensitive decision making, and making it difficult to ensure confidence in their output. For instance, a network which classifies images of dogs and cats may turn out to be flawed with little consequence, but a neural network that diagnoses the presence of diseases should be assured to make sound predictions. By understanding why a network makes the decisions it does, we can help to guarantee that the choices were made in a sensible way. However, part of the reason neural networks are considered a black-box is because it is very difficult computationally to explain how they work. In fact, individual neurons are known to be hard to explain already. In our research, we consider whether it is possible to learn an individual neuron that is explainable from the start. Unfortunately, our first result tells us that it is NP-hard to learn such a neuron. Fortunately, we have found new conditions under which we can learn an explainable neuron in pseudo-polynomial time.
  Department: Computer Science
  Supervisor: Dr. Arthur Choi
  Topics: Artificial Intelligence
  Presentation | Poster | More Information

Graduate Capstone

- **1st Place: GC-279 Geometry Matching Task for Improving The Cognitive Ability in Rehabilitation Process** by owoade, samuel, Chamarthi, Ravi Teja, Kalipindi, Jeevana, Temgoua, Ghislain Dongbou
  Abstract: According to Taylor & Francis Group, LLC (2015), in the National Library of Medicine“Traumatic brain injury (TBI) impacts the lives of 1.5 to 2 million new individuals each year; 75,000 to 100,000 of these are classified as severe and will suffer enduring severe spasticity in addition to cognitive”. This game follows and respect basic and fundamental rules of brain and muscles recovery process and will help patients in their process of rehabilitation and by extension will improve their cognitive abilities.
  Department: Software Engineering and Game Design and Development
  Supervisor: Dr. Sungchul Jung
  Topics: Games
  Presentation | Poster | More Information

- **2nd place: GC-250 Object Detection and Tracking: Deep Learning-based Framework with Euclidean Distance, IoU, and Hungarian Algorithm** by Hossain Faruk, Md Jobair
  Abstract: Object tracking is an important basis for the logistics industry where multiple packages are moved on conveyor belts at a time. Accurate datasets and efficient benchmarks are a few of the several problems for both object detection and tracking for training the deep learning-based framework. Preparing 100% accurate correspondence between objects throughout different frames by assigning human annotated unique_attributes to train framework efficiently over ground truth data. In this research, we develop an (i) OpenCV-based framework that allows the user to assign human-annotated identification between objects and (ii) a novel application for object detection and tracking. We utilize the assigned attributes to train the deep learning model accurately and adopt various evaluation parameters including euclidean distance, intersection over union (IoU), and scale-invariant feature transform (SIFT) to measure the accuracy of an object correspondence or tracking. We also adopt the Hungarian algorithm to increase the efficiency in determining correspondences between objects and apply our framework to human-annotated ground truth datasets

comprising ~1,000 images and the same amount of JSON files. Our demonstration achieved 94.53 % accuracy in object detection, finding correspondence, and object tracking. In future studies, we are aiming to apply a neural network to draw a comparison of identified accuracy.
Department: Computer Science
Supervisor: Dr. Selena He, Dr. Dan Lo
Topics: Artificial Intelligence
Presentation | Poster | More Information

- **3d Place GC-312 Title - GTRI IT Service Desk System** by Nwago, Koranna, Emani, Vineela, Gopi, Venkata Naga Rishita, Chatrathi, Bhavishya, Msimanga, Siphiwindoda
  Abstract: This overarching project would be web development, which would entail coding both the back end and the front end. The use of libraries is encouraged, but we must be cautious about licensing and ensure that this project remains as open-source as possible (a good open-source license ensures people can use, modify, redistribute, and sell without worry). This is a free and open-source project.
  Department: Information Technology
  Supervisor: Dr. Dr. Jack Zheng
  Topics: Other (explain in the comments section)
  Presentation | Poster | More Information

Contact Info

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kennesaw.edu/info

Resources For

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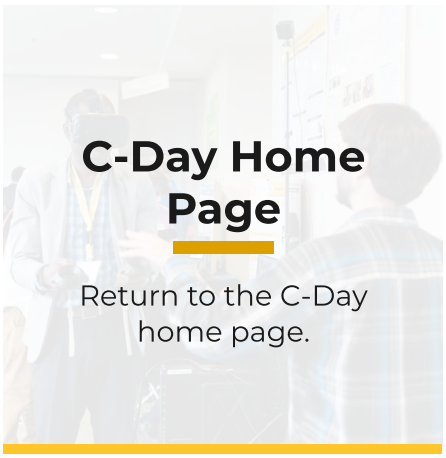
Fall 22 C-Day Program

Thursday, December 1st, 2022

Location: Marietta Campus - Atrium (J) and Design 2 (I2) buildings



TIME	EVENT
4:00 pm - 4:30 pm Atrium (J) building 1st & 3d floors	Student check-in: Atrium (J) building 1st floor lobby followed by set-up :Atrium (J) building3d floor (presenters only)
4:30 pm - 5:00 pm Atrium (J) building 1st floor lobby	Check-in judges, industry partners, Networking. Students, **bring your resume**.
5:00 pm - 5:35 pm Design 2 (I2) Auditorium	Welcome from the Dean Yenduri followed by Flash Session
5:35 pm - 6:20 pm **Atrium (J) building 2nd and 3d floors**	Judging of Student Projects Browsing
6:20 pm - 6:50 pm J-152 Atrium (J) building	Pizza and Networking. Students, **bring your resume**.

6:50pm - 7:00 pm Design 2 (I2) Auditorium	Recognition of Judges
7:00 pm - 7:30 pm Design 2 (I2) Auditorium	Presentation of Awards ◦ Best Undergraduate Project ($600 per project) ◦ Best Graduate Project ($600 per project) ◦ Best Undergraduate Research Project ($600 per project) ◦ Best Graduate Research Project ($600 per project) ◦ Assurant Special Awards (two awards $800 per project)

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Fall 2022 Presentations

Judges

- William Forsyth - Lecturer of Information Technology, Kennesaw State University
- Chan Grant - Futurus, LLC
- Victoria Williams - Technology Consultant (Agile and Product Management), Accenture
- George McBroom - Park Ranger, US Army Corps of Engineers
- Russell Miller - VP, D/CISO, Finance of America Companies
- Mark Fender - VP of Information Security, National Christian Foundation
- Tanvir Rahman - VP of Data Engineering & Analytics, MyEyeDr
- Jose Morales - Data Engineer Manager, UPS
- Alla Kemelmakher - Software Development Line Manager, Amdocs Inc
- Dorren Schmitt - Sr. Director of IT, The Weather Channel
- Victor Sahin - Microsoft
- Lloyd Middlebrooks - Senior Cybersecurity Specialist, Newell Brands
- Vannel Zeufack - ETL Developer, DataSeers Inc.
- Issouf Kindo - NodeJS Developer, DataSeers Inc.
- Julie Kimball - Kennesaw State University
- Ethan Luettgemann – Research Technologist, I, GTRI – ELSYS Lab
- Andrew Hamilton - CTO, Cybriant
- Byron DeLoach - VP of Managed Services, Cybriant
- Alan Lozano - Manager of SOC, Cybriant

- Jeff Uhlich - CEO, Cybriant
- Aaron Tomason - Information Systems Engineer, GTRI
- William Parish - MagMutual
- John Eidson - Consultant
- Michael Parlotto - VP of Emerging Technologies, InComm Payments
- Eric Jackson - Lead Cloud Engineer, Assurant
- Justin Bull - Full Stack Engineering Intern, Assurant
- Samba Kovelamudi - Principal Cloud Engineer, Assurant
- Tanya Loskutova - Director of Science Solutions Management, Infor
- Logan McDonald - Research Technologist, II, GTRI – ELSYS Lab
- Keith Tatum - The Weather Channel

Rubrics and Acceptance Rate −

Best Project in Each Category Rubric

Undergraduate and graduate projects: scale 0- 10with 0representing "Poor" and 10representation "Exceeds Expectations"

- Successfully completed stated project goals and reported deliverables (0-10)
- Methodology/Approach: All required elements are clearly visible, organized, and articulated (0-10)
- Effective verbal presentation (0-10)
- Evidence of Rigor (0-10)
- Merit and Broader impact (0-10)

Games: scale 0 - 10 with 0 representing "Poor" and 10 representation "Awesome"

- TECHNICAL: Technically sound with appropriate visual & audio fidelity(0-10)
- GAMEPLAY: Engaging & Fun, with an intuitive UI. Rules of play are clear. Includes a win/lose state(0-10)
- ORIGINALITY: Sound, Art, Design, or Code(0-10)
- Evidence of Rigor (0-10)
- Merit and Broader impact (0-10)

Alumni's Choice Award Rubric

Alumni Judges will judge the Undergraduate Capstone projects to determine the “best” from those presented. Undergraduate Capstone Project titles start with the letters “UC –“ on their poster.

1. Team Approach: 20 pts (did the team work together effectively to meet goals)
2. Presentation: 20 pts (did the team sell the idea)
3. Use of Technology: 40 pts (is technology being used an effective way)
4. Feasibility/Impact for Business/Industry: 20 pts (doable/valuable/effective)

Academic courses undergraduate (e.g. capstones, games, innovative special topics projects, other course projects) (23)

*** Project will be featured during the Flash Session**

- *** UC-238 SP4-DogEm** (UC-238) by Chung, Chloe, Atkinson, Zane, Iniestra, Melissa, Intshakal A Nzeng, Deo, Willson, Joshua K
  Abstract: The DogEm project's overarching objective is to produce a functional cross-platform mobile app that reliably sends a specific contact a series of calls, emails, and texts until the contact responds. To accomplish this goal, we have compiled preliminary research, produced a series of prototypes, and started the development process. Our preliminary research consists of research pertaining to our tech stack, our user base, our app's requirements, possibilities for messaging and calling features, UX/UI research, reading through React Native documentation, and constraints on the messaging and calling features on iOS vs. Android. Each member produced a DogEm app prototype to familiarize ourselves with the technology that will be employed throughout the project: React Native and Expo CLI. Features implemented throughout the prototypes include, React Native Navigation, expo-sms, expo Linking, Firebase, and various other React Native libraries and APIs. Our development process currently consists of a team effort in which members are assigned an important functionality of the app. Members then actively contribute their changes to a GitHub repository holding our final product. GitHub is an important tool for our development efforts because it allows for code review and effective version control. With regard to version control, we are tracking and maintaining changes made to code on our GitHub. It is an integral part of our software development process. In order to facilitate best practices in our source code management, the DogEm team has been storing and managing our code in GitHub and maintaining a source code directory on our website.
  Department: Computer Science
  Supervisor: Prof. Sharon Perry
  Topics: Other (explain in the comments section)
  Presentation | Poster | More Information
- **UC-240 Gone Fishin' VR** (UC-240) by Lott, Donovan E, Halbert, Richard, Peters, Tanner M, Hancock, Joseph B, Polidura, Anthony L
  Abstract: Gone Fishing is a VR game that allows the player to fish from the comfort of their own home. This take on a fishing simulator has creative and playful designs that are sure to surprise the players. With this game, we intend to invoke different comedic aspects found in other games such as designs, descriptions, and possible voiceovers in order to give the players a good time. This isn't the average fishing simulator.
  Department: Software Engineering and Game Design and Development
  Supervisor: Dr. Joy Li
  Topics: Games
  Presentation | Poster | More Information
- *** UC-246 Spudify** (UC-246) by Bintliff, Nathanial R, Nguyen, Jimmy V, Holmes, Tyler, Tawara, Alex M, Christian, Addison
  Abstract: Spotify's yearly wrapped report is extremely popular amongst its users. Unfortunately users must wait a year from every report to view statistics about their listening habits. Our app will allow users to generate reports displaying their top songs and artists whenever they want. Additionally, our app will allow users to generate recommendations for new music based on their favorite songs/artists. Users will also be able to generate advanced

recommendations by inputting custom artists/genres/songs and customizing a variety of parameters such as the recommended song's tempo, loudness, and danceability. Our app will give Spotify users the freedom to view statistics regarding their listening habits whenever they want. Additionally, users will never run out of new music to listen to due to the custom song recommendation feature of our app.
Department: Computer Science
Supervisor: Prof. Sharon Perry
Topics: Software Engineering
Presentation | Poster | More Information

- **UC-247 Wild Fire Friend Or Foe** (UC-247) by Henderson, Christian S, Jennings, Revian C, Shelton, Kwentin
  Abstract: The U.S. Army Corp of Engineers in Carters Lake required a game that attempts to educate on the principles of both prescribed and non-prescribed fires. They request that the game be playable on an android device housed in a HOLOFIL holographic display. Additionally, it needed to be created in the mirrored format as the projection flips everything. We decided to use Unity Real-Time Development Platform to complete the game's development. Unity is a set of tools to give content creators an all-in-one development environment that helps content creators develop games and applications. "Unity is royalty-free and does not charge on a per-title basis or require revenue sharing of your application (Unity, 2022)."
  Department: Information Technology
  Supervisor: Dr. Zheng, Dr. Privitera
  Topics: Games
  Presentation | Poster | More Information
- *** UC-248 GTRI IT Management Web Application** (UC-248) by Oliver, Joshua D, Bryant, Teryn, Hamrick, Renate M, Hansford-Bellamy, Kendra, McGilberry , Terrell B
  Abstract: This application was part of an industry Capstone project with Georgia Tech Research Institute, with Mr. Matthew Pinkston as the industry sponsor, Ms. Allison Boyle as the industry Capstone coordinator, and Mr. Donald Privitera as the Capstone professor. Our team worked on creating the framework for an opensource, web-based IT management application that future developers can add various features and sub-applications onto for purposes such as asset and budget management. The application is PHP-based with its backend, utilizing the Laravel framework and several of its built-in features for routing, database management, login authentication with bcrypt hash security, and session tracking. The frontend design of the web application was done using HTML, Bootstrap, and jQuery. MySQL was used for the database, which is currently used primarily for the user authentication system. We have chosen the MIT licensing model to ensure future developers can easily add onto the code and incorporate sub-applications into our framework, which was created with the intent of being a basis for developers to add functionality to as they see fit. It also ensures the application serves as a free, opensource solution for small IT management departments.
  Department: Information Technology
  Supervisor: Prof. Donald Privitera, Sponsor Matthew Pinkston
  Topics: Enterprise Systems
  Presentation | Poster | More Information
- *** UC-249 Hemorrhage** (UC-249) by Respess, Daniel M, Brewer, Antonio S, Tran, Kenny, Li, Sandy, Watson, Rick B

Abstract: Hemorrhage is a fast-paced FPS action game with a focus on risky gameplay and dodging enemy attacks. Fight your way through hordes of grotesque creatures and make it to the end! The player starts with limited health but can steal more from killing enemies. Then, you can unleash this stored-up health to deal massive damage to your foes! Will you choose to be an unkillable tank? Or a brutal glass cannon?
Department: Software Engineering and Game Design and Development
Supervisor: Dr. Joy Li
Topics: Games
Presentation | Poster | More Information

- *** UC-253 Studio Buddy - Mobile Application** (UC-253) by Zicavo, Alejandro, Moloi, Tubatsi, Kinmakon, Elmiche
  Abstract: Studio Buddy is a Mobile App that will allow teachers and students to connect for Music Lesson coaching sessions. Teachers will be able to post practice material [hands-on and musical in nature] and assign the material to students. Professors will be able to track student progress and tailor students practice exercises. This is not a replacement for existing teaching technologies but allows for more seamless and directed instrumental practice. Our team worked with Professor Douglas Lindsey, the Mobile App requester (in the KSU music department) to define requirements and design the app. We used the first month of this course to solicit, document and design the application in FIGMA tooling. Once requester approved the design, we continued to building the application in react native and using other relevant technologies.
  Department: Computer Science
  Supervisor: Prof. Sharon Perry
  Topics: Software Engineering
  Presentation | Poster | More Information
- **UC-254 StewardShip** (UC-254) by Williams, Krystale A, Merrill, Jaeleon K, Jansen, Christian Thomas, Kroleski, Castle L
  Abstract: “StewardShip” is a virtual reality (VR) survival game set in a subterranean cave on an alien world. The game is a narrative-driven experience centered around the titular Stewards, a series of crewmembers awoken by the mining ship they inhabit after something catastrophic occurs, causing the ship to become irreparably buried. The player takes on the role of these successive Stewards to survive, explore, and uncover the mystery of how they ended up buried on an alien planet. Each Steward emerges into a unique environment, as the circumstances of the previous Steward impact how the setting has evolved during the time passed. Ultimately, the Stewards work towards the goal of uncovering the mystery of their situation and escaping the planet alive. The game's main focus is to give a new meaning for death and what it could mean for the player. With each Seward being awoken sometime after another dies, the player will have different experiences with each steward, who doesn't know that they are not the first. This also allows the passage of time from the death of one steward and the waking of another, causing changes in the environment which gives the player new and interesting things to explore.
  Department: Software Engineering and Game Design and Development
  Supervisor: Dr. Joy Li
  Topics: Games
  Presentation | Poster | More Information
- **UC-257 GTRI: AOA** (UC-257) by Pham, Jake D, Huballah, Zayda, Jones, Evans, Modi, Roshni, Bado, Salimata
  Abstract: The Capstone project Analysis of Alternatives focuses on research and testing workstation deployment software and see if they can fulfill certain

requirements that GTRI has requested. Planning and research was first conducted on ten different software that are available on the market where each software was evaluated on a point based system based on the requirements given to us by the company. After researching the ten software three are chosen that best fit the requirements from the company and are then moved to the testing phase. After testing the three chosen software the team will collectively decide which one to recommend to the company with a detailed analysis.
Department: Information Technology
Supervisor: Prof. Donald Privitera
Topics: Enterprise Systems
Presentation | Poster | More Information

- *** UC-261 Grocery Application** (UC-261) by Lyles-Woods, Quin'darius A, Maksymczuk, Adam, Le-Beard, Aidan, Sharma, Jeetu, Sor, Danny
  Abstract: This project is being completed for Kennesaw State University's CS 4850 - Computer Science Senior Project undergraduate capstone course. This project as described is a dynamic grocery list mobile app that updates all members when items are added. The app then must contain groups that the user is able to join, have a list that is shared between that group, and have the ability for all users in the group to add and remove items from the list. To notify the users, push notifications are likely to be used. In addition to having a shared list, it makes sense that each individual user must have their own individual list, where they can add and remove items, before adding them to their group's shared list.
  Department: Computer Science
  Supervisor: Prof. Sharon Perry
  Topics: Software Engineering
  Presentation | Poster | More Information
- *** UC-262 GTRI IT Web Management Project** (UC-262) by Sunar, Vanessa, Duong, Scott, NGAPPI , Firmin, Schmit, Meva H, Mah, Stephan
  Abstract: This project is meant to develop a baseline web application that will support development of future tools for managing an IT department (licensing, asset tracking, budget management, self-service software/configuration, issue management/tickets, etc.) As well as provide a free IT Management tool that an IT manager can easily access and use. Having an IT management tool to aid with different things such as tracking, budget management and more is very essential to efficiently run an IT department. There are various tools to assist with that which exist today. However, as pointed out by our client GTRI, a lot of them are poorly designed. Hence, our project seeks to help solve this issue by developing a baseline web application that will support development of future tools for managing an IT department and provide functionalities
  Department: Information Technology
  Supervisor: Prof. Donald Privitera, Dr. Reza Parizi, Matthew Pinkston
  Topics: Software Engineering
  Presentation | Poster | More Information
- **UC-263 IT4983 Cybersecurity Capstone** (UC-263) by White, Jordan, Woodman, Stephen C, Owens, Jenny, Gomez, Hector, Scott, Aaron
  Abstract: For the Cybersecurity capstone project, our team was given a webserver and website for the company Akwaaba. We were tasked to fix all vulnerabilities, keep the server up to date, and help maintain the site with uptime being the priority. After the first two milestones were complete, we

were to attempt to hack another team's server while they attempted to do the same to us. When the attack phase began on Wednesday 10/26, our team discovered the other team had not changed any of their original passwords, so we took control within thirty minutes and took it down soon after. As of 10/30, their site is still down while we haven't noticed any issues with our own. The attack phase has two weeks to go (ending on 11/14), so our group is actively monitoring both servers. Should the other team recover their server, we will make attempts to get back in and shut it down again. In the meantime, we have full confidence in our own server and do not anticipate any downtime.
Department: Information Technology
Supervisor: Prof. Donald Privitera
Topics: Security
Presentation | Poster | More Information

- *** UC-266 INDY-5 CompChores** (UC-266) by Berry, Myers, Snyder, Ian
  Abstract: Getting anyone motivated to complete chores can be a chore itself! To solve this issue, our team is using Dart and Flutter to build a desktop application that pits roommates, family members, and siblings against one another to complete chores for points. The purpose of this program is to simulate competition between users in order to motivate users to complete tasks amongst the living space. To complete this task, our program will provide a place where users can create a family, create an account, join a family, create chores, complete chores, check chore history, view the family scoreboard, and view how many chores they have completed. Users will be able to change chore points based on difficulty, estimated time of completion, and priority. There will also be a way for users to check chore history in order to know which chores were completed by each person. The family will have a main homepage which will show the top three scores within the family, the chores with the highest priority, and the family ID in which users can share with one another to allow others to join the family. Then for more detail there will be a chore page, a scoreboard page, and a settings page to change account information or leave a family. All of these pages and features will allow users to create an environment amongst their peers that is not only productive but is also fun!
  Department: Computer Science
  Supervisor: Prof. Sharon Perry
  Topics: Software Engineering
  Presentation | Poster | More Information
- *** UC-268 Buggy - Price Scraper Application** (UC-268) by Blake, John, Fitzgerald, David W, Guse, Anderson F., Zardoya, Jessica, Allen, Paul
  Abstract: Buggy is a desktop price scraper application that finds the best deals for users across several major retailers. Retailers include Amazon, Costco, Target, Walmart, and eBay. It simplifies bargain hunting by condensing product information from multiple websites into one, convenient place. Users can save products for future access, track search history, and compare search results with tabs for navigation. When they are ready to buy, they can simply click on the buy button and are directed to the vendor's page to check out.
  Department: Software Engineering and Game Design and Development
  Supervisor: Dr. Reza Parizi
  Topics: Software Engineering
  Presentation | Poster | More Information
- **UC-270 Red Pepper IT: IT Web Management Application and Content Management System** (UC-270) by Kim, Eun, Adekunle, Bukky, Washington, Catlin, Dedani, Neha, George, Ivana
  Abstract: Red Pepper IT is an application developed for Georgia Tech Research

Institute. The conception of this project arose from the lack of IT management tools that can address all the needs of an IT department. Furthermore, with the currently available tools, they are either poorly designed or have a high licensing cost. This project seeks to solve the need for such applications by building an open-source application that can be deployed internally by any business seeking a management tool for its IT department.
Department: Software Engineering and Game Design and Development
Supervisor: Dr. Reza Parizi, Course Instructor; Mr. Matthew Pinkston, GTRI Sponsor/Client
Topics: Enterprise Systems
Presentation | Poster | More Information

- *** UC-272 Defunct to Funct: Expanding the Functionality of Forgotten Robots** (UC-272) by Stockdale, Thomas E, Ho, Khoa, Huynh, Johnny, Nguiagaing Seuga, Marcel Youri
  Abstract: The field of robotics is an expanding landscape, pushing the frontiers of engineering, machine vision, artificial intelligence and more. The robotics industry also has a foothold in many areas, such as consumer markets, scientific research, industrial and medical applications, and even exploration. With the growing interest in automated machines, individuals who can work with these machines are in demand, and providing a way to learn the skills to do so would be just as valuable. Kennesaw State University is currently in possession of two UXA-90 Humanoid robots; both of which have remained in storage for extended periods of time since their purchase in the mid 2010's. They have been intermittently worked on, but prior groups were unable to make the robots functional. Our project is to assess the robots, attempt to bring them back online, and then to explore their functionality in the hopes that current and future students would be able to utilize these robots in different projects. We utilized the manuals that accompanied the robots, as well as the software documentation for the Robot Operating System (ROS) in order to access the robot's internal computer and diagnose the problems with the preloaded programs. By fixing the problems in the preloaded programs, we are now able to expand on the functionality of the robot with things such as voice control and face recognition.
  Department: Computer Science
  Supervisor: Prof. Sharon Perry
  Topics: Other (explain in the comments section)
  Presentation | Poster | More Information
- *** UC-274 RESTful Robots** (UC-274) by Young, Jack I, Comella, Derek M, Thomas, Sarah, Loveless, Andrew
  Abstract: The UXA-90 Robots have been sitting idle at Kennesaw State University for years. The only documentation provided were factory manuals, and there was nothing additional found online. The first step was to conduct a risk assessment and report the results to Professor Perry and Dr. Pei. The objective of the risk assessment was to determine the viability of the robots and the feasibility of three different senior project teams using them for a project. Once the risk assessment was completed and reported it was determined that all three teams could proceed with their senior projects. However, it was recommended that this team, SP-1 RED, develop a robot handling and training program and conduct training and certification of all other members of the other teams. The training and certification was conducted from September 14th through September 15th and documented online with a documentation website for all teams to reference. The robots

have the ability to move, walk, see (through a webcam), hear and speak (using built in speakers and microphones). The robots consist of: * An internal mini-PC running Ubuntu 14.04 LTS * Serial-over-USB communication ports * SAM interface motor control boards * RF remote control * USB HD webcam * Internal microphone and speakers The goal of this team, SP-1 RED is to increase the accessibility and usability of the UXA-90 robot including a REST API, documentation and training.
Department: Computer Science
Supervisor: Prof. Sharon Perry
Topics: Software Engineering

- Documentation website | Team website
Presentation | Poster |
- **UC-275 Network Simulation Software Analysis of Alternatives** (UC-275) by McCannon, Justin, Marsonia, Nidhi, McInnis, Michael, Nguyen, Tiffany, Uddin, Azm
Abstract: Computer networking is a challenging and complex area of study for those studying information technology. It is also one of the core tenants of the information technology industry. A barrier for many students entering the IT field is a lack of experience that can be applied to the real world. This project sought to research the various networking simulators currently available to find the one best suited for classroom usage as a way for students to gain more hands-on experience. It was found that Cisco Packet Tracer most met the requirements as provided by the project sponsor through the use of cosine similarity to compare the results. The project team then created a guide that covered creating a network in Packet Tracer with routers, switches, VLANs, IPv4, and IPv6 addresses. After creating the guide, the team concluded that Packet Tracer would be a strong tool to facilitate more hands-on networking experience in the Data Communications and Networking class at Kennesaw State University.
Department: Information Technology
Supervisor: Prof. Donald Privitera
Topics: IoT/Cloud/Networking
Presentation | Poster | More Information
- **UC-276 Akwaaba Web Server Security Project** (UC-276) by Vann, Jayland, Rogers, Ty G, Reese, Cody, Southern, Ronald W, Choudhury , Taiyeb
Abstract: Our team engaged in a mock cybersecurity drill. Our objective was to take on the roll of cybersecurity consultants and to secure a mock business website. Afterwards, we were to engage in the active defense of the site from another team, while perpetuating attacks on another team's site. Goals: - Secure a business website and then engage in it's active defense. -Perform a successful attack(s) on another team's website. Outcomes: -Developed a comprehensive security policy -Documented site risk and vulnerabilities - Implemented security and configuration changes
Department: Information Technology
Supervisor: Prof. Donald Privitera : Project Owner & Advisor/Instructor, Dr. Jack Zheng: Advisor / Instructor
Topics: Security
Presentation | Poster | More Information
- *** UC-277 Cosmic Cookoff** (UC-277) by Wilson, Milo D, Fushimi, Aidan, Parham, Wade G, Anderson, Miller, Chima, Kosi M
Abstract: A cooking rogue-like game where you cook the weapons you fight with.
Department: Software Engineering and Game Design and Development
Supervisor: Dr. Joy Li

Topics: Games
Presentation | Poster | More Information

- *** UC-278 Cyber Security in Blockchain** (UC-278) by Weese, Eric C, Cooper, Eric G, Fortson, Alex
  Abstract: Blockchain is a growing technology that utilizes a decentralized public record of transactions. It is not only used for cryptocurrency, but also IoT, financial systems, healthcare, supply chain, etc. Although blockchain is quite robust, it is not invulnerable. This project will explain and demonstrate several weaknesses of blockchain and how to prevent them. We will demonstrate the following attacks and how to prevent them using Solidity: Transaction Order Dependence, Denial of Service, Replay Attack, Writing of Arbitrary Storage Address Attack, Weak Randomness, and Honeypot Attack.
  Department: Computer Science
  Supervisor: Project Owner: Dr. Yong Shi, Advisor/Instructor: Prof. Sharron Perry
  Topics: Security
  Presentation | Poster | More Information
- **UC-296 Cybersecurity Park** (UC-296) by Weingarten, Neil E, Hendrick, JaDante, Nowokunski, Kylie, Crawford , Tyler
  Abstract: Cybersecurity Park is an educational VR game intended for middle-school-age children that aims to demonstrate a wide range of cybersecurity concepts to the players. Such concepts include hacking ethics and types of hackers, cryptography, Trojan Horse / ransomware viruses, and authentication and authorization. These concepts are split into various mini-games that the player can freely navigate to from the hub they spawn in. For example, in the mini-game showcasing the Trojan Horse concept, players play as a knight defending a castle from evildoers. Visitors will approach the castle and ask access into the castle, and, based on the actions by the visitors, the player will choose whether or not to allow access into the castle. The player acts as a firewall, and the visitors act like applications requesting access into a computer. If a bad visitor/application is let into the castle (representing a computer), then the castle will begin to catch fire. This one of six mini-games present within this game, and video demonstrations of some of these mini-games are provided.
  Department: Software Engineering and Game Design and Development
  Supervisor: Dr. Joy Li - Supervisor, Course Instructor; Dr. Yan Huang - Owner
  Topics: Games
  Presentation | Poster | More Information
- *** UC-304 A WEB APPLICATION DEVELOPED IN COLLABORATION BETWEEN THE CS 4850 SENIOR PROJECT COURSE AND THE KSU DEPT OF HISTORY AND PHILOSOPY** (UC-304) by Wilson, Leafy, Garcia Ortiz, Alexa, Morella, Mae B., Meyer, Braxton M
  Abstract: The Vada Project is is an upgrade to an existing web application for a collaborative debate platform used to facilitate good faith argumentation and evidence based reasoning using classical Indian theories of knowledge sources (prama?a vada). This web application is designed for classroom use to facilitate critical thinking, debating, and archiving arguments and counterarguments as structured by an Indian philosophical debate style known as Vada. The goals of this project are to design an intuitive and usable interface (HTML+CSS), a stable back-end (PHP+MySQL), and a maintainable codebase managed using static-analysis tools and continuous integration (GitHub Actions).
  Department: Computer Science

Supervisor: Prof. Sharon Perry – Department of Computer Science, Dr. Amy Donahue – Project Manager, Department of History and Philosophy
Topics: Other (explain in the comments section)
Presentation | Poster | More Information

Academic courses graduate (e.g. capstones, games, innovative special topics projects, other course projects) (8)

*** Project will be featured during the Flash Session**

- **GC-243 AoA of Workstation Deployment Solutions** (GC-243) by Alam, Mohammed S, Daino, Rahima, Davis, Brittany
  Abstract: Best suited for IT students who are able to use on-site (@ KSU) testing environment Perform a market survey of the best reviewed and used workstation deployment solutions Determine a set of requirements the business needs the solution to meet Determine metrics based off the requirements to measure the tools against each other Test the top 3 tools and provide a recommendation to the organization for which tool and its instructions for its basic initial setup
  Department: Information Technology
  Supervisor: Dr. Jack Zheng, Prof Donald Privitera
  Topics: Enterprise Systems
  Presentation | Poster | More Information
- **GC-244 MSIT Capstone Project Fall 2022** (GC-244) by Cochran, Megen, Story, Skylar, Brown, Tatiana, Babatunde, Simisola
  Abstract: Computer network system administrators need to inspect and analyze network traffic and detect malicious communications, monitor system performance, and provide operational services. However, identifying threats contained within encrypted network traffic, which has become increasingly prevalent, poses a unique set of challenges. It is imperative to monitor this traffic or threats and malware but do so in a way that maintains privacy. This project aims to develop a machine learning-based system that can accurately detect malware communication in this setting.
  Department: Information Technology
  Supervisor: Dr. Jack Zheng
  Topics: Data/Data Analytics
  Presentation | Poster | More Information
- **GC-250 Object Detection and Tracking: Deep Learning-based Framework with Euclidean Distance, IoU, and Hungarian Algorithm** (GC-250) by Hossain Faruk, Md Jobair
  Abstract: Object tracking is an important basis for the logistics industry where multiple packages are moved on conveyor belts at a time. Accurate datasets and efficient benchmarks are a few of the several problems for both object detection and tracking for training the deep learning-based framework. Preparing 100% accurate correspondence between objects throughout different frames by assigning human annotated unique_attributes to train framework efficiently over ground truth data. In this research, we develop an (i) OpenCV-based framework that allows the user to assign human-annotated identification between objects and (ii) a novel application for object detection and tracking. We utilize the assigned attributes to train the deep learning model accurately and adopt various evaluation parameters including euclidean distance, intersection over union (IoU), and scale-invariant feature transform (SIFT) to measure the accuracy of an object correspondence or

tracking. We also adopt the Hungarian algorithm to increase the efficiency in determining correspondences between objects and apply our framework to human-annotated ground truth datasets comprising ~1,000 images and the same amount of JSON files. Our demonstration achieved 94.53 % accuracy in object detection, finding correspondence, and object tracking. In future studies, we are aiming to apply a neural network to draw a comparison of identified accuracy.
Department: Computer Science
Supervisor: Dr. Selena He, Dr. Dan Lo
Topics: Artificial Intelligence
Presentation | Poster | More Information

- *** GC-258 Heart Disease Prediction using Machine Learning** (GC-258) by Jackson, Devin, Stupka, Richard, Chigurupati, Trinadh, Moore, Demontae
  Abstract: Research has shown that the early detection of Heart Disease is critical to treating and understanding the causes. Through the use of advanced machine learning models and com- prehensive data sets collected on patients of varying backgrounds and health statuses, this research shows the listed correlations between attributes of data points and positive identification of the disease. This research uses 1026 unique records and 14 attributes including the classifier of Heart Disease. These attributes range from simple (cholesterol level) to more complex and subjective (chest pain type) but each attribute presents an opportunity to improve each of the analyzed models significantly. Index Terms—WEKA, Machine Learning, Health Data
  Department: Information Technology
  Supervisor: Dr. ack Zheng, Dr. Seyedamin Pouriyeh
  Topics: Data/Data Analytics
  Presentation | Poster | More Information
- *** GC-279 Geometry Matching Task for Improving The Cognitive Ability in Rehabilitation Process** (GC-279) by owoade, samuel, Chamarthi, Ravi Teja, Kalipindi, Jeevana, Temgoua, Ghislain Dongbou
  Abstract: According to Taylor & Francis Group, LLC (2015), in the National Library of Medicine“Traumatic brain injury (TBI) impacts the lives of 1.5 to 2 million new individuals each year; 75,000 to 100,000 of these are classified as severe and will suffer enduring severe spasticity in addition to cognitive”. This game follows and respect basic and fundamental rules of brain and muscles recovery process and will help patients in their process of rehabilitation and by extension will improve their cognitive abilities.
  Department: Software Engineering and Game Design and Development
  Supervisor: Dr. Sungchul Jung
  Topics: Games
  Presentation | Poster | More Information
- **GC-308 Heart Disease Prediction And Analysis By Machine Learning** (GC-308) by Nekkalapu, Venkata Sabarinath, Yammada, Venkata Anusha, Kapoor, Mrinal, Ponugoti, Sai Sindhu, Pudota, Suman
  Abstract: The heart is the most crucial part of the Human body. The organ circulates blood out of the circulatory system’s blood vessels. Any disease or failure of this organ causes death. Heart disease is one of the primary sources of death in the cutting-edge world. There are 2,380 deaths from heart disease each day, based on 2018 data. Also, heart disease causes the highest number of deaths globally, with approximately 18 million people dying yearly, meaning around 31This prediction can be made using Machine Learning techniques.

With machine learning. Combining a prediction model with machine learning correctly classified results for heart disease with classification Zero r, Grip (FURIA) classification, Decision tree J48, Classification MLP, MLR (multinomial logistic regression), Bagging, Boosting, stacking classification. J48 has the highest accuracy. As it is described that early detection of heart disease plays vital role in saving individuals life. considering the classification method in machine learning is chosen one for diagnosing heart disease and hence there are good outcomes that are came out. This research was based on 2020 survey conducted by CDC on BRFSS. based on these 8 different machine learning methods we have chosen.
Department: Information Technology
Supervisor: Project Owner: Dr. Seyedamin, Project Coordinator: Dr. Jack Zheng
Topics: Data/Data Analytics
Presentation | Poster | More Information

- *** GC-311 SINGSINGMARKETPLACE.COM: E-commerce marketplace for remote vendors** (GC-311) by tor, daniel k, Ogegbene-Ise, Ebikela
  Abstract: American residents in the (Nigerian, Liberian, Indian, Ghanaian, etc.) Diaspora have strong ties back home and as such support loved ones, back home, on a regular basis, by sending cash remittances through Western Union, MoneyGram, etc. Remittances are expensive. Remitters have no control over how funds are spent once received. Remitters cannot send small amounts because the fees cannot be justified. We built a marketplace platform that allows the Diaspora to remit goods and services, instead of sending money to relatives back home in. The objectives are to remove or greatly reduce the cost of remittances, give more control to the remitters, and facilitate the spending of small amounts to sustain loved ones back home.
  Department: Software Engineering and Game Design and Development
  Supervisor: Dr. Reza Parizi
  Topics: Software Engineering
  Presentation | Poster | More Information
- *** GC-312 Title - GTRI IT Service Desk System** (GC-312) by Nwago, Koranna, Emani, Vineela, Gopi, Venkata Naga Rishita, Chatrathi, Bhavishya, Msimanga, Siphiwindoda
  Abstract: This overarching project would be web development, which would entail coding both the back end and the front end. The use of libraries is encouraged, but we must be cautious about licensing and ensure that this project remains as open-source as possible (a good open-source license ensures people can use, modify, redistribute, and sell without worry). This is a free and open-source project.
  Department: Information Technology
  Supervisor: Dr. Dr. Jack Zheng
  Topics: Other (explain in the comments section)
  Presentation | Poster | More Information
-

Graduate Research (14) −

*** Project will be featured during the Flash Session**

- *** GR-241 On Training Explainable Neurons** (GR-241) by Kennedy, Lance,
  Abstract: Neural networks have become increasingly powerful and commonplace tools for guiding decision-making. However, due to the black-box nature of many of these networks, it is often difficult to

understand exactly what guides them to a certain prediction, making them dangerous to use for sensitive decision making, and making it difficult to ensure confidence in their output. For instance, a network which classifies images of dogs and cats may turn out to be flawed with little consequence, but a neural network that diagnoses the presence of diseases should be assured to make sound predictions. By understanding why a network makes the decisions it does, we can help to guarantee that the choices were made in a sensible way. However, part of the reason neural networks are considered a black-box is because it is very difficult computationally to explain how they work. In fact, individual neurons are known to be hard to explain already. In our research, we consider whether it is possible to learn an individual neuron that is explainable from the start. Unfortunately, our first result tells us that it is NP-hard to learn such a neuron. Fortunately, we have found new conditions under which we can learn an explainable neuron in pseudo-polynomial time.
Department: Computer Science
Supervisor: Dr. Arthur Choi
Topics: Artificial Intelligence
Presentation | Poster

- *** GR-245 Parsimonics: Achieving High Classification Accuracy even with High Dimensional Image Reduction** (GR-245) by Owens, Joshua,
  Abstract: In an age of big data, being able to “do more with less” is important. We show that by following a minimalist paradigm, or “parsimonics”, high image classification accuracy can be achieved even with massively reduced-size datasets. This lets us “do nearly as much with way less”. This idea was tested against a dataset of 87,000 American Sign Language (ASL) alphabet images, yielding high accuracy results of greater than 99% over multiple iterations. These results could have implications for how big data is handled because the data needed to meet objectives may not need to be so big after all.
  Department: Computer Science
  Supervisor: Dr. Dan Lo
  Topics: Artificial Intelligence
  Presentation | Poster
- **GR-251 Operating System (OS) Security: Identifying Vulnerable Logging Events and Logging Optimization to Detect OS Threats** (GR-251) by Hossain Faruk, Md Jobair
  Abstract: Modern operating systems have security threats from different perspectives, logging for instance. Logging refers to a collection of computer activities uses for statistical purposes, and it becomes a fundamental feature of OS. Analysis of events of logs allows not only the detection and debugging of OS but also configuration errors of applications. Cyberattackers can utilize logging information that can jeopardize operating systems' security. In this research paper, we investigate operating systems logging mechanisms of modern operating systems where we focus on Microsoft Windows OS. We introduce different security issues related to logging and emphasize the selection and optimization of logging events for the Windows 11 event viewer to find features of the logging service that can be exploited by malicious individuals to conduct vulnerability in OS. We identify various unwanted logging features that are vulnerable to the operating system's

security. We also identify features for system tuning, intrusion detection, authentication, session management, file system, runtime, and connectivity errors along with virus detection and configuration changes. These logging features also can be adopted for forensics purposes to identify fraud, suspicious, or other cybercrime activities utilizing user's activities. According to our preliminary findings, identified logging features should be discarded or improved to enhance OS security and increase the level of logging events protection for users. In our extended study, we will consider including the available open-source vulnerable logging dataset to provide a comparison between previous and identified logging vulnerabilities.
Department: Computer Science
Supervisor: Dr. Dan Lo
Topics: Security
Presentation | Poster

- * **GR-252 Solving Multiple Traveling Salesman Problem using K Means Clustering and Mixed Integer Programming - An Integrated Approach** (GR-252) by Verma, Navneet,
  Abstract: In this research paper, we explore an efficient algorithm for multiple Traveling Salesman Problem (m-TSP) using an approach which combines K Means clustering algorithm and Mixed Integer Programming (MIP). The Traveling Salesman problem is an NP hard problem which relates to generation of minimum cost round trip tours for multiple salesmen visiting several cities in their territory. Our novel approach has the promise of reaching closer to the optimal solution as compared to heuristics-based approaches such as genetic algorithms.
  Department: Computer Science
  Supervisor: Dr. Dan Lo
  Topics: Other (explain in the comments section)
  Presentation | Poster
- * **GR-267 Churn Prediction** (GR-267) by DASARI, MANOJ KUMAR, Thota, Nikhil, Thota, Dinesh Kumar, Basava, Rishi Sai, Sugguna, Prudhvi Kalyan Sai
  Abstract: Employee churn is a situation where people leave the organization voluntarily or involuntarily. This has become a serious problem in recent times. We have also seen that attrition rates in several industries are going high. So, it is very much required to understand and analyze the reason behind attrition and why this is happening. We must conduct an analysis to know what the factors affecting employee churn are. It will create a huge impact on the organization if the attrition rate goes high. In order to resolve this issue, we are trying to take up this issue and find the best solution for this.
  Department: Computer Science
  Supervisor: Dr. Dan Lo
  Topics: Artificial Intelligence
  Presentation | Poster
- * **GR-273 BUILDING A CHATBOT** (GR-273) by Gottam, Varun, Chepyala, Sathwik, Saimpu, Sai Mohit, Yalavarthi , Venkata Sai krishna, Buddiga, Nikhil Sai
  Abstract: A chatbot is now a part of many online applications like Health Care, Education, E-commerce, etc. It made the conversation between the customers and the service providers much more convenient as the chatbot can answer most of the queries without human intervention from the website side. This saves a lot of time and work.

Department: Computer Science
Supervisor: Dr.. Dan Lo
Topics: Artificial Intelligence
Presentation | Poster

- **GR-283 CHATBOT** (GR-283) by Dhulipalla, Vamsi krishna,
Abstract: Mental health issue are the most common issue facing in human society. These issues are mostly in impact negatively on working peoples, on the individual, his/her family, workplace, community, and the economy. Our project is based on mental health chat bot of natural language processing with deep learning models .We have a structure data set of Mental Health. In the data set we have nine columns. We use neural networks to create our models .We use another method call scratch in which we create a model by our self and use it so our project we create a layer with the help of scratch .There is a 3 script of code first on is for chat bot second one is for deep learning models with neural networks and third one is from scratch. We use NLTK preprocessing methods that helps us to clean text data. Then we pass the data into chat bot class that we have created. The chat bot class is helps us to test that our data set is perfectly clean or not and we take predictions of that data set. We select two columns in our data set and extract them know we apply some method to extract features on it the data set. These features helps us to find a better accuracy result for the models. So we convert our data set into training part or test part. We convert it randomly and through library so we sure that our data set is perfectly clean for our deep learning models. We create our own different deep learning models and compile that model after that we fit data into these models and take predictions. We draw a graph and confusion matrix that help us to understand who our models works and what is the predictions of the models. We use python version 3.9 and tools is Jupiter Notebook in Anaconda.
Department: Computer Science
Supervisor: Dr. Md Abdullah Al Hafiz Khan
Topics: Artificial Intelligence
Presentation | Poster
- **GR-284 Automated Vulnerability Detection in Source Code Using Deep Neural Networks** (GR-284) by Akter, Mst Shapna
Abstract: One of the most important challenges in the field of a software code audit is the presence of vulnerabilities in software source code. Every year, more and more software flaws are found, either internally in proprietary code or revealed publicly. These flaws are highly likely exploited and lead to system compromise, data leakage, or denial of service. C and C++ open-source code are now available in order to create a large-scale, machine-learning system for function-level vulnerability identification. We assembled a sizable dataset of millions of open-source functions that point to potential exploits. We created an efficient and scalable vulnerability detection method based on deep neural network models that learn features extracted from the source codes. To remove the pointless components and shorten the dependency, the source code is first converted into a minimal intermediate representation. We keep the semantic and syntactic information using state-of-the-art word embedding algorithms. The embedded vectors are subsequently fed into convolutional neural networks to classify the possible vulnerabilities.

Furthermore, we proposed a new neural network model which seems to overcome issues associated with traditional neural networks. To measure the performance, we used evaluation metrics such as f1 score, precision, recall, accuracy, and total execution time.
Department: Computer Science
Supervisor: Dr. Dan Lo
Topics: Artificial Intelligence
Presentation | Poster

- **GR-287 NATURAL DISASTER PREDICTION** (GR-287) by Sabbu, Sravya, Turlapati, Aishwarya, Adivi, SuryaPraveen
  Abstract: Natural disasters are events that are difficult to avoid. There are several ways of reducing the risks of natural disasters. One of them is implementing disaster reduction programs. There are already several developed countries that apply the concept of disaster reduction. In addition to disaster reduction programs, there are several ways to predict or reducing the risks using artificial intelligence technology. One of them is machine learning. By utilizing this method at the moment, it facilitates tasks in visualizing, analysing, and predicting natural disaster. This project will focus on conducting a review process and understanding the purpose of Machine learning in the area of disaster management and natural disaster. The result of this project is providing insight and the use of data, machine learning in disaster management area.
  Department: Computer Science
  Supervisor: Dr. Mahmut Karakaya
  Topics: Other (explain in the comments section)
  Presentation | Poster
- **GR-288 Comparative performance analysis of hybrid quantum machine learning algorithm to assess Post stroke rehabilitation exercises** (GR-288) by Murikipudi, Manohar, Azmee, Abm. Adnan
  Abstract: Due to the advancements in technology, data is growing exponentially. With this increased dataset size, the computation to process the generated information is rising sequentially. And the currently available classical computational tools and learning algorithms will not work due to the limitations of Moore's law. To overcome the computational issues, we have to switch to Quantum Computing which works based on the laws of Quantum Mechanics. Quantum Machine Learning (QML), a subset of Quantum Computing, is faster and more capable of doing complex calculations that a classical computer can't. Classical Computers work on bits - 0 or 1, whereas a Quantum Bit (also known as a qubit) works on the superposition principle and can be 0 and 1 at the same time before it is measured. Other properties known as Quantum Entanglement, Quantum Parallelism, etc., also will help in understanding the other qubit state and parallel processing the data. In this paper, we introduce hybrid quantum and convolutional models built using PennyLane on the UI-PRMD dataset for the Kinect sensor. By involving quantum layers in a traditional network, a better performance can be achieved compared with the traditional neural network performance.
  Department: Computer Science
  Supervisor: Dr. Md Abdullah Al Hafiz Khan - Supervisor
  Topics: Artificial Intelligence
  Presentation | Poster

- **GR-300 Azure Security KQL Query Builder** (GR-300) by Sabbula, Navyapravalika,
  Abstract: We produce and manage petabytes of data every day in today's culture when everything is digitally recorded, from our web surfing habits to our medical records. Big data will significantly alter all facets of existence. However, simply processing and interpreting data is insufficient; when data is presented visually, the human brain can identify patterns more quickly. In many different businesses, data analytics and visualization are essential decision-making tools. The visualization field is also opened up, displaying innovative thinking for visualizing the big-data dilemma. It is challenging to see such massive volumes of data in static or real-time formats. we explain why large data visualization is crucial, outline its difficulties, and evaluate a few big data visualization solutions. These advancements include looking at how to use systems and techniques for data visualization to manipulate, understand, and show data more effectively. The potential of our Azure Security KQL Query Builder's new visualization technologies to improve the display of performance data collected as an output from simulation programs in the built environment area has mostly gone untapped. Azure Security KQL Query Builder, a set of business intelligence (BI), reporting, and data visualization tools and services for people and teams, curates the best practices and knowledge of thousands of customers to assist users, teams and your organization in becoming more data driven.
  Department: Software Engineering and Game Design and Development
  Supervisor: Dr. Reza Parizi
  Topics: Data/Data Analytics
  Presentation | Poster | More Information >>
- **GR-303 DEMPSTER-SHAFER THEORY OF COMPUTATION** (GR-303) by Eadara, Sandeep, Bandi, Dhanunjai, Nannapaneni, Sri Manju, Rayavarapu, Jayanth Kumar, Yarlagadda, Taraka Vishnu
  Abstract: To implement the Dempster-Shafer Theory algorithm as well as check the prediction accuracy using this mentioned algorithm in the iris dataset. The actual aim of this paper is to understand and implement the Dempster-Shafer Theory using the python programming language. To reflect doubt and inaccuracies in the evidence, one might use a belief structure that is defined as a set function m that satisfies. The conjecture of this report is to get the closable prediction accuracy that can help to understand future improvement as well as the gap of the applied implementation techniques
  Department: Computer Science
  Supervisor: Dr. Dan Lo
  Topics: Other (explain in the comments section)
  Presentation | Poster
- **GR-306 Improving Wildfire Propagation Simulations Using Cellular Automata to Help Emergency Management** (GR-306) by Frank, Madeline, Meesala, Lokesh, Bollineni, Yagnasree, Venkatesh, Amrutha, Shaik, Mujahid Shaheed
  Abstract: Discrete computational models known as cellular automata (CA) utilize discrete spatial cells, each existing in one of a set of possible states at any given moment. Transition rules specify how a given cell's state evolves in subsequent time steps and is dependent on the states of the given cell's neighborhood of surrounding cells. A cellular automaton

model can also account for the influence of other external or physical factors on the evolution of a given cell's state. These capabilities afforded by CA models make it an ideal tool to simulate the propagation of wildfires. One specific study carried out by Freire et al. [2019] sought to improve upon the benchmark concept by attempting to incorporating topographical, meteorological, and fuel loading factors into the transition rules of their probabilistic CA model. This project proposes two ways to improve the accuracy of their proposed CA to model wildfire propagation to reduce uncertainty intrinsic to a probabilistic approach. First, we attempt to incorporate fire weather indices that account for relevant meteorological, climatological, and fuel stress and flammability conditions that affect the ability of, and therefore the probability that, fuel within a cell can ignite within a given time step. Next, Freire et al. [2019] determined a constant burn rate to use for each time step based on empirical and probabilistic data that is specific to a certain fire they studied. The capability to account for burn rate for cells with varying fuel load factors will also be assessed in this paper. Ultimately, the purpose of these efforts is to increase the accuracy of fire propagation simulations using cellular automata models to assist emergency management and firefighters warn, evacuate, fight, and allocate resources to efficiently protect life and property.
Department: Computer Science
Supervisor: Dr. Dan Lo
Topics: Other (explain in the comments section)
Presentation | Poster

- ***GR-307 EEG classification using Neural Network – An Application of Machine Learning in Classification of attention deficiency, to measure the effect of ChakraMarmaKosha Meditation-II** (GR-307)
by Gopi, Sreekanth,
Abstract: In his previous research, the author did a study on ChakaMarkaKosha Meditation, a meditation developed by the author that could reduce stress, by using Heart Coherence as the only metric. As a sequel, this study involves a second part of the meditation that could reduce distractions and hyperactivity among students. The hypothesis is that ChakaMarkaKosha Meditation II improves attention, induces calmness, and increases student efficacy and performance. Attention is one of the cognitive skills that involves concentration, problem-solving, judgment, and language (Rego et al., K. 2010). Attention-Deficit Hyperactivity Disorder (ADHD) is a neuro-developmental disorder which is characterized by hyperactivity, inattention, and abrupt actions (Mohammadi et al., 2016), as well as certain degrees of inattentiveness, impulsivity, and hyperactivity subsets (Lambalgen et al., 2008). Thus, it could be an approach for improving Attention-deficit/hyperactivity disorder (ADHD) as well. In initial phase, this study involves detection of ADHD using a Machine Learning classifier Multi-layer Perceptron (MLP). MLP, a backpropagation learning algorithm classifier, is a fully connected multi-layer neural network that is used in classification of ADHD (Nelles, O. (2020). Here, we used an existing EEG dataset that includes data collected from 30 kids (22 boys and 8 girls around 10 years of age) who had been diagnosed with ADHD by a skilled psychiatrist and 30 kids who were healthy controls (25 boys and 5 girls) participated in the study in a silent room. To achieve classification for ADHD diagnosis by electroencephalogram (EEG) as an objective approach, we developed a new Machine Learning Algorithm. This was accomplished using a

feature extraction process using Fourier analysis and frequency band calculations. Alpha (a), Beta (ß), Gamma (?), Delta (d), and Theta (?) bands table were extracted and then used to classify data accordingly. This was determined through spectral analysis of theta/beta ratio (TBR) - an index of inattention. The ability to control one's attention, actions, thoughts, and/or emotions to counteract a strong internal propensity or external enticement is one of the main executive functions (EFs), and TBR may be a biomarker for this ability (Zhang, D. W, 2017). These techniques utilized for classification were developed in Python using MLP classifier, and after training and testing, it was found that the model produced 61.5% accuracy. This model will be improved for accuracy in the next phase to determine the effect of ChakaMarkaKosha Meditation II through live EEG data analysis.
Department: Computer Science
Supervisor: Dr. Nasrin Dehbozorgi
Topics: Data/Data Analytics
Presentation | Poster

Undergraduate Research (6) −

*** Project will be featured during the Flash Session**

- *** UR-269 Towards Bounding the Behavior of Deep Neural Networks** (UR-269) by Borowski, Richard,
  Abstract: Advances in Artificial Intelligence (AI), particularly in the form of deep neural networks, have revolutionized a diverse range of fields. As neural networks become more pervasive, the need to understand the boundaries of their behavior is becoming increasingly important. For example, can we formally guarantee that an autonomous vehicle will not violate traffic laws, such as reaching excessive speeds? Towards the goal of bounding the behavior of a neural network, we propose how to bound the behavior of individual neurons by incrementally tightening formal bounds on it. We further provide a case study on classifying handwritten digits to illustrate the utility of our algorithm in terms of bounding the behavior of an individual neuron.
  Department: Computer Science
  Supervisor: Dr. Arthur Choi
  Topics: Artificial Intelligence
  Presentation | Poster | More Information
- *** UR-280 Speech Recognition** (UR-280) by Rojjhanarittikorn, Rachnicha,
  Abstract: Most people use Google, and they have Google Assistant installed on their devices, such as smartphones. It allows us to talk with the robot and it will assist us by answering questions and controlling devices on the phone. Google can convert the user's speech to text using Natural Language Processing and Neural Networks. Google Assistant has a tool to convert speech to text, which is speech recognition. Speech recognition can be developed as a tool to assist people by using voice. It will save people time or benefit the people who do not know how to write English or other languages, they should be able to speak, and the program will understand them.
  Department: Computer Science

Supervisor: Prof. Nick Murphy
Topics: Artificial Intelligence
Presentation | Poster | More Information

- *** UR-285 OPERATION ENDURING FREEDOM: Improving Mission Effectiveness by Identifying Trends in Successful Terrorism** (UR-285) by Shaver, Dalton A,
  Abstract: This research examines how the characteristics of terrorist attacks predict the chance of an attack succeeding, where an attack is defined as successful if the intended attack type is carried out. Data from The Global Terrorism Database (https://www.start.umd.edu/gtd) was analyzed across three geographical missions within Operation Enduring Freedom: Trans-Sahara, Horn of Africa, and the Philippines. The three models were able to distinguish between successful and unsuccessful attacks at 78.74%, 82.11%, 74.25%, respectively. Using predicted probabilities of success obtained from each logistic regression model, the medians were plotted to compare the characteristics of terrorist attacks across missions. The coefficients for each model were analyzed to compare the odds of success for each variable level to the odds of success of the reference level for that variable. Lastly, the coordinates for successful and unsuccessful attacks as classified by the dataset was plotted to explore spatial patterns in regional maps. Many insights were gathered through analyzing Operation Enduring Freedom missions. It is shown that terrorists are substantially successful in their aims to terrorize the general populace. Attacks targeting private citizens, tourists, non-governmental organizations, and food or water supply, have the largest probability of success for the Trans-Sahara and Horn of Africa regions. Suicide attacks in the Philippines raise the chance of success, in contrast to the other two missions. The predicted probability of success when explosives and firearms are used in the Philippines is lower than the Trans-Sahara and Horn of Africa mission areas. Additionally, the odds of an attack succeeding when it involves a barricade incident with hostages is 10,491 times greater the odds of an attack succeeding when it involves bombings. By determining the specific characteristics of attacks that produce the highest probabilities of success, the effectiveness of Operation Enduring Freedom can be improved by focusing counter-terrorism training and operations on the features that predict successful attacks.
  Department: Data Science and Analytics
  Supervisor: Prof. Susan Hardy - Main Advisor, Dr. Gene Ray - Consultant Meeting, Dr. Austin Brown - Consultant Meeting
  Topics: Data/Data Analytics
  Presentation | Poster | More Information
- *** UR-294 A Quantum Arithmetic Logic Unit** (UR-294) by Butler, Ethan, Phillip, Bryson, Ulrich, Benjamin G, Carroll, David
  Abstract: This paper demonstrates that a quantum version of a classical Arithmetic Logic Unit (ALU) can be implemented on a quantum circuit. It would perform the same functions as the classical ALU, with the possibility of adding quantum functions in conjunction. To create the quantum ALU, we utilized IBM's Qiskit Python package and JuypterLab. We also used the IBM Quantum Lab to run the circuit. We believe that a quantum ALU has the potential to be faster than its classical counterpart and the ability to calculate quantum specific operations. The simple classical functions translated to a quantum circuit show a promising future for the development of a full quantum ALU with unique quantum operations.
  Department: Computer Science
  Supervisor: Senior Project Course Instructor: Prof. Sharon Perry; Project Owner:

Dr. Dan Lo
Topics: Other (explain in the comments section)
Presentation | Poster | More Information

- **UR-295 Data Collection in Parkinson's VR** (UR-295) by Weingarten, Neil E, McConnell, Ian
  Abstract: This submission is meant to show an addition to a Parkinson's simulation within VR where there are now different methods of data collection that are collected in-game. These data points are tracked and logged during gameplay, and are meant to allow researchers to make more effective use of the simulation as a tool for data collection. An example demo of the game and example files that were generated during gameplay are provided.
  Department: Software Engineering and Game Design and Development
  Supervisor: Dr. Joy Li
  Topics: Games
  Presentation | Poster | More Information
- *** UR-302 Using Quantum Computing to Determine the Optimal Path on Cascading Graphs** (UR-302) by Swann, Michael B, Hunt, Ethan K
  Abstract: Quantum computing has completely changed the computing paradigm. These special computers leverage the unique properties of quantum mechanics to solve problems that a classical computer cannot solve in polynomial time. Quantum mechanics such as superposition and entanglement are used to boost computational power exponentially in many problems . Many traditionally NP-complete problems, such as breaking the encryption of public-private key systems, are solvable with quantum computing in polynomial time. In this project, we will review quantum computing basics using real quantum computers and build on those basics to solve a subset of a graph optimization problems using both existing and new methodologies. Our research focuses on a subset of graphs named "Cascading Graphs" and finding the "best" path based on a predetermined metric. To solve this problem, we plan to use a mixed approach for finding a mathematical algorithm and creating an implementation of the algorithm in a quantum computer. This mixed approach will be based on a cycle consisting of trying a find a mathematically rigorous proof and testing different cases to help build an understanding of the problem, which will then be verified using a quantitative approach.
  Department: Computer Science
  Supervisor: Mentor: Dr. Dan Lo; Course Instructor: Prof. Sharon Perry
  Topics: Other (explain in the comments section)
  Presentation | Poster | More Information

Exploratory Projects (0) −

*** Exploratory Projects for C-day are not judged. This category is reserved for students who are still taking foundation courses (e.g. CSE 1321, IT 5443), and for teams with more than 5 members.**

- **eGC-**