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 structur

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 Capsotne) 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