Proceedings of College of STEM Symposium

PROC(04ACSS2025)001
Clayton State University
03/2025

Book of Abstracts

Compiled by the editor, Dr. Dmitriy Beznosko*

Abstract 1.

Type: Student Poster

Title: DESTINY

Presented by: Joshua Bandoo, Malick N'Dow

Additional names or collaboration: Hassan Stewart, Nadia Macias-Rodriguez

Corresponding author: jbandoo@student.clayton.edu

DESTINY is an advanced career guidance system designed to revolutionize how individuals navigate their professional futures. By leveraging data-backed forecasting, strength evaluation, and AI-driven recommendations, the system identifies promising career paths that align with user skills and market demand. DESTINY minimizes decision paralysis by providing clear, tailored suggestions for long-term career success. Through continuous adaptation and real-world data integration, it offers dynamic, future-proof guidance, ensuring users make informed, strategic career choices in an ever-evolving job market.

Abstract 2.

Type: Student Poster

Title: C.L.A.Y - Career and Learning Advisory for Youth

Presented by: Armani Allen

Additional names or collaboration: Braxton Tucker, Abraham Perdomo

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C.L.A.Y. (Career and Learning Advisory for Youth) is an AI-driven university recommendation system designed to provide personalized guidance based on student preferences. Unlike traditional survey-based tools, C.L.A.Y. leverages machine learning, collaborative filtering, and adaptive weighting to generate tailored suggestions. By incorporating real-time feedback loops and training on organic student data, the system continuously refines its recommendations, reducing error rates and improving accuracy. This data-driven, user-focused approach ensures a more effective and individualized college selection process, bridging the gap between student needs and institutional offerings.

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Abstract 3.

Type: Student Poster

Title: CSU Lochin

Presented by: Zion Clery

Additional names or collaboration: Hassan Stewart, Nadia Macias-Rodriguez

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CSU Lochin is a full-stack social networking application exclusive to the University of Clayton State. Its purpose is to provide a remedy to the very issue stated above for aspiring students in Clayton State's IT and Computer Science departments. By utilizing the application, CSU Lochin, you can get class insights from your fellow peers. You can learn from their experiences and mistakes. You can use the application to not only learn concepts but also master them. Collaborate and conquer!

Abstract 4.

Type: Student Poster

Title: VoltFix

Presented by: Amylynn Bui, Antania Bivens, Bernice Santana, Melissa Medoza-Mora, Nadia Macias-Rodrigues

Additional names or collaboration: William Carroll

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With Electrical Vehicles being relatively new and ever growing, the average consumers have expressed concerns with finding appropriate services and information for their vehicles. On the other hand, mechanics find difficulty investing into the high cost and labor to perform maintenance for EV's specifically due to lack of customers. With this in mind, we introduce Voltfix as a way for consumers to connect with mechanics in hopes to encourage engagement on both ends and provide information on services needed to maintain and upkeep their vehicles.

Abstract 5.

Type: Faculty Presentation

Title: An AI-Powered Self-Expired Email System to Organize Inboxes

Presented by: Ken Nguyen

Additional names or collaboration: Muhammad Rahman

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Managing email inboxes is a daily, time-consuming, and tedious task. An intelligent system that can automatically organize our emails by relevancy, give a short descriptive summary for each email, identify and archive emails that are no longer relevant could revolutionize the email systems. In this study, we explore and strategize the development of such a system by deploying an AI-powered solution at the server-level to automatically classify the incoming emails with expiration date and relevancy to free the user from handling these emails manually.

Abstract 6.

Type: Student Poster

Title: Spending Firewall: AI-Driven Financial Security

Presented by: Kossi Sessou

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Many people struggle with overspending and unexpected financial stress. Traditional banking systems focus on fraud detection but do not help individuals prevent personal overspending. Spending Firewall is an AI-powered tool that analyzes transactions in real time and warns users before they make high-risk purchases. It uses machine learning to detect unusual spending and applies business rules to refine risk assessments. The system provides a Spending Security Score (0-100) and alerts users through a notification. It integrates with banking data to simulate real-world transactions and improve financial awareness. Spending Firewall helps users develop better spending habits, avoid overdraft fees, and stay financially secure. In the future, it could expand to detect fraud, assist with budgeting, and improve credit risk assessment. By providing proactive spending protection, this system helps users make smarter financial decisions.

Abstract 7.

Type: Student Poster

Title: The State of Modern Assault Drones and the Countermeasures Against Them

Presented by: William Shiflett

Additional names or collaboration: Dr. Catherine Matos

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The recent rapid emergence and innovations of modern drones has completely changed the approach to the modern battlefield. Since the terrorist attacks against the United States on September 11th, 2001, the use of armed drones in combat areas has increased dramatically to alleviate and control the global threats through remote controlled aircraft use. These aircraft can perform surveillance and various attacks such as cyber-attacks, or by carrying payloads of high-grade explosives. Recently, the use of AI has rapidly improved attack efficiency by enabling drones to be autonomous in their missions. Since 2001, major superpower countries have been rapidly researching, improving, and producing increasingly effective drones. The goal of this research is to survey the history and uses of drones used in modern combat scenarios and the effective countermeasures that have been put in place against them.

Abstract 8.

Type: Student Poster

Title: AI's Role in Education

Presented by: Jasmine Heath, Alex Ramirez, Tomas Almazan Macedo, Zenande Nyathi, Ingrid Guzman

Additional names or collaboration: William Carrol

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Enhancing Learning with Retrieval-Augmented Generation AI Artificial Intelligence is reshaping education by providing precise, context-aware information retrieval. This project introduces a Retrieval-Augmented Generation (RAG) AI model that processes PDFs to generate accurate, subject-specific answers. Built with LangChain and Llama3, the system integrates retrieval-based and generative AI to enhance accessibility, personalize learning, and support automated assessments. While addressing challenges like misinformation and bias, RAG offers cost-effective domain adaptation for improved control and security, with applications across academic and professional fields.

Abstract 9.

Type: Student Poster

Title: Visualizing Bias Crime in the United States

Presented by: Amiah Pierre

Additional names or collaboration: David Williams

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This project will focus on converting 10 years of NIBRS raw encoded bias crime data into accessible readable format using MATLAB and Tableau. The comparison will be based upon Bias Fraction (βf) metric to compare bias incidents across regions. Interactive map will be created to help reader's better understand and will also be used to search for potential correlations in the data. This research will help better inform reader of the specific types of crime and encourage better reporting in the NIBRS system amongst states.

Abstract 10.

Type: Student Poster

Title: Newton's Method

Presented by: Alexa Roberts, Spencer Roberson

Additional names or collaboration: Christopher Raridan

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Newton's Method is an iterative technique that uses the tangent line to approximate solutions of an equation.

Abstract 11.

Type: Student Poster

Title: Cops and Robbers on Graphs

Presented by: Tracy Dao, Tony Doan, Josue Olivo

Additional names or collaboration: Christopher Raridan

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In this poster, we explore the optimal number of cops needed to guarantee a win in the game of Cops and Robbers on distinct graph configurations. Assuming all graphs are finite, simple, connected, and undirected, we analyze various structures, including tree graphs, complete graphs, and cycle graphs. We identify cop-win graphs requiring only one cop and cases where a single cop is insufficient, such as cycles with four or more vertices. Through our research, we introduce the concept of “capturing points,” which helps determine the minimum number of cops needed. Our findings suggest that once all capturing points are removed, the structure of the remaining subgraph dictates the cop count necessary for a guaranteed win.

Abstract 12.

Type: Student Poster

Title: Hexapod GUI

Presented by: MD SAZIDUL, ISLAM

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Abstract Hexapod robots are widely recognized for their stability and bio-inspired locomotion. This research focuses on developing a graphical user interface (GUI) to enhance control over a hexapod robot, particularly its leg movements, obstacle detection, and visual recognition, including facial recognition. The system integrates Raspberry Pi, Python, and PyQt5 to provide an intuitive, real-time interface for monitoring and controlling the robot through a menu-driven system. Key functionalities include movement control, gait selection, and camera streaming, allowing for efficient user interaction. The GUI communicates with a Raspberry Pi-based server, which processes commands and actuates servos. Additionally, ultrasonic sensors enable obstacle detection, while a live camera feed supports real-time vision and facial recognition. This study demonstrates how an interactive control system can improve robotic automation, usability, and adaptability. The findings contribute to the advancement of human-robot interaction, paving the way for future applications in robotics research, education, and autonomous systems.

Abstract 13.

Type: Student Poster

Title: Modeling Mortality Trends: A Data-Driven Approach to Predicting Longevity

Presented by: Evan Castillo, Yulisa Govea-Morales

Additional names or collaboration: Louisa Catalano

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To analyze historical mortality data and develop predictive models to estimate future mortality rates and life expediencies. The project will provide insights into demographic trends and their implications. Life tables gathered from the years 2000-2021 will be the data that our predictive models will be based on. The goal is to use this predicted mortality rate(national-level) along with individual-level mortality data to gain a better assessment of risk.

Abstract 14.

Type: Faculty Presentation

Title: Plants save the world, right?

Presented by: Jere Boudell

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It is a common assumption that plants can simply absorb the excess CO_2 released into our atmosphere. However, when we examine plants' capacity to absorb ever-increasing CO_2, the answer becomes more complex. This is especially true when other environmental factors—such as rising temperatures, drought, and other stressors—interact with elevated CO_2 (eCO_2). In this talk, we explore how a suite of wetland plants responds to these combined stresses, and how something as small as a leaf pore can profoundly impact a plant's ability to thrive—and ultimately, its capacity to support ecosystem function in the face of a changing climate.

Abstract 15.

Type: Student Poster

Title: Real-Time Phishing Detection on BeagleBone Black with Phone Alerts.

Presented by: Martins Okonye

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The goal of this project is to build a real-time phishing detection system using BeagleBone Black, integrated with an alerting mechanism via phone notifications. The system captures network traffic, scans URLs and emails for phishing indicators, and sends alerts to a predefined phone number when phishing attempts are detected.

Abstract 16.

Type: Student Poster

Title: Laker STEM Sisters

Presented by: Janiah Leavens, Shenelle Higgs

Additional names or collaboration: Louisa Catalano, Catherine Matos, Yulisa Govea-Morales

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Laker STEM Sisters is dedicated to fostering a vibrant and empowering community that unites and elevates female STEM majors within the precincts of Clayton State University. Our presentation will discuss the organization's mission, vision, participation on campus, and involvement in the community.

Abstract 17.

Type: Student Poster

Title: AI-Powered Real-Time Brain Tumor Detection and Classification Using MRI

Presented by: Abraham Duarte Perdomo, William Faircloth, Johnny Doan, Kishan Bhagwandas

Additional names or collaboration: Ken Nguyen

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Magnetic Resonance Imaging (MRI) plays a crucial role in diagnosing brain tumors, but the manual analysis of these scans can be a time-consuming process, which can impact patient care. This study presents a deep learning approach to creating a system for real-time brain tumor analysis and classification that can help radiologists in making accurate diagnoses. A convolutional neural network (VGG16) was implemented to classify tumors as malignant, benign, or normal tissue, achieving a test accuracy of 95% with a confidence score of 0.98. Additionally, a U-Net segmentation model was employed to highlight tumor regions with a Dice Coefficient of 0.85–0.90 and a Jaccard Index of 0.80–0.85. Due to lack of access to an MRI machine, a synthetic MRI generator was used to replicate the machine to test real-time analysis, and a camera system was employed to secure data access to patient data, allowing users to scan a QR code to get access to the system's analysis. This proof-of-concept demonstrates that AI driven MRI analysis can enhance efficiency for tumor detection and classification which also can improve patient care with the time solved. We hope that this research project can show how AI can be used in the medical care field for the benefits of professionals and patients.

Abstract 18.

Type: Student Poster

Title: Building Awareness and Empowering Change: The SoS Coke Scholars' Approach to Environmental Science

Presented by: Jakayla Bryant, Mahir Cheema, Arianne Cook, Dev Shastri, Jordan Tucker

Additional names or collaboration: Jere Boudell

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The 2024-2025 CSU School of Sciences Coke Scholars focused on environmental science, community service, and researching climate change awareness among CSU students. Beginning in Fall 2024, they studied climate change, focusing on its impacts in the Southeastern US and its role in events like Hurricane Helene. They also explored the BioLab incident in Conyers, GA. In addition, they participated in preservation and restoration projects such as the Jesters Creek Stream Clean-up and the Reynolds Nature Preserve Invasive Species Pull. Scholars also networked at the CSU Launchpad Leadership Academy, connecting with industry leaders and peers. Furthermore, they launched a study to assess CSU students' understanding of climate change.

Abstract 19.

Type: Student Poster

Title: Construction progress of Detector of Unusual Cosmic-ray casKades.

Presented by: Xuong Minh Tran

Additional names or collaboration: D.U.C.K. Collaboration[†]

Corresponding author: xtran2@student.clayton.edu

High Energy Physics (HEP) is a field that has still has many mysteries that need to be solved. An open question is about the origin and composition of the Ultra-high Energy Cosmic Rays (UHECRs). These cosmic rays originate well outside our planet, may even be outside of the galaxy. They are messengers that could help us better understand the universe around us and provide insight into the fundamental building blocks of our universe. The primary goal of the Detectior of Unusual Cosmic casKades, or D.U.C.K. system, is to detect and verify the existence of unusual cosmic events. Moreover, it can help innovate EAS (Extensive Atmospheric Shower) analysis methods. This poster aims to highlight developments of the detector system, instrument calibrations and other activities conducted at Clayton State University.

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