

College of Computing and Software Engineering / Computing Showcase /  
Fall 2023 C-Day Winners

# Fall 2023 C-Day Winners

## 1st place Graduate Capstone Project

GC-417 IT Curriculum Success Portal (Graduate Capstone) by [Thacker, Alexander, Boakye-Danquah, Cedric, Adeyemo, Damola, Ndiaye, Abdoulaye, Asante, Lydia,](#)

**Abstract:** In this project, we built a curriculum and course web portal to have all curriculum and course information in one place with easy search and browse interfaces. Currently course data and information are scattered in various places. These include essential information like course description, learning outcomes, sample syllabus, offering schedule and history. It also includes curriculum development information for department use, such as coordinator, developer, revision schedule, open learning materials. We collected all sources of IT course information and built a database to integrate the data in one place. Through this, we can build a complete profile of a course and our curriculum. Then, a data driven interactive web app can pull the data from the database and display all course information to users in dynamic views. This is meant to consolidate a large amount of information about IT courses into one place so students and faculty can easily find the otherwise fragmented information.

Department: Information Technology

Supervisor: Dr. Jack Zheng

Topics: Application Development

[Presentation](#) | [Poster](#) | [More Information](#)

## 1st place Graduate Research Project

GR-434 Phase Estimation's Application in QRAM (Graduate Research) by [Hunt, Ethan K,](#)

**Abstract:** The paper proposes a new novel way of creating QRAM through quantum phase estimation. This is done by mapping a monotonically increasing sequence of natural numbers to a binary series and, ultimately, to a characteristic constant  $\eta$  which is then encoded as a phase in a quantum state. This process leverages quantum phase estimation, a fundamental quantum algorithm for finding the eigenvalues of a unitary operator which can be used as a form of QRAM in either Quantum or Hybrid models of computing

Department: Computer Science

Supervisor: Dr. Dan Lo

Topics: High Performance Computing

[Presentation](#) | [Poster](#)

# 1st place Undergraduate Capstone Project

**UC-400 Electric Vehicle Team** (Undergraduate Capstone) by [Solon, Brandon A](#), [Klein, Austin D](#), [McMaster, Caleb](#),

**Abstract:** The KSU Electric Vehicle Team is developing a fully autonomous electric go-kart to compete in the Autonomous Karting Series (AKS). Our team will be making two programs for the kart's software stack. These programs include a race line optimizer, which can take the centerline of a track and generate a minimum curvature path for it to follow to get around the track faster, as well as a race controller which can switch navigation algorithms automatically based on the current conditions of the race.

Department: Computer Science

Supervisor: Prof. Sharon Perry

Topics: Artificial Intelligence

[Presentation](#) | [Poster](#) | [More Information](#)

# 1st place Undergraduate Research Project

**UR-409 Enhancing Aircraft Electronic Warfare Testing with Automated RF Spectrum Analysis** (Undergraduate Research) by [De Santiago, Anthony](#), [Morgan, Matthew T](#), [Kim, Geonhyeong](#), [Bailey, Jalon L](#), [Reaves, Camille](#),

**Abstract:** Military test ranges utilize a variety of Radio Frequency (RF) threat systems, to assess the effectiveness of Electronic Warfare (EW) systems during flight tests. A component of this process involves monitoring RF transmissions. Traditionally, system engineers at Robins Airforce Base have manually analyzed video from spectrum analyzers to confirm properties of specific threat systems. To streamline this analysis, our team's aim was to develop an automated solution for RF spectrum analysis. We employed a custom YOLO V8 model to isolate the analyzer screen and used a novel combination of frame differencing, summing, and agglomerative clustering techniques to extract relevant properties of measured signals. Our resulting application significantly reduces human interaction, enhances accuracy, and allows for the transformation of video data into a digitally manipulatable numeric format.

Department: Software Engineering and Game Design and Development

Supervisor: Project Sponsor: Elizabeth Dayton; Capstone Professor: Dr. Yan Huang

Topics: Artificial Intelligence

[Presentation](#) | [Poster](#) | [More Information](#)

# 2nd place Graduate Capstone Project

**GC-503 Multikernel: A detailed Analysis of Multicore OS Kernel** (Graduate Capstone) by [Jinan](#),

[Umme Afifa,](#)

**Abstract:** In modern computer systems, multiple processing cores offer immense possibilities to perform parallel and dynamic computing and diversity in architecture. However, such processing creates more challenges as software developers need to design applications that can effectively utilize these multicores for improved performance. Static optimization of such dynamic structures is practically impossible. So, a novel OS structure called multikernel inspired by the distributed systems, is introduced, which will provide superior scalability. In this paper, we briefly review the concept of multikernel OS, analyze and re-evaluate its architecture. Then we introduce some debugging and analysis tools to measure performance of the Windows hybrid kernel. This study will help get a deep insight into existing multikernel-based research, the use of existing analysis tools to measure performance and possible optimization based on analysis results of popular hybrid kernels like Windows.

Department: Computer Science

Supervisor: Dr. Dan Lo (Course Instructor)

Topics: High Performance Computing

[Presentation](#) | [Poster](#)

## 2nd place Graduate Research Project

**GR-519 Meditation as an intervention to improve Student Attention An EEG study based on Machine learning prediction and Spectral Ratio Analysis (Graduate Research) by [Gopi, Sreekanth,](#)**

**Abstract:** This research aims to develop a machine learning model using EEG data to identify student inattention, serving as an early intervention tool. Attention deficit, influenced by social media, adversely affects student performance. ADHD, characterized by inattention, hyperactivity, and impulsivity, is linked to academic challenges. Early detection in academics is crucial. A Machine Learning model was designed, and trained on an attention dataset with 34 EEG recordings of young adults. The raw EEG data was pre-processed and filtered, ICA was applied, and spectral analysis was done. Guided meditation with music was developed as an intervention to improve attention. EEG recordings from 15 young adults during a visual reasoning test assessed the model's efficacy by comparing model output to test scores. The ML model achieved a 98% accuracy rate in classifying attention vs inattention states.

Department: Computer Science

Supervisor: Dr. Nasrin Dehbozorgi

Topics: Data/Data Analytics

[Presentation](#) | [Poster](#)

## 2nd place Undergraduate Capstone Project

**UC-413 I Spy... Water Safety (Undergraduate Capstone) by [Robertson, Caden M,](#) [Winters, Danny,](#) [Jaquez, Denice,](#) [Brown, Tahj,](#) [L'Hernault, Maksims D,](#)**

Abstract: I Spy Water Safety is a game that teaches people about the importance of water safety around a lake. Our goal is to teach people proper water safety etiquette and lower the amount of water-related incidents.

Department: Software Engineering and Game Design and Development

Supervisor: Dr. Yan Huang - SWE Capstone Professor; George McBroom - Sponsor

Topics: Games

[Presentation](#) | [Poster](#) | [More Information](#)

## 2nd place Undergraduate Research Project

**UR-510 Exploring the Impact of Wavelength in Non-Invasive Blood Glucose**

**Monitoring** (Undergraduate Research) by [Oakley, John E](#), [Kazi, Tahsin](#),

Abstract: Diabetes and metabolic diseases are some of the most crucial health issues of the 21st century. Monitoring blood glucose, the lead indicator of these diseases is a cumbersome process of constantly drawing blood or using subcutaneous needles. However, new technologies have emerged for non-invasive blood glucose monitoring that uses spectroscopy, which involves emitting light and capturing patient data with cameras. These new devices remove the cost of multiple tests, reduce the risk of skin conditions, and create more patient-friendly solutions. However, the hardware variables of these devices have not been tested thoroughly. One such avenue is via laser wavelength, which substantially affects device performance as different wavelengths interact with skin in varying ways. This study aims to investigate the impact of wavelength on the performance of the team's non-invasive device across different races, genders, and ages of people.

Department: Information Technology

Supervisor: Dr. Maria Valero

Topics: IoT/Cloud/Networking

[Presentation](#) | [Poster](#)

## 3d place Graduate Capstone Project

**GC-465 Transportation as a Service** (Graduate Capstone) by [Wear, Frank](#), [Uzoka, Abel](#), [P, Harini](#), [Parsi, Pranavi](#), [owoade, samuel](#),

Abstract: Personal transportation is shifting away from privately owned vehicles and toward "hired services" to satisfy the same mobility needs. This shift is one of many cultural changes that combine to reduce emissions, improve efficiency, and support an ever-increasing human population. This project supports a shift away from private vehicle ownership as a monolithic solution. Utilizing existing mapping API services, we are planning routes that not only display, but also combine transportation solutions into a single route from origin to destination.

Department: Software Engineering and Game Design and Development

Supervisor: Dr. Reza Parizi

Topics: Application Development

[Presentation](#) | [Poster](#)

## 3d place Graduate Research Project

**GR-397 Conceptualizing a TOC-Enhanced Chatbot: Pattern Recognition and Interaction** (Graduate Research) by [Tasneem, Sumaiya](#), [ELUGOTI, SHARON](#), [Aduri, Chinni Cherrishma Reddy](#), [KOLLI, PURNA PAVAN KUMAR](#), [Anche, Krishna Vamsi](#),

Abstract: A chatbot is a software which is capable of communicating with human by using natural language processing. In our project, we plan to develop a Python-based chatbot that integrates theory of computation (TOC) concepts, including finite automata and regular expressions. The chatbot will interact with users, recognizing patterns and keywords in their inputs. We'll begin by defining initial regular expressions for basic user interactions including greetings and inquiries. Future developments may enhance regular expressions and broaden the chatbot's TOC-related capabilities, creating a versatile educational tool with practical TOC applications.

Department: Computer Science

Supervisor: Dr. Dan Lo

Topics: Artificial Intelligence

[Presentation](#) | [Poster](#)

## 3d place Undergraduate Capstone Project

**UC-523 IT 4983 Server Hardening** (Undergraduate Capstone) by [Chico, Manuel](#); Vuong, Gilbert; [Jones, Harrison](#); Barbar, George

Abstract: The team was assigned the responsibility of securing a web server. This business website is hosted on a technology stack comprising Apache, MariaDB, Red Hat Linux, and PHP. Our initial task involves conducting a comprehensive assessment of the provided network to identify vulnerabilities and assess potential risks. Subsequently, we will develop a robust security policy plan in alignment with the standards set forth by the National Institute of Standards and Technology (NIST) and industry best practices. Once the plan was approved, our group will proceed to implement the recommended changes to fortify the network, ensuring it complies with industry best security practices. In the final phase, the team engaged in a red/blue team cyber security ethical hacking exercise, involving our network and other team. we will attempt to gain access to other team's server, protect ours by promptly addressing any verified security breach utilizing the team's incident response procedure.

Department: Information Technology

Supervisor: Prof. Donald Privitera

Topics: Security

[Presentation](#) | [Poster](#)

## 3d place Undergraduate Research Project

## UR-407 Illusion of Weight: The Use of Tactile Glove for Muscle Exercise for Elders in Virtual Gym Experience (Undergraduate Research) by [Autry, Johnathon R.](#)

**Abstract:** This pilot study aims to investigate the potential creation of the perception of weight through a blend of visual and tactile feedback. Utilizing a tactile glove with varying vibration intensities and virtual dumbbell sizes, the experiment explores multiple conditions. These include tactile intensity (small, medium, large), virtual dumbbell sizes (small, medium, large), and diverse visualizations—ranging from no virtual dumbbell with or without tactile feedback to scenarios including both virtual dumbbells and tactile feedback. The study evaluates the virtual reality exercise experience and real performance using EMG sensors to measure muscle response, Heart Rate (HR), Galvanic Skin Response (GSR), and hand tracking. These biometric indicators enable a comprehensive understanding of the physiological and experiential impact of different conditions. The findings will provide insights into the efficacy of combined visual and tactile feedback in simulating weight perception.

Department: Software Engineering and Game Design and Development

Supervisor: Dr. Sungchul Jung - Project Supervisor; Dr. Garret Hester - Physical Therapy and Health Expert; Prof. Lei Zhang - VR/AR Subject Expert

Topics: Games

[Presentation](#) | [Poster](#)

### Contact Info

#### Kennesaw Phone

**Campus** 470-KSU-INFO  
1000 (470-578-4636)

Chastain  
Road  
Kennesaw,  
GA 30144

[kennesaw.edu/info](http://kennesaw.edu/info)

#### Media Resources

#### Marietta

**Campus**  
1100 South  
Marietta  
Pkwy  
Marietta,  
GA 30060

### Resources For

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Inclusive  
Excellence

Sustainability

Accessibility

## Campus Maps

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# Fall 2023 Presentations

## Judges

Hamza Kamergi - Actemium  
Rob Wade - Beaumont Products, Inc  
Brian Woods - 402d Software Eng. Group  
Keith Tatum - Allen Media Group  
Phoenix Sink - Cybriant  
Daniel Omuto - Accenture  
Juan Huaca - FIS  
Michael Parlotto - InComm Payments Go Studio  
Billy Harbinson - Go Studio/Incomm  
Siphiwe Msimanga - Walmart  
Elie F - JP Morgan Chase & Co.  
Nick Suppiah - Kennesaw State University  
Andrew Hamilton - Cybriant  
Anatoly Lubarsky - x2line  
Stanley Lewis - Lockheed Martin  
Corey Tucker - EY/KSU  
Quinton Mills - Assurant  
Nathan Ghadirifard - Wellstar Health Systems  
Kevin Cully - Cherokee County BOC  
Chris Kwan - Assurant  
Vladimir Rusanov - Stanley Black & Decker  
George McBroom - US Army Corps of Eng.  
Alla Kemelmakher - Rebillia  
Amer Uttamchandani - Assurant  
Len Greski - Leading Agile LLC  
Ryan Hill - Microsoft  
Jey John Britto - Microsoft  
James Tollerson - Norfolk Southern Corp.  
Abdul Rafee Wahab - State Farm  
Bhavana Pateriya - Ernst & Young  
Orlando Karam - Amazon Web Services  
Leafy Null - Origami Risk  
Bob Cole - Accenture  
Tom Perez - Cybriant  
Ray Borough - Lockheed Martin  
Christian P. Wysocki - Lockheed Martin  
Justin Bull - Assurant  
Nicholas Scott - Arabia Mountain HS  
Steve Taylor - State Farm  
Javier Garcia - Mandarin Oriental Hotel Group  
Dave Hudson - Independent

## Rubrics



### **Best Project in Each Category Rubric**

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

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

### **Academic courses graduate**

(e.g. capstones, games, innovative special topics projects, other course projects) (20)

\* Project will be featured during the Flash Session

+ Exploratory Project that is 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.

📄 **GC-412 EcoEdConnect** (Graduate Capstone) by [Dave, Vidhi, Jayaraman, Mythili, Anugu, Manikanta reddy, Paithanker, Rohini, Beeram, Neharika,](#)

Abstract: An inventive educational platform called EcoEdConnect provides high school students with various opportunities to investigate biodiversity and environmental issues. By adjusting to each user's needs and choices, the web app offers a customized educational experience such as quizzes, experiments, videos, blogs, articles, etc. The project's first analysis, methodology, and early conclusions are presented in this document. It shows the several phases of the project, such as the introduction modules, practical experiments, discussions, blog, final assessment, and presentation, among other things. The application customizes the material and complexity according to the user's inclinations. Students' knowledge of biodiversity and environmental issues and their part in reducing their consequences could be significantly enhanced by following this educational path.

Department: Information Technology

Supervisor: Dr. Ying Xie

Topics: Application Development

[Presentation](#) | [Poster](#) | [More Information](#)

📄 \* **GC-417 IT Curriculum Success Portal** (Graduate Capstone) by [Thacker, Alexander](#), [Boakye-Danquah, Cedric](#), [Adeyemo, Damola](#), [Ndiaye, Abdoulaye](#), [Asante, Lydia](#),

Abstract: In this project, we built a curriculum and course web portal to have all curriculum and course information in one place with easy search and browse interfaces. Currently course data and information are scattered in various places. These include essential information like course description, learning outcomes, sample syllabus, offering schedule and history. It also includes curriculum development information for department use, such as coordinator, developer, revision schedule, open learning materials. We collected all sources of IT course information and built a database to integrate the data in one place. Through this, we can build a complete profile of a course and our curriculum. Then, a data driven interactive web app can pull the data from the database and display all course information to users in dynamic views. This is meant to consolidate a large amount of information about IT courses into one place so students and faculty can easily find the otherwise fragmented information.

Department: Information Technology

Supervisor: Dr. Jack Zheng

Topics: Application Development

[Presentation](#) | [Poster](#) | [More Information](#)

📄 \* **GC-427 Elevating AI Research: Creating a website for Kennesaw State University's AI Lab** (Graduate Capstone) by [Gadhe, Shashank](#),

Abstract: The project titled "Elevating AI Research: Creating a website for Kennesaw State University's AI Lab" is dedicated to developing an HTML5 Content Management System website for Kennesaw State University. This website, Allab.kennesaw.edu, serves as a dedicated platform to showcase lab facilities, ongoing projects, and cutting-edge research, with a focus on promoting global AI research and education. Our target audience encompasses university students, faculty, AI researchers, and organizations with an interest in AI innovation. Preliminary findings support our goal: engaging platforms showcasing AI Lab research effectively. The incorporation of admin access empowers university professors to customize content, thus enhancing adaptability and personalization. These preliminary results underscore the project's promising direction and potential to establish a compelling online presence for the AI Lab at Kennesaw State University, with transformative implications for AI research and education.

Department: Information Technology

Supervisor: Dr. Ying Xie

Topics: Artificial Intelligence

[Presentation](#) | [Poster](#)

📄 \*+ **eGC-442 SARS-CoV-2 Spike and ACE2 protein-protein interactions database** (Graduate Capstone) by [Duran Salgado, Jovanny](#), [Addepalli, Durga Narayana Varma](#), [Meeks, Travis](#), [Ramana Adapa, Pooja Venkata](#), [Ambati, Divya Sri](#),

Abstract: SARS-CoV-2 protein interactions are essential for viral replication and pathogenesis. To better understand these interactions, we have created a database using AWS (Amazon Web Services) to store data extracted from protein simulations. This database can be used to study the structure and function of SARS-CoV-2 proteins and their interactions with each other and with host cell proteins.

Department: Information Technology

Supervisor: Dr. Jack Zheng - Capstone Instructor; Dr. Chloe Yixin Xie - Project Owner

Topics: Data/Data Analytics

[Presentation](#) | [Poster](#) | [More Information](#)

📄 **GC-444 IT course profile website** (Graduate Capstone) by [Voruganti, Manikanta](#),

Abstract: Build a Dynamic course profile website for Bachelor of science in information technology courses, that display all the information regarding the course.

Department: Information Technology

Supervisor: Dr. Jack Zheng

Topics: Application Development

[Presentation](#) | [Poster](#) | [More Information](#)

📄 \* **GC-447 Bio-Contribute** (Graduate Capstone) by [Divi, Tejaswi](#), [Tandra, Kiranmayi](#), [Bheemireddy, Sainath reddy](#), [Bheemireddy, Chandrasekhar reddy](#), [Chinthakuntla, sharanya](#),

Abstract: The "Bio-Contribute" challenge is an ambitious initiative aimed at revolutionizing the way facts are generated and shared in lifestyle sciences. Bio-Contribute encompasses various aspects, including design, development, and facts collection. It leverages Figma for innovation, ensuring a user-friendly and collaborative interface. The challenge has completed the frontend development section, permitting customers to carry out various movements, which include content advent and information seizure with the help of the GPT-3 era.

This report gives an in-depth analysis of the venture's progression, strategies used, and initial outcomes, demonstrating its potential to convert statistics introduction and sharing in the discipline of lifestyles sciences.

Department: Information Technology

Supervisor: Dr. Ying Xie

Topics: Application Development

[Presentation](#) | [Poster](#)

📄 **GC-448 Project Title: Discover, Learn, and Protect: A Mobile App for Informal STEM Learning about Local Biodiversity and Environmental Issues.** (Graduate Capstone) by [McCray, Elvin](#), [Appah, David Y](#), [Banu, Adedunmola](#), [Tran, Binh](#), [Tucker, Zenya](#),

Abstract: Our team assignment for this project was to create a mobile application that offers informal STEM learning about local biodiversity and environmental issues. Dr. Ying Xie, Professor in the College of Computing and Software Engineering (CCSE) is the owner of this project, who also laid out required features and provided necessary information, guidance, and advice for the project development. The core function of this application is to empower users to explore, identify and gain insights into the plant and animal species native to their region. Leveraging the capabilities of their smartphone's camera, users can effortlessly scan, record, or locate local wildlife and environmental phenomena. To enrich the user experience, the app incorporates AI, notably ChatGPT, which delivers comprehensive information about the identified species. Our team also integrated a GPS feature. This feature will reveal the zip code and provide an approximate location of the identified species' origin.

Department: Information Technology

Supervisor: Dr. Ying Xie

Topics: Application Development

[Presentation](#) | [Poster](#) | [More Information](#)

📄 \* **GC-452 Implementing OpenRAN: Democratizing 5G Networks** (Graduate Capstone) by [McOsker, Caitlin](#), [Kennebrew, Chavarous](#),

Abstract: This project highlights the endeavor to democratize 5G networks by making their deployment and ownership more accessible to a broader range of stakeholders. The purpose is to break down existing barriers and foster greater inclusivity in the 5G landscape. To achieve this goal, a method is proposed by the Open-Air Interface Software Alliance (OSA) involving the decoupling of software and hardware, coupled with leveraging

virtualization techniques to simulate User Equipment (UE), gNodeB, and the 5G Core Network. This approach embraces open standards and interfaces, effectively lowering the barriers to entry for new vendors and promoting innovation in the 5G ecosystem. Through these innovative methods, the project underlines the transformative potential of making 5G networks more democratic, inclusive, and conducive to accelerated technological advancements.

Department: Information Technology

Supervisor: Dr. Ying Xie - Capstone Instructor; Dr. Sumit Chakravarty - Project Owner; Dr. Ramesh Annavajjala - Project Sponsor

Topics: IoT/Cloud/Networking

[Presentation](#) | [Poster](#)

📄 \* **GC-456 Spectrum Analyzer Analysis Tool** (Graduate Capstone) by [O'Connor, Ryan](#), [Reed, Nathan](#), [Luthringshauser, Richard](#), [Lawani, Ayorinde](#), [Sekar, Dinesh](#),

Abstract: Military flight test ranges employ Radio Frequency (RF) Threat Systems, both real and simulated, to evaluate and test Aircraft Electronic Warfare (EW) Systems during flight. A critical component of this testing process is the radar tracking station, which records RF transmissions from various Threat Systems, in the form of video footage. This project aims to significantly reduce human interaction and improve efficiency by automating the analysis of the video data, transcribing it into a numeric format, and storing the results in a user-friendly, exportable format.

Department: Software Engineering and Game Design and Development

Supervisor: Dr. Reza Parizi

Topics: Software Engineering

[Presentation](#) | [Poster](#) | [More Information](#)

📄 \* **GC-458 Traffic & Road Sign Detection Using Deep Learning** (Graduate Capstone) by [Anumula, Sai Narasimha Reddy](#), [Anumula, Krishna puja](#), [BABU, CHANGANABOYINA SURESH](#),

Abstract: In a stride toward autonomous driving, this project aims to craft a deep learning system for detecting and classifying road signs. A dataset of 1000 varied traffic sign images form the study's core, ensuring diverse learning scenarios. Leveraging the RESNET framework and transfer learning, the model discerns signs into key categories critical for navigation. The methodology spans from data curation to RESNET training, with robust metrics planned for validation. Future work includes dataset augmentation and model optimization, enhancing adaptability and performance for intelligent transport systems.

Department: Computer Science

Supervisor: Dr. Mahmut Karakaya

Topics: Artificial Intelligence

[Presentation](#) | [Poster](#)

📄 **GC-462 Traffic Pattern Analysis and Anomaly Detection Using Large-scale Trajectory Data** (Graduate Capstone) by [Taylor, Christian](#), [Sharma, Desh](#), [Patel, Janki](#), [Nemmikanti, Nikhil sai](#), [Dundoo, Surya Harshith](#),

Abstract: With the advancement of IoT and improved computing capabilities, real-time vehicle and road user trajectories are easily accessible through advanced traffic sensing, replacing time-consuming manual checks. This study employs machine learning to analyze extensive trajectory data, focusing on anomaly detection in traffic patterns. It investigates efficient techniques for processing time-series data using an open-source dataset (InD dataset). The procedure involves data preprocessing, feature extraction, machine learning model training, and anomaly detection at 4 intersections. Irregular paths reveal abnormal driving behavior like U-turns and unexpected stops. The study highlights their impact on traffic management and safety and discusses potential applications in vehicle-to-infrastructure alert systems.

Department: Information Technology

Supervisor: Dr. Junxuan Zhao (sponsor), Dr. Jack Zheng (instructor)

Topics: Data/Data Analytics

[Presentation](#) | [Poster](#) | [More Information](#)

📄 \* **GC-465 Transportation as a Service** (Graduate Capstone) by [Wear, Frank](#), [Uzoka, Abel](#), [P, Harini](#), [Parsi, Pranavi](#), [owoade, samuel](#),

**Abstract:** Personal transportation is shifting away from privately owned vehicles and toward "hired services" to satisfy the same mobility needs. This shift is one of many cultural changes that combine to reduce emissions, improve efficiency, and support an ever-increasing human population. This project supports a shift away from private vehicle ownership as a monolithic solution. Utilizing existing mapping API services, we are planning routes that not only display, but also combine transportation solutions into a single route from origin to destination.

Department: Software Engineering and Game Design and Development

Supervisor: Dr. Reza Parizi

Topics: Application Development

[Presentation](#) | [Poster](#)

📄 **GC-467 Moral Parenting platform** (Graduate Capstone) by [Kamal, Zularbine](#),

**Abstract:** Children in most cases learn by observing their parents or caregivers. Some children are deprived from this because they don't have parents or their parents are so poor that they are struggling with their life and they have no time to give careful attention to their children. What if there is a place where a poor student can find a moral parent? A nonbiological parent who can help financially and do reciprocal duties for a child's better future. This relationship demands restraint, self-sacrifice, and patience from the parents toward the child to develop a strong moral foundation that will serve them all through their lives.

Department: Software Engineering and Game Design and Development

Supervisor: Prof. Nick Murphy

Topics: Application Development

[Presentation](#) | [Poster](#) | [More Information](#)

📄 **GC-468 Eco-Insight** (Graduate Capstone) by [Kumboji, Keerthan](#), [Syamala, Hari Trinadh Reddy](#), [Nalluri, Raghu](#), [Thallapalli, Shashank](#), [Khan, Ishtiaque](#),

**Abstract:** Eco-Insight is a pioneering application designed to bridge the gap between technology and environmental conservation. At its core, the application aims to empower users to contribute to the understanding and preservation of biodiversity and the ecosystem. Contribute allows users to capture and upload images of various aspects of the natural world, including everything from insects, birds, animals and fragile plant species. The uploaded data is securely stored in a robust database. Leveraging the power of geotagging and timestamping, Eco-Insight offers a user-friendly interface to enable seamless retrieval of specific data based on geographical regions and timelines, including detailed insights spanning years. Eco-Insight aspires to serve as a vital tool in the conservationist arsenal, fostering a deeper understanding of biodiversity dynamics and enabling proactive measures.

Department: Information Technology

Supervisor: Dr. Ying Xie

Topics: Application Development

[Presentation](#) | [Poster](#)

📄 **GC-471 M-Script: Accelerating Preparatory and Analytical Phases in MD Simulations** (Graduate Capstone) by [Addepalli, Durga Narayana Varma](#),

**Abstract:** "M-Script" revolutionizes Molecular Dynamics (MD) simulations by automating time-consuming preparatory and analytical tasks. Traditional folder preparation and salt bridge data extraction, taking 25 and 30 seconds respectively, are reduced to 1.5 and 0.5 seconds with M-Script. This efficiency is achieved through

tailored TCL and Python scripts, optimizing the process for high-volume protein analysis. M-Script not only saves time but also enhances the focus on scientific discovery, promising significant strides in biotechnological research and protein behavior understanding.

Department: Information Technology

Supervisor: Dr. Chloe Yixin Xie

Topics: Software Engineering

[Presentation](#) | [Poster](#)

📄 **GC-479 BioEduHub** (Graduate Capstone) by [Chintam, Tejesh R](#), [Chopparapu, Shiswa Preethi](#), [Panati, Viswa Narendra Reddy](#), [Pasupuleti, Lithin Venkata Sai](#), [Chopparapu, Aravind](#),

Abstract: Our project introduces an interactive and personalized learning experience aligned with the Next Generation Science Standards (NGSS). Users can explore a diverse range of topics related to biodiversity and environmental issues through quizzes, games, simulations, experiments, videos, podcasts, and articles. The web app adapts content to individual interests and provides tailored feedback to enhance knowledge, skills, attitudes, and behaviors related to these critical subjects. The user-friendly interface and comprehensive modules, including video lectures, readings, quizzes, hands-on experiments, debates, and assessments, ensure a holistic learning journey. Join us on a pathway to understanding and mitigating climate change while making a positive impact on our environment.

Department: Information Technology

Supervisor: Dr. Ying Xie

Topics: Application Development

[Presentation](#) | [Poster](#)

📄 \* **GC-487 Image Identification & AI-Powered Knowledge Provision** (Graduate Capstone) by [Katla, Sri Kruthi](#), [Chepyala, Sathwik](#), [Vunnam, Kranthi](#), [Veeranki, Salman Raj](#), [Bandi, Krishna vijitha](#),

Abstract: Our capstone project focuses on the development of an innovative application that combines image recognition technology with AI-powered text generation to provide instant and accurate information about local flora and fauna. This project encompasses the creation of precise image recognition algorithms, a user-friendly interface, and an efficient knowledge delivery system. By allowing users to easily identify and learn about local species, our application aims to promote environmental awareness and engagement.

Department: Information Technology

Supervisor: Dr. Ying Xie

Topics: Application Development

[Presentation](#) | [Poster](#) | [More Information](#)

📄 **GC-499 A Mobile App for Informal STEM Learning about Local Biodiversity and Environmental Issues** (Graduate Capstone) by [Sunkavalli, Susmitha](#), [Battepati, Venkata Karthik Krishna](#), [Mogulla, Soundarya Reddy](#), [Gunti, Sahithi](#), [Tati, Suresh](#),

Abstract: Biodiversity is essential for the processes that support all life on our earth. Without the existence of entire range of animals, trees and species, we can not live healthy life. We can not have a balanced ecosystem that we depend on to provide with oxygen we breath and the food we eat. So studying and understanding (Exploring) Biodiversity is the at most priority of current and coming generations.

Department: Information Technology

Supervisor: Dr. Ying Xie

Topics: Application Development

[Presentation](#) | [Poster](#)

📄 **GC-503 Multikernel: A detailed Analysis of Multicore OS Kernel** (Graduate Capstone) by [Jinan, Umme Afifa](#),

Abstract: In modern computer systems, multiple processing cores offer immense possibilities to perform

parallel and dynamic computing and diversity in architecture. However, such processing creates more challenges as software developers need to design applications that can effectively utilize these multicores for improved performance. Static optimization of such dynamic structures is practically impossible. So, a novel OS structure called multikernel inspired by the distributed systems, is introduced, which will provide superior scalability. In this paper, we briefly review the concept of multikernel OS, analyze and re-evaluate its architecture. Then we introduce some debugging and analysis tools to measure performance of the Windows hybrid kernel. This study will help get a deep insight into existing multikernel-based research, the use of existing analysis tools to measure performance and possible optimization based on analysis results of popular hybrid kernels like Windows.

Department: Computer Science

Supervisor: Dr. Dan Lo (Course Instructor)

Topics: High Performance Computing

[Presentation](#) | [Poster](#)

📄 **GC-511 Predicting Stock Prices Using Different Machine Learning and Deep Learning Models** (Graduate Capstone) by [Crystal, Afnan](#), [Jonnalagadda, Rohith Sundar](#), [Chandel, Hrithik Singh](#),

Abstract: Our project focuses on the challenge of predicting the daily closing prices and stock movements of Amazon, one of the world's largest and most dynamic corporations. Amazon's stock prices are known for their unpredictability and are influenced by a multitude of intricate factors. Our project aims to provide accurate and reliable forecasts for Amazon's stock prices, going beyond mere predictions. The analysis employs a comprehensive approach, comparing the performance of three distinct machine learning and deep learning models: Linear Regression, Support Vector Machine (SVM), and Multi-Layered Perceptron (MLP) for financial time series data. The dataset we used spans from January 2, 2005, to August 21, 2019, covering a substantial period of Amazon's stock history. Our project not only delivers precise predictions but also outlines the methodologies and techniques used for stock price forecasting.

Department: Computer Science

Supervisor: Dr. Mahmut Karakaya

Topics: FinTech

[Presentation](#) | [Poster](#)

## Graduate Research

(e.g. capstones, games, innovative special topics projects, other course projects) (21)

\* Project will be featured during the Flash Session

+ Exploratory Project that is 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.

📄 \* **GR-397 Conceptualizing a TOC-Enhanced Chatbot: Pattern Recognition and Interaction** (Graduate Research) by [Tasneem, Sumaiya](#), [ELUGOTI, SHARON](#), [Aduri, Chinni Cherrishma Reddy](#), [KOLLI, PURNA PAVAN KUMAR](#), [Anche, Krishna Vamsi](#),

Abstract: A chatbot is a software which is capable of communicating with human by using natural language processing. In our project, we plan to develop a Python-based chatbot that integrates theory of computation (TOC) concepts, including finite automata and regular expressions. The chatbot will interact with users, recognizing patterns and keywords in their inputs. We'll begin by defining initial regular expressions for basic user interactions including greetings and inquiries. Future developments may enhance regular expressions and broaden the chatbot's TOC-related capabilities, creating a versatile educational tool with practical TOC applications.

Department: Computer Science

Supervisor: Dr. Dan Lo

Topics: Artificial Intelligence

[Presentation](#) | [Poster](#)

📄 **GR-405 Boosting Clickbait Detection through Semantic Insights and Attention-Driven Neural Network** (Graduate Research) by [Meesala, Lokesh](#),

Abstract: The digital age has witnessed an explosion of online content, making it increasingly challenging for users to differentiate between reliable information and clickbait, which is often misleading or sensationalized. Clickbait contributes to the spread of misinformation, phishing attacks, and illegal marketing practices, and manipulates users' decisions. Even from a business standpoint a clickbait might not lead to a conversion, A user might land on the page by following a clickbait and get frustrated and close the page. Additionally, with the increase in the usage of large language models for content writing it is even more challenging for the general user to differentiate between clickbait and genuine content. As a result, clickbait detection has become an important research topic. Existing clickbait detection models often work on rule-based techniques which lack the nuanced understanding of human semantic knowledge, making them vulnerable to sophisticated clickbait techniques.

Department: Computer Science

Supervisor: Dr. Md. Abdullah Al Hafiz Khan

Topics: Data/Data Analytics

[Presentation](#) | [Poster](#)

📄 **GR-406 Federated Learning in Cardiac Diagnostics: Balancing Predictive Accuracy with Data Privacy in Heart Sound Classification** (Graduate Research) by [Donkada, Sricharan](#),

Abstract: Cardiovascular diseases account for nearly a third of global deaths, posing a challenge that machine learning can help address. However, data privacy concerns hinder the direct application of conventional machine learning in this sensitive area. This paper explores Federated Learning (FL) as a decentralized strategy to mitigate these concerns by allowing for local data processing. FL's design ensures that only processed updates, not raw data, are shared with a central server, maintaining individual privacy. Our research assesses FL's practicality and effectiveness in predicting heart disease while adhering to ethical and legal norms. We build upon previous studies, such as Wanyong et al.'s work on heart sound analysis with FL, to underline its privacy-preserving benefits. This study aims to improve healthcare outcomes with machine learning while setting a privacy-conscious benchmark for future research.

Department: Information Technology

Supervisor: Dr. Seyedamin Pouriyeh

Topics: Artificial Intelligence

[Presentation](#) | [Poster](#)

📄 \* **GR-422 Simplified Named Entity Recognition Using Context Free Grammar** (Graduate Research) by [Koganti, Sai Chandana](#), [Yaganti, Varshini](#), [Yaganti, Vinesh Babu](#), [Katragadda, Surya Kiran](#), [Thulluru, Pavani](#),

Abstract: Named Entity Recognition (NER) is a crucial component of natural language processing. Although Spacy is a popular tool for NER, it faces challenges in accurately identifying individual's names. In response, Context-Free Grammar (CFG) is introduced as a complementary solution to augment Spacy's NER functionality, with the specific objective of enhancing the precision of person name recognition. This project focuses on formulating CFG rules and applying them to a sample text, showcasing improved NER accuracy. By combining the strengths of Spacy and CFG, we aim to address the limitations of current NER systems, particularly in recognizing individual's names, and contribute to more reliable and efficient NER processes.

Department: Computer Science

Supervisor: Dr. Dan Lo

Topics: High Performance Computing

[Presentation](#) | [Poster](#)



📄 **GR-430 PLANT DISEASE DETECTION USING CNN** (Graduate Research) by [Shankara Murthy, Nandini, Vasireddi, Divya, Kulkarni, Mounika](#),

Abstract: Plant diseases are a major source of worry for farmers and the agricultural business. We hope to create a system that can assist in identifying and controlling these diseases more efficiently by leveraging the capabilities of deep learning. This not only protects agricultural yields but also adds to agriculture's sustainability and economic well-being. For this project we have chosen a suitable dataset from Kaggle: Kaggle Dataset: <https://www.kaggle.com/datasets/emmarex/plantdisease/data> Dataset Overview: The Plant Village dataset contains images of various crops, with each belonging to different classes representing diseases and healthy states. Having a diverse set of images presents an opportunity for deep learning models to capture intricate patterns and we can train our model for various categories which can make the detection more accurate.

Department: Computer Science

Supervisor: Dr. Mahmut Karakaya

Topics: Artificial Intelligence

[Presentation](#) | [Poster](#)

📄 \* **GR-434 Phase Estimation's Application in QRAM** (Graduate Research) by [Hunt, Ethan K](#),

Abstract: The paper proposes a new novel way of creating QRAM through quantum phase estimation. This is done by mapping a monotonically increasing sequence of natural numbers to a binary series and, ultimately, to a characteristic constant  $\eta$  which is then encoded as a phase in a quantum state. This process leverages quantum phase estimation, a fundamental quantum algorithm for finding the eigenvalues of a unitary operator which can be used as a form of QRAM in either Quantum or Hybrid models of computing

Department: Computer Science

Supervisor: Dr. Dan Lo

Topics: High Performance Computing

[Presentation](#) | [Poster](#)

📄 \* **GR-450 Enhancing Sarcasm Detection with Context Sensitivity** (Graduate Research) by [Koganti, Sai Chandana, Yaganti, Varshini, Yadali, Venkata Sai Ashik, Yaganti, Vinesh Babu, Borra, Hemanth](#),

Abstract: Sarcasm identification is a vital challenge in natural language processing. In this project, we address this challenge by employing a context-sensitive approach that leverages deep learning, transformer learning, and conventional machine learning models. We conducted our research using two benchmark datasets: Twitter and Internet Argument Corpus (IAC-v2). Our three primary models—Bi-LSTM with GloVe embeddings, BERT, and feature fusion—outperformed baseline methods, achieving an 89.4% highest accuracy on Twitter datasets and an 81.2% highest precision on IAC-v2. These results highlight the effectiveness of our approach in sarcasm detection, with significant implications for sentiment analysis and opinion mining. While our project provides promising results on benchmark datasets, further testing on live tweet datasets is essential to validate its real-world predictive capabilities. This project contributes to the ongoing efforts to enhance communication understanding in the digital era.

Department: Computer Science

Supervisor: Dr. Dan Lo

Topics: High Performance Computing

[Presentation](#) | [Poster](#)

📄 \* **GR-453 Medical Records Summarization Using Prompt-Based NLP** (Graduate Research) by [Masadeh, Rawan, Servies, Nicholas S](#),

Abstract: In this paper, we present an innovative Natural Language Processing (NLP) algorithm for summarizing medical records extracted from the MIMIC-IV dataset using state-of-the-art (SOTA) techniques in text summarization. The increasing volume of electronic health records (EHRs) demands efficient methods for

extracting meaningful insights from these complex and extensive documents. Our algorithm leverages recent advancements in NLP, including transformer-based models, to automate summarizing medical records while preserving critical information. Our algorithm is trained and tested using the Medical Information Mart for Intensive Care (MIMIC)-IV database that provides critical care data for over 40,000 patients admitted to intensive care units at the Beth Israel Deaconess Medical Center (BIDMC) between 2008 and 2019. The algorithm aims to extract the query text from medical records in the MIMIC-IV dataset, which often contains diverse and extensive clinical information.

Department: Computer Science

Supervisor: Dr. Md Abdullah Al Hafiz Khan

Topics: Artificial Intelligence

[Presentation](#) | [Poster](#)

📄 **GR-461 Sudoku solver using brute force algorithm with backtracking approach** (Graduate Research)

by [Alam, Md Shamsul](#), [ISLAM, MD JAHIRUL](#), [Kommineni, Vyghni Sudha](#), [Vellanki, Jaswanthi](#), [Sudheer, Poka](#),  
Abstract: Sudoku is a fun game that challenges our brain to think logically. It only has numbers from 1 to 9 in a 9x9 matrix network where the nine numbers should not be repeated in the same column, row or each 3x3 submatrix. Although there are numerous methods to solve this problem, the most common method is the backtracking algorithm. So, we are using brute force algorithm to solve sudoku and then compare it with backtracking to ensure which algorithm gives best results.

Department: Computer Science

Supervisor: Dr. Dan Lo

Topics: Games

[Presentation](#) | [Poster](#)

📄 **GR-469 A Simulation Model of the Traffic Signal System Using Java** (Graduate Research) by [Chen, Lingtao](#),

Abstract: A traffic signal controls the flow of traffic at the intersection of two or more roadways. The first system of traffic signals was installed in London, England, in 1868. In this project, I will develop a simulation model for the traffic signal system using Java. The model will simulate the traffic signal system at a single four-way intersection. Also, I will compare the system performance with different input parameters, such as the number of vehicles and the cycle length, using various performance metrics, such as average waiting time and average sojourn time.

Department: Computer Science

Supervisor: Dr. Dan Lo

Topics: Application Development

[Presentation](#) | [Poster](#)

📄 **+ eGR-470 Optimizing the Search in Location Using SVM, Naive Bayes, K-Means and KNN** (Graduate Research)

by [Mantha, Lalitha Sangamithra](#), [Naraparaju, Krishna Chaitanya](#), [Vadlamani, Abhishikth](#),  
Abstract: The widespread adoption of global positioning technology has led to an increase in products featuring GPS functionality. These devices gather large amounts of location data. However, inherent inaccuracies in GPS data collection are unavoidable. To address these challenges, we shift our focus to identifying the closest points in a location. This requires gathering data to measure distances between a point and all others, and keeping a record of the nearest points. In this project, the Naive Bayes, SVM, k-means, and KNN algorithms are employed to determine the nearest points.

Department: Computer Science

Supervisor: Dr. Mahmut Karakaya

Topics: Artificial Intelligence

[Presentation](#) | [Poster](#)

📄 \* **GR-485 Email Summarizer and Action Item Extractor** (Graduate Research) by [Deem, Ryan](#), [Weese, Eric C](#),  
Abstract: Countless emails are sent and received daily, and a lot of time is spent reading through and understanding the content of these emails. This project aims to increase the efficiency of reading and gathering relevant email information. Our solution includes two parts: abstractive text summarization and action item extraction. Currently, these two items are common in different domains, however, they have not been combined and used with email understanding. Abstractive text summarization is the process of outputting the ideas of the emails using different words without giving quotes from the document. In this way, a person would be able to tell if the email is something they will need to look at and if not, then the Action Item Extractor tells what actions need to be performed, it involves finding all instances in a piece of text that are instructions, dates, or require something from the recipient. These two solutions hope to improve the efficiency of parsing through emails.  
Department: Computer Science  
Supervisor: Dr. Md Abdullah Al Hafiz Khan  
Topics: Artificial Intelligence  
[Presentation](#) | [Poster](#)

📄 + **eGR-490 Importance of Food Recognition on Blood Glucose Monitoring** (Graduate Research) by [Crystal, Afnan](#),  
Abstract: Maintaining blood sugar under control requires eating a healthy and balanced diet, exercising, and adhering to medications. Dietary consumption must be under strict control for diabetic patients' general health. Traditional techniques for monitoring dietary consumption include recollection and manual record-keeping, which can be tedious and prone to mistakes. However, automated technologies for maintaining records that make use of computer vision, such as food image recognition systems, can streamline chronic health management for diabetics. These solutions seek to efficiently track daily food intake and consequential calories to facilitate and encourage lifestyle improvements. With this goal in mind, we design a Machine Learning model that can recognize/classify food categories and estimate the corresponding volume and calorific content from picture(s) of an upcoming meal, which would help users assess the effect of the intake on their blood sugar levels.  
Department: Information Technology  
Supervisor: Dr. Maria Valero, Dr. Valentina Nino  
Topics: Artificial Intelligence  
[Presentation](#) | [Poster](#)

📄 **GR-493 Advancing Non-Invasive Glucose Monitoring through Integrated Physical Factors and Wavelength Optimization** (Graduate Research) by [Belfarsi, El Arbi](#),  
Abstract: This work examines the effects of physical factors like skin tone, temperature, thickness, and humidity on the performance of GlucoCheck, a non-invasive glucose monitoring device using IR technology. It delves into how these variables influence light absorption and scattering in the skin, affecting IR image quality in GlucoCheck. The research addresses how skin humidity alters transmittance, and skin temperature and color diversely impact light absorption. These findings underscore the importance of considering these variables to improve glucose level predictions. We propose a data collection strategy using advanced sensors for real-time acquisition of these factors, integrating them into the algorithm for enhanced device accuracy. This strategy seeks to boost GlucoCheck's reliability, contributing to personalized, adaptive healthcare innovations.  
Department: Computer Science  
Supervisor: Dr. Maria Valero  
Topics: IoT/Cloud/Networking  
[Presentation](#) | [Poster](#) | [More Information](#)

🔗 **+ eGR-494 Using a Non-System Language to implement an Optimized Round Robin Scheduling Algorithm** (Graduate Research) by [Nweke, Francis E](#),

Abstract: The objective of this project is to create an optimized Round Robin scheduling algorithm in C# and examine the related performance metrics. In this study, I will evaluate performance by implementing the optimized model in a non-system language such as (C#). Our simulation would provide insight into the execution of many processes while taking into account arrival times, burst timings, and user-defined time quantum. We can interact with the simulator because it is a Graphical User Interface (GUI) software.

Department: Computer Science

Supervisor: Dr. Dan Lo

Topics: Software Engineering

[Presentation](#) | [Poster](#)

🔗 **\* GR-496 Cardiac arrest prediction model** (Graduate Research) by [Amsham, Vineeth](#), [Balaiah, Sai Reddy](#), [Subbarayakgounder, Tamilkumar](#),

Abstract: The "Cardiac arrest prediction model" project melds machine learning with healthcare to tackle heart disease. It aims to surpass current diagnostic tools that fail to catch early signs of cardiac events, often leading to high mortality. By developing an ML model that identifies early predictors of cardiac arrest, the project seeks to enable early interventions. Using supervised learning for its pattern recognition strength, the goal is to predict heart attacks accurately and thus, revolutionize preventative care and outcomes. This effort marks a leap in medical diagnostics and moves towards personalized healthcare, potentially saving countless lives and pioneering a new direction in the fight against heart disease.

Department: Computer Science

Supervisor: Dr. Mahmut Karakaya

Topics: Artificial Intelligence

[Presentation](#) | [Poster](#)

🔗 **\* GR-504 Synthetic DNA Sequence Generation and Classification for Species Discrimination** (Graduate Research) by [Tasnim, Nishat](#),

Abstract: The two main goals of this research are to apply machine learning models in computational biology to classify DNA sequences from different species and to create synthetic DNA sequences using GANs. Generative Adversarial Networks (GANs) synthesize DNA sequences while preserving key characteristics like sequence length and GC content. The dataset is enhanced by these artificial sequences, which makes classification jobs better. The classification accuracy of black rat and human genome sequences is evaluated using machine learning models, including Random Forest, SVM, and Logistic Regression. Notably, when trained with synthetic data, all models perform better.

Department: Computer Science

Supervisor: Dr. Yong Shi

Topics: Artificial Intelligence

[Presentation](#) | [Poster](#)

🔗 **\* GR-512 A FCFS Approach for Order of Operations in Arithmetic Formalism in Programming Languages** (Graduate Research) by [Hunt, Ethan K](#),

Abstract: This paper provides the description of my research project on the computational power a programming language can have that uses an arthritic model that has a first come first serve approach to the order of operations. The goal of such analysis is to verify if such a method of computation can enclose all basic arithmetic and algebraic expressions, the answer to which will help disclose the computational limitations of certain programming language frameworks.

Department: Computer Science

Supervisor: Dr. Rifatul Islam

Topics: Application Development

[Presentation](#) | [Poster](#)

🔗 **GR-515 Developing a Conversational Chatbot using Seq2Seq Model with TensorFlow** (Graduate Research) by [Parmar, Drashtee, Anugu, Ruthvik R;](#)

Abstract: Sequence-to-Sequence (Seq2Seq) modeling, when paired with Long-Short-Term Memory (LSTM) units, has demonstrated significant potential in developing conversational chatbot capable of participating in text-based conversation and providing human-like responses. The Cornell Movie-Dialogs Corpus will be used to extract dialogues, preprocess the data, and then use the output to train the Seq2Seq model. Our contributions include exploring the application of LSTM for Natural Language Generation (NLG) and creating a comprehensive chatbot system. According to the results of the experiment, our method works well for coming up with thoughtful answers during a conversation.

Department: Computer Science

Supervisor: Dr. Md. Abdullah Al Hafiz Khan

Topics: Artificial Intelligence

[Presentation](#) | [Poster](#)

🔗 **+ eGR-518 A Multi-Model Approach for Detecting and Combating Fake News** (Graduate Research)

by [devineni, sujisha, Bodakunta, Thrisandhya,](#)

Abstract: Internet plays a vital role in our daily lives, we use it for various purposes and benefit from advancements in technology and social media. However, the same platforms which make global information exchange also promote spread of fake news, raising a significant threat. To resist this issue, fact checking has become important, leading to extensive research to identify fake news and deal problems arising with them. Our project's mission is to find the most effective model for fake news detection. We explore different approaches and models, like BERT, Decision Trees, Logistic Regression, and Ada Boost classification and evaluate their performance by calculating accuracy, precision, recall, and more. We aim to provide valuable insights on this critical fake news issue and show the best performing model among the pool of models.

Department: Computer Science

Supervisor: Dr. Md. Abdullah Al Hafiz Khan

Topics: Artificial Intelligence

[Presentation](#) | [Poster](#)

🔗 **\* GR-519 Meditation as an intervention to improve Student Attention An EEG study based on Machine learning prediction and Spectral Ratio Analysis** (Graduate Research) by [Gopi, Sreekanth,](#)

Abstract: This research aims to develop a machine learning model using EEG data to identify student inattention, serving as an early intervention tool. Attention deficit, influenced by social media, adversely affects student performance. ADHD, characterized by inattention, hyperactivity, and impulsivity, is linked to academic challenges. Early detection in academics is crucial. A Machine Learning model was designed, and trained on an attention dataset with 34 EEG recordings of young adults. The raw EEG data was pre-processed and filtered, ICA was applied, and spectral analysis was done. Guided meditation with music was developed as an intervention to improve attention. EEG recordings from 15 young adults during a visual reasoning test assessed the model's efficacy by comparing model output to test scores. The ML model achieved a 98% accuracy rate in classifying attention vs inattention states.

Department: Computer Science

Supervisor: Dr. Nasrin Dehbozorgi

Topics: Data/Data Analytics

[Presentation](#) | [Poster](#)

## Academic courses undergraduate

(e.g. capstones, games, innovative special topics projects, other course projects) (20)

\* Project will be featured during the Flash Session

+ Exploratory Project that is 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.

📄 \* **UC-394 AI Limitations** (Undergraduate Capstone) by [Hurtado Garcia, Maria](#), [Ahmed, Syed S](#), [Tran, Tuan T](#), [Ramcharan, Michael A](#), [Tuzova, Kristina](#),

Abstract: Our project, "AI Limitations," explores the application of AI, in our case ChatGPT, in creating an online auction website. It investigates the boundaries of ChatGPT's capabilities and highlights its potential, while recognizing limitations in generating precise guidance for completing complex tasks. The project combines research, programming, and documentation, providing valuable insights into AI's role in project development.

Department: Information Technology

Supervisor: Prof. Donald Privitera

Topics: Artificial Intelligence

[Presentation](#) | [Poster](#)

📄 \* **UC-395 CCSE Reservation Application** (Undergraduate Capstone) by [Kelley, Nicholas](#), [Carreker, Tykira](#), [Mutisya, Keith](#), [Hyatt, Aaron](#),

Abstract: The CCSE department tasked us with creating an application to streamline the reservation of the rooms and equipment maintained by the college. To achieve this, we developed a front-end application created with PHP that allows users to view available resources, and request reservations for them. We created and maintained a back-end database configured with MySQL through phpMyAdmin to allow for the easy integration with the front end. Through the project we created new functions in the application with the user in mind, to create the best possible application to fit the needs of the CCSE department.

Department: Information Technology

Supervisor: Prof. Donald Privitera

Topics: Software Engineering

[Presentation](#) | [Poster](#)

📄 \* **UC-400 Electric Vehicle Team** (Undergraduate Capstone) by [Solon, Brandon A](#), [Klein, Austin D](#), [McMaster, Caleb](#),

Abstract: The KSU Electric Vehicle Team is developing a fully autonomous electric go-kart to compete in the Autonomous Karting Series (AKS). Our team will be making two programs for the kart's software stack. These programs include a race line optimizer, which can take the centerline of a track and generate a minimum curvature path for it to follow to get around the track faster, as well as a race controller which can switch navigation algorithms automatically based on the current conditions of the race.

Department: Computer Science

Supervisor: Prof. Sharon Perry

Topics: Artificial Intelligence

[Presentation](#) | [Poster](#) | [More Information](#)

📄 \* **UC-401 Website Hardening and Ethical Hacking** (Undergraduate Capstone) by [Liu, Alex L](#), [Pandya, Samrat H](#), [Sanchez, Kennedy A](#), [Frontin, Kenny M](#), [Wogomebu, Komlan I](#),

Abstract: This project is to showcase a real life scenario of securing a theoretical business website on Red Hat Linux, Apache, MariaDB, and PHP hosted in a virtual machine. The project objective is for a team to research ways to secure the theoretical business website, develop and implement security policies, and perform a red/blue team exercise. This project is a way for a team to exercise ethical hacking in a closed environment to

obtain experience.

Department: Information Technology

Supervisor: Prof. Donald Privitera

Topics: Security

[Presentation](#) | [Poster](#) | [More Information](#)

📄 \* **UC-408 Web Hardening** (Undergraduate Capstone) by [Brown, Christopher](#), [Jackson, Spencer J](#), [Kigo, Lynder](#), [Hooper, Gabrielle](#),

Abstract: Our project focuses on ethical hacking and defending in the form of a red/blue team. Our project was broken into 3 phases. In Phase one we were given a server stack and told to do what we could in order to analyze weak points. In phase 2 we were told to bolster the defenses of those weak points. Lastly, in phase 3 we were given an IP address of an opposing team to attack while defending against another teams advances.

Department: Information Technology

Supervisor: Prof. Donald Privitera

Topics: Security

[Presentation](#) | [Poster](#) | [More Information](#)

📄 \* **UC-413 I Spy... Water Safety** (Undergraduate Capstone) by [Robertson, Caden M](#), [Winters, Danny](#), [Jaquez, Denice](#), [Brown, Tahj](#), [L'Hernault, Maksims D](#),

Abstract: I Spy Water Safety is a game that teaches people about the importance of water safety around a lake. Our goal is to teach people proper water safety etiquette and lower the amount of water-related incidents.

Department: Software Engineering and Game Design and Development

Supervisor: Dr. Yan Huang - SWE Capstone Professor; George McBroom - Sponsor

Topics: Games

[Presentation](#) | [Poster](#) | [More Information](#)

📄 **UC-423 Developing Support for DICOM medical Images** (Undergraduate Capstone) by [Grogan, Cassidie G](#),

Abstract: DICOM (Digital Imaging and Communications in Medicine) is the standard for storing and sharing medical image information. GIMP (GNU Image Manipulation Program) is the leading open-source program for processing professional and scientific images; however, it is currently unable to open many modern DICOM images. The project goal is to update GIMP's DICOM import plugin with code to support all types of DICOM images. After creating a C++ wrapper to incorporate the GDCM (Grassroots DICOM) library into the existing software, GIMP could import images that previously caused errors. The updated plugin has been submitted as a merge request and is currently being reviewed by the developers for the next software release. The next step would be to expand GIMP's DICOM metadata and display multi-frame images to continue to better support medical professionals and researchers.

Department: Software Engineering and Game Design and Development

Supervisor: Prof. Nick Murphy

Topics: Software Engineering

[Presentation](#) | [Poster](#)

📄 \* **UC-424 AI Limitations for Web Development** (Undergraduate Capstone) by [LaLicata, Jacob J](#), [Garske, Josh](#), [Rowlinson, Thomas](#), [Madrigal, Matthew](#), [Adewumi, Muyiwa E](#),

Abstract: This research project delves into the exploratory journey of using an AI (Artificial Intelligence), specifically ChatGPT, to assist in developing an auction website. Highlighting the iterative process of problem identification, solution finding, and implementation during development, this project aims to furnish insights into leveraging AI capabilities while addressing its limitations. Through this, developers and AI enthusiasts can gain a comprehensive understanding of effective collaboration with AI, addressing common pitfalls, and

devising solutions during software development.

Department: Information Technology

Supervisor: Prof. Donald Privitera

Topics: Artificial Intelligence

[Presentation](#) | [Poster](#) | [More Information](#)

📄 \* **UC-426 Cybersecurity Park** (Undergraduate Capstone) by [Leung, Michael P](#), [Masters, Kalil R](#), [Deason, Robert](#), [Skoonberg, Ian C](#), [Gohlke, Aiden D](#),

Abstract: We are presenting two additional modules to the Cyber Security Park, a long-running game project that is part of the realities lab. Whack-a-Malware is an arcade game where the player has to whack various malware, each with unique effects that mimic real-world malware. This includes Adware, Spyware, Ransomware, Computer Worms, and Trojan Horses. The player is equipped with two hammers that instantly destroy malware. But it goes on a three-second cooldown every time they destroy something. The player can reduce the cooldown by destroying adware as they are the main cause of slowing down the computer. Digital Footprints Private Investigator is a complete rework of an existing module. The player will be tasked by their client to find the perpetrator who has been anonymously intimidating them online and in person. The Player will have to explore the city to find digital footprint clues that will provide alibis and evidence against the suspects in the case.

Department: Software Engineering and Game Design and Development

Supervisor: Dr. Joy Li

Topics: Games

[Presentation](#) | [Poster](#)

📄 **UC-432 CCSE Reservation Application** (Undergraduate Capstone) by [Bunn, Brandon R](#), [Kafka, Ryan](#), [Levieva, Dina](#), [Ovell, Alyn](#), [Venuti, Olivia C](#),

Abstract: This CCSE Reservation Application project is focused on creating a unified web application to simplify the reservation process for inventory devices and room time slots for faculty and staff at Kennesaw State University. This initiative combines two separate reservation systems into a single solution, encompassing a database, backend, and frontend. The database will store relevant information, the backend will handle data communication, and the frontend will provide a user-friendly interface for making reservations. Administrators will have access to an admin view for managing requests. The project has faced challenges, including resource constraints and team coordination issues. While the integration of the university's login system remains pending at the time of submission, the application is on track to deliver a functioning reservation system for devices and rooms.

Department: Information Technology

Supervisor: Course instructor: Prof. Donald Privitera; Project sponsor: Prof. Christine Bryant

Topics: Software Engineering

[Presentation](#) | [Poster](#) | [More Information](#)

📄 \* **UC-433 Finding the Limits of AI for Web Development in 2023** (Undergraduate Capstone) by [Layson, Christopher S](#), [Kagika, Njagi](#), [Bush-Cunningham, Christian](#), [Lawal, Ismail O](#), [Nash, Adam Z](#),

Abstract: Our team was tasked with finding the limits of artificial intelligence for web development in 2023. This involved our team researching what the different parts of a website are, how to prompt an AI chatbot to provide us with source code, and how to put together a working prototype of an auction website by the end of our project. Our team produced various documents along the way that show our progress such as various slideshow files, documentation word docs, and a research report on our findings. After working with the AI to produce source code for our website, we have come to realize that an AI is helpful for making general outlines but, starts to have diminishing returns if one tries to get it to produce an entire website. Making general outlines can be quick but, you must be very specific in your prompting to get fully usable code that requires no



modification. With this being the case, we believe that AI should be used as a sort of co-pilot when it comes to web development in 2023.

Department: Information Technology

Supervisor: Prof. Donald Privitera

Topics: Artificial Intelligence

[Presentation](#) | [Poster](#) | [More Information](#)

📄 \* **UC-441 Finding the Limits of AI for Web Development in 2023** (Undergraduate Capstone) by [Chavez, Jessica](#), [Chastine, Jackson A](#), [Eve, Joel R](#), [Khan, Danish](#), [Garcia, Alexandre D](#),

Abstract: This Project explores the limits of artificial intelligence (AI) in web development, focusing on the year 2023. The study is conducted by AI Limits Team 1 from Kennesaw State University. The primary objective of the project is to harness the potential of ChatGPT 3.5, an advanced AI model, to create a fully functional Auction House Website. The achievements of the project include innovative web development, AI-generated content, and successful integration of AI into both frontend and backend aspects of web development. The research findings offer valuable insights into ChatGPT's proficiency in generating web application code and emphasize the importance of validation and testing in AI-driven development. Ethical considerations in AI-generated content are highlighted as well.

Department: Information Technology

Supervisor: Prof. Donald Privitera

Topics: Artificial Intelligence

[Presentation](#) | [Poster](#) | [More Information](#)

📄 \* **UC-454 Resilient Infrastructures: Enhancing Akwaaba's Cyber Defenses** (Undergraduate Capstone) by [McKee, Christian](#), [Begum, Mateen](#), [Diaz, Marisa G](#), [Nguyen, Kelvin](#), [Patel, Shreya](#),

Abstract: The project focuses on securing the server infrastructure of Akwaaba, a Caribbean-inspired steakhouse chain with locations in New York City, Atlanta, and Los Angeles. It involves assessing risks, implementing mitigation strategies, and establishing access policies for the on-premise servers. The student team will analyze the Red Hat Linux-based Virtual Machine hosting the WordPress website, which uses PHP, MariaDB, and Apache. Their objective is to prevent intrusions and data breaches that could compromise customer and business data. Furthermore, the team will perform Red and Blue team penetration testing to evaluate security measures and simulate potential attacks. They will incorporate the latest industry best practices and deliver a research paper and video presentations as project outcomes.

Department: Information Technology

Supervisor: Prof. Donald Privitera

Topics: Security

[Presentation](#) | [Poster](#) | [More Information](#)

📄 + **eUC-472 BIOMIMETIC REMOTE-CONTROLLED VEHICLE** (Undergraduate Capstone) by [Ridley, Jonathan](#), [Brown, Kian](#),

Abstract: The goal of this project is smoothly integrating instinctual concepts of control into devices beyond the body. It is essentially an attempt to extend the body without any complex prior training. To do this, we have developed a both a Bluetooth connection between hand movements and the motors of a multifaceted vehicle. Furthermore, the hand movements will be tracked using both an accelerometer and gyroscope found in the common hobbyist tool Arduino nano. Logging this data and processing it through the Bluetooth communication system, the intention is to provide real-time updates to the vehicle's motors that ultimately sync the intentions of a user and its movement.

Department: Computer Science

Supervisor: Prof. Nick Murphy

Topics: IoT/Cloud/Networking

[Presentation](#) | [Poster](#)

📄 \* **UC-491 Spectrum Analysis CLI Tool** (Undergraduate Capstone) by [Santos, Vitor B](#), [Redden, Trey](#), [Corella, Sam](#), [Flores Santos, Christopher](#), [Glennon, Jonathan](#),

Abstract: The Spectrum Analysis CLI Tool takes in .mp4 recordings of a Spectrum Analyzer, converts them programmatically into values the application can understand and outputs this data into a .csv file. This file can be parsed/filtered by the user with commands during upload of the .mp4 recording, or anytime after the recording has been processed.

Department: Software Engineering and Game Design and Development

Supervisor: Dr. Yan Huang

Topics: Data/Data Analytics

[Presentation](#) | [Poster](#)

📄 **UC-492 LotSpotter** (Undergraduate Capstone) by [Yankah, Julian](#), [Pham, Henry](#), [Greene, Tripp](#), [Perry, Jonathan](#), [Dongbou, Ghislain](#),

Abstract: The parking issue has quietly become the cause of a lot of stress for travelers and other regular users. It's nothing new that some people miss their flight and/or get late to other important meetings and appointments because they couldn't locate an available parking lot. Not because there isn't available parking but because they don't know where it is! What if there was some way to solve that? Introducing LotSpotter! An application built to detect and navigate to vacant parking spaces across the United States. It will leverage various technologies, including image processing, sensors, AI and mobile app development, to achieve its goal with frameworks such as OpenCV and processes from Amazon Web Services such as DynamoDB. Additionally, it will all be run through RaspberryPi to take advantage of GPS, and camera functionality! Users will be able to create accounts, reserve spaces, and much more. The days of being restricted by the struggles of metropolis are no more! LotSpotter is here!

Department: Software Engineering and Game Design and Development

Supervisor: Dr. Yan Huang - SWE Capstone Professor; George McBroom - Sponsor

Topics: Artificial Intelligence

[Presentation](#) | [Poster](#)

📄 \* **UC-502 Chess App with AI** (Undergraduate Capstone) by [Handley, Connor](#), [Cohran, John Paul](#), [Smith, Cole](#), [Russell, Paul](#), [Tsai, Eric](#),

Abstract: The objective of this project is to create a website that contains a virtual chess game, where the user can play against an opponent powered by an artificial intelligence model. This chess platform will be a widely accessible and user-friendly way to become more familiar with and practice the game of chess.

Department: Computer Science

Supervisor: Prof. Sharon Perry

Topics: Artificial Intelligence

[Presentation](#) | [Poster](#) | [More Information](#)

📄 \* **UC-506 Underrock Arena** (Undergraduate Capstone) by [Walker, Bryanna N](#),

Abstract: The game I developed was meant to highlight the ways that game developers can utilize our mobile devices to create a casual game. Breaking down complex parts of an RPG battling game, I devised the most casual and mobile-friendly way for the player to battle with unique bugs against an AI enemy using only 3 simple buttons: attack, heal, and ultimate. In addition, because of my areas of study at Kennesaw State University, I wanted to use my artistic abilities in my game. I thought it would be interesting to see how traditional art looks in a mobile game on a digitized screen.

Department: Software Engineering and Game Design and Development

Supervisor: Prof. Sungchul Jung

Topics: Games

[Presentation](#) | [Poster](#) | [More Information](#)

📄 **UC-508 Memories: Echoes of Resilience** (Undergraduate Capstone) by [Hester, Ethan J](#), [Padgett, Joshua Tyler](#), [Freeman, Katelyn R](#), [Crosby, Sarah](#), [Rhymer, Keith W](#),

Abstract: Memories: Echoes of Resilience is a first-person narrative experience that takes players through different experiences of a boy with autism. The game aims to show how everyday interactions can be different to someone with autism. Experiences such as making friends in school, being in overstimulating environments, or managing adult life are experiences we want to simulate for the player. The player will be able to interact with the world around them but will also have to be aware of how their environment impacts them, so they don't become overstimulated.

Department: Software Engineering and Game Design and Development

Supervisor: Prof. Joy Li

Topics: Games

[Presentation](#) | [Poster](#)

## Undergraduate Research

(e.g. capstones, games, innovative special topics projects, other course projects) (7)

\* Project will be featured during the Flash Session

+ Exploratory Project that is 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.

📄 \* **UR-407 Illusion of Weight: The Use of Tactile Glove for Muscle Exercise for Elders in Virtual Gym Experience** (Undergraduate Research) by [Autry, Johnathon R](#),

Abstract: This pilot study aims to investigate the potential creation of the perception of weight through a blend of visual and tactile feedback. Utilizing a tactile glove with varying vibration intensities and virtual dumbbell sizes, the experiment explores multiple conditions. These include tactile intensity (small, medium, large), virtual dumbbell sizes (small, medium, large), and diverse visualizations—ranging from no virtual dumbbell with or without tactile feedback to scenarios including both virtual dumbbells and tactile feedback. The study evaluates the virtual reality exercise experience and real performance using EMG sensors to measure muscle response, Heart Rate (HR), Galvanic Skin Response (GSR), and hand tracking. These biometric indicators enable a comprehensive understanding of the physiological and experiential impact of different conditions. The findings will provide insights into the efficacy of combined visual and tactile feedback in simulating weight perception.

Department: Software Engineering and Game Design and Development

Supervisor: Dr. Sungchul Jung - Project Supervisor; Dr. Garret Hester - Physical Therapy and Health Expert;

Prof. Lei Zhang - VR/AR Subject Expert

Topics: Games

[Presentation](#) | [Poster](#)

📄 \* **UR-409 Enhancing Aircraft Electronic Warfare Testing with Automated RF Spectrum**

**Analysis** (Undergraduate Research) by [De Santiago, Anthony](#), [Morgan, Matthew T](#), [Kim, Geonhyeong](#), [Bailey, Jalon L](#), [Reaves, Camille](#),

Abstract: Military test ranges utilize a variety of Radio Frequency (RF) threat systems, to assess the effectiveness of Electronic Warfare (EW) systems during flight tests. A component of this process involves monitoring RF transmissions. Traditionally, system engineers at Robins Airforce Base have manually analyzed

video from spectrum analyzers to confirm properties of specific threat systems. To streamline this analysis, our team's aim was to develop an automated solution for RF spectrum analysis. We employed a custom YOLO V8 model to isolate the analyzer screen and used a novel combination of frame differencing, summing, and agglomerative clustering techniques to extract relevant properties of measured signals. Our resulting application significantly reduces human interaction, enhances accuracy, and allows for the transformation of video data into a digitally manipulatable numeric format.

Department: Software Engineering and Game Design and Development

Supervisor: Project Sponsor: Elizabeth Dayton; Capstone Professor: Dr. Yan Huang

Topics: Artificial Intelligence

[Presentation](#) | [Poster](#) | [More Information](#)

📄 **+ eUR-443 The Compression Connection: NCD and KNN in Law Enforcement Text Analytics** (Undergraduate Research) by [Gillott, Gabriel T.](#)

**Abstract:** Facing a deluge of digital records, law enforcement needs advanced data sorting systems. This project uses a new NLP model, blending compression algorithms and KNN, to categorize Cobb County police reports by mental health, behavioral, and drug issues—vital for efficient resource allocation. The model employs Normalized Compression Distance (NCD) to discern text similarities, enhancing analysis of varying report styles. Early tests show promise in label categorization, but generalizing remains challenging, marking future research directions. This NLP advancement could revolutionize data handling in public safety, aiming to surpass current classification standards.

Department: Computer Science

Supervisor: Dr. Hafiz Khan

Topics: Artificial Intelligence

[Presentation](#) | [Poster](#)

📄 **UR-445 Symphony of Silicon: Rethinking Music Creation through Deep Learning Models** (Undergraduate Research) by [Gillott, Gabriel T.](#)

**Abstract:** Generative AI has transformed music creation, blending human and machine artistry. This study presents a neural network model trained on piano MIDI files for music generation, utilizing LSTM and self-attention mechanisms to capture music's complexity. Bayesian optimization with Tree-structured Parzen Estimator (TPE) refines the model's hyperparameters. The architecture includes bidirectional GRUs and self-attention layers, trained on the extensive Magenta MAESTRO dataset. The model, bettered by TPE over conventional tuning, is assessed for accuracy and expressiveness. The paper details the model's design and validates TPE's efficiency, marking progress in AI's creative application in music.

Department: Computer Science

Supervisor: Dr. Hafiz Khan

Topics: Artificial Intelligence

[Presentation](#) | [Poster](#)

📄 **\* UR-484 AI Detection – Chat GPT** (Undergraduate Research) by [Everett, Wylder](#), [Mode, Daniel](#), [Nguyen, Paul](#), [Johnson, Alfred](#), [Khan, Bilal](#),

**Abstract:** With the emergence of large language models (LLM) and Artificial Intelligence (AI) assistants like ChatGPT, accompanying tremendous potentials are critical challenges. Indeed, these assistant systems can provide quality information with conveniences. However, the generated contents are highly problematic being seemingly indistinguishable from that of human. The implication of this issue is severe in science, education, and domains that value original contents. With such motivation, this project addresses the task of identifying ChatGPT-synthesized texts with a focus on education, specifically, in short-answer questions. The goal of the project is to develop an AI technology that identifies synthesized texts by comparing such contents to examples known to be from AI for the same questions.

Department: Information Technology  
Supervisor: Sponsor: Dr. Linh Le; Prof. Donald Privitera  
Topics: Artificial Intelligence  
[Presentation](#) | [Poster](#) | [More Information](#)

📄 **UR-510 Exploring the Impact of Wavelength in Non-Invasive Blood Glucose Monitoring** (Undergraduate Research) by [Oakley, John E](#), [Kazi, Tahsin](#),

Abstract: Diabetes and metabolic diseases are some of the most crucial health issues of the 21st century. Monitoring blood glucose, the lead indicator of these diseases is a cumbersome process of constantly drawing blood or using subcutaneous needles. However, new technologies have emerged for non-invasive blood glucose monitoring that uses spectroscopy, which involves emitting light and capturing patient data with cameras. These new devices remove the cost of multiple tests, reduce the risk of skin conditions, and create more patient-friendly solutions. However, the hardware variables of these devices have not been tested thoroughly. One such avenue is via laser wavelength, which substantially affects device performance as different wavelengths interact with skin in varying ways. This study aims to investigate the impact of wavelength on the performance of the team's non-invasive device across different races, genders, and ages of people.

Department: Information Technology  
Supervisor: Dr. Maria Valero  
Topics: IoT/Cloud/Networking  
[Presentation](#) | [Poster](#)

📄 **\*+ eUR-525 AI-based Quiz Generation: The Role of LLMs in Digital Education** (Undergraduate Research) by [Sreekanth, Devananda](#),

Abstract: Our investigation delves into the application of Large Language Models (LLMs) and AI in crafting quiz-based learning tools for college students. We sifted through academic resources, utilizing keywords such as "AI," "GPT," "BERT," and "LLM," and pinpointed 24 pivotal papers out of over 80. Our findings highlight a preference for models like GPT-3, with newer technologies like BERT and RAG less represented, suggesting potential avenues for future inquiry. The research employed a structured methodology that encompassed an exhaustive literature review, trend analysis over time, and detailed textual scrutiny of AI technology mentions and innovative methods within the domain. This approach surfaced trends towards personalization in AI-powered educational tools, integrating advanced LLMs such as GPT-4 into practical applications, and crafting varied AI-facilitated question types to cater to diverse educational contexts.

Department: Computer Science  
Supervisor: Dr. Nasrin Dehbozorgi  
Topics: Data/Data Analytics  
[Presentation](#) | [Poster](#)