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05. Computer Science

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Mathematics and Science.Computer Science.01

Yan FayChong

University of Central Oklahoma

An Analysis of the Knee Injury Rehabilitation via a Mobile-Computing Approach

Major knee injuries and problems often occur during accidents, recreational activities or sports. Depending on the severity, a knee injury typically takes a long time to recover. Therefore, in order to promote knee recovery, knee exercises have proven to be very crucial and important to build strength and recover the range of motion of the injured knee. However, since the cost of rehabilitation is usually high, most patients would opt to complete it on their own at home. Also, as the rehabilitation protocol is complex by nature, it is very challenging for a patient to accomplish it without any professional guidance. As a result, many patients will not be able to fully recover from the injury. Thus, we have proposed an effective and low-cost approach to overcome this problem. In this project, we used the sensors, i.e., accelerometer and gyroscope, in a smartphone to collect the knee rotation data, and used machine learning techniques, particularly artificial neural network, to analyze the collected data. The goal is to provide an effective solution to help patients achieve effective rehabilitation.

Mathematics and Science.Computer Science.02

DanielBennett

Northeastern State University

Defeating Multi-Factor Authentication with SIM Swapping

Multi-Factor Authentication (MFA) is a practice websites or applications can use to add an extra layer of protection to authenticate a user. These factors are usually categorized as something you know, something you are, and something you have. MFA is rightfully becoming a common security practice on websites and mobile apps to reduce the risk of compromise. With MFA enabled, an attacker would not only need your password but also the other piece to the puzzle. One common method of providing MFA is Short Message Service (SMS), better known as text messaging. When SMS MFA is used, the user is sent a one-time password to their mobile device to use in authentication. SMS can be exploited by attackers using a method called SIM swapping. SIM swapping occurs when an attacker uses social engineering or a corrupt phone store employee to clone (swap) the requested phone number to a blank SIM card for the attacker. The attacker can now send and receive calls as well as messages using your phone number. This enables the attacker to perform password resets, verify accounts, and more. SIM swapping has been credited for many high value attacks over the past few years. One example is in early 2018, when over $20 million in cryptocurrency was stolen from Michael Terpin. This research examines SIM swapping and its use as a method to exploit MFA using SMS messaging.

Mathematics and Science.Computer Science.03

Dr. GangQian

University of Central Oklahoma

Building an Algorithmic Trading System

This presentation describes an implementation of a system to trade financial markets algorithmically. We present the workflow including data acquisition via exchange APIs, data modeling via technical analysis, and model assessment via back-test.

Mathematics and Science.Computer Science.04

Dr. GangQian

University of Central Oklahoma

Financial Machine Learning: Using machine learning to enhance the performance of a systematic trading strategy

Machine learning in finance is a unique field. Special considerations need to be made when working with financial data. Samples are not independent or identically distributed. In this research, I show a mean reversion technical trading strategy can be enhanced with the proper use of machine learning, maintaining consistent profitability in harsh markets (Bitcoin). The machine learning enhancement results with a Sharpe ratio more than twice that of the original strategy.

Mathematics and Science.Computer Science.05

BillyAndrew

East Central University

Utilizing Forms to Digitize the Data for PAWS

Pontotoc Animal Welfare Society (PAWS), located in Ada Oklahoma, still collects paper-based data for their daily operations. With a PetSmart Charities grant and support from the McNair Scholars Program at East Central University, we were able to obtain electronic data collection equipment and develop specialized forms for data entry utilizing KoboToolBox. Creating a working and efficient electronic form is vital in making this a viable method for data transfer and entry for PAWS, other humane societies, and small businesses. For non-profit organizations and small businesses, it is crucial to minimize the operating costs. KoboToolBox is free to use for research and humanitarian reasons, making it the perfect choice for this project. In the future, FormHub will be considered for small business and other types of organizations. FormHub will be used much like KoboToolBox but is open source and can be implemented by the organization. We plan to analyze possible database methods. This includes Access and Open Office to build a specialized database to fit the needs of PAWS. The new databases will allow the employees at PAWS to manipulate the data, make simple print outs for the adopters, and keep it updated to provide better adoption rates.

Mathematics and Science.Computer Science.06

MatthewKing

University of Tulsa

Is Second Factor Authentication Broken? An Analysis of 2FA Token Harvesting Techniques and the Transition to Universal Second Factor Authentication

Second factor authentication (2FA) is the process of providing two different authentication factors to gain access to desired resources. 2FA involves combining something the user knows, most commonly a password, with something that they have. The "something they have" ranges from one-time passcodes sent through SMS or mobile applications, to biometrics and hardware tokens. While 2FA is better than simply using passwords to secure accounts, recently released tools reveal critical vulnerabilities for users attempting to secure accounts with SMS or authenticator app-based one-time passcodes (OTPs). This project details how one of those particular tools accomplishes the task of automatically harvesting user credentials and OTPs. Additionally, the project details how Universal 2nd Factor (U2F), an open source authentication protocol, can be used to provide more robust security for user accounts than 2FA. The project discusses features of the protocol's security as well as issues associated with implementation.

Mathematics and Science.Computer Science.07

JacobHall

University of Tulsa

Problems and Vulnerabilities behind Hyperledger Enterprise Blockchains

Hyperledger claims permissioned blockchains ensure immutability of data in a network. However, the decentralized nature of blockchains opens doors to many security issues not seen in a standard web application. Maintaining blockchain security comes at a compromise of speed and extreme complexity. Developers usually reduce security endorsements to improve performance. Since the blockchain was designed to run arbitrary code, a single compromised peer could provide unauthorized access. This research explores how standard web application testing tools can be used to attack permissioned blockchains. This project lays the groundwork for greater blockchain security in the future.

Mathematics and Science.Computer Science.08

ReidKinder

East Central University

Teaching Your Computer to Think

Teaching a computer to classify data accurately through multi-layer neural network processing is known as deep learning. The MNIST dataset was used to explore and compare machine learning processes to deep learning through packages such as SKLearn, and Tensorflow. Through SKLearn, different dimensional reduction techniques were used to manipulate the dataset, such as Principal Component Analysis (PCA) and T-Distributed Stochastic Neighbor Embedding (t-SNE). PCA and t-SNE were used to reduce the number of dimensions of the dataset, while conserving certain characteristics of the data. Finally, K-Nearest Neighbors (KNN) was used to classify the data after dimensional reduction. After this classification, a graphical representation of the data was presented. An accuracy greater than 85\% on the test set was achieved through this method. Tensorflow was also successfully applied to the data set. Through Tensorflow, we reached a result of greater than 95\%.

Mathematics and Science.Computer Science.09

ChaseMinden

University of Central Oklahoma

Coin Collector: First Introduction and Project with Unity

Before starting this project, I had never used Unity before, I had never programmed in C# before, and I had no idea how to even start making a game. So starting out, I practiced with the tutorials that Unity provided and watched some videos about how to use different parts of Unity. After finishing the coin collecting tutorial, I wanted to try out some of the things that I'd picked up. I started expanding the playing area and experimenting with player and camera controls, and eventually ended up with a 3D terrain and a ball to play as. I wanted to keep improving the game, so I found Adobe Fuse to create a player model and imported the model into Unity to make a new player, and used a prefabricated script to make the first-person movement. Then after this, I started working on scripts of my own to make interactable obstacles and pickups. As the semester came to a close, I started working on finishing touches like animation connections, object organization, and visuals. At the end of the project, I feel like I have a better understanding of how to use different facets of Unity, how to create programs in C#, and how to make the connections between those two. This will be very helpful if I wish to continue making projects in Unity in the future.

Mathematics and Science.Computer Science.10

RobertManley

University of Central Oklahoma

BadDroid: A First-Person Perspective Video Game Project Using Unity 3D

In this project, we are developing a survival based first-person shooter game called BadDroid using the Unity 3D game engine. Making BadDroid has involved learning skills from various online tutorials and then taking them a step further. 3D gun models were coupled with particle effects to create muzzle flashes and impact burns on the environment and enemy robots. The player can select multiple weapons with various properties such as impact force, which causes enemy robots and objects to be pushed backward. In addition to this, each weapon has been given unique sound effects and firing modes. The player can switch between firing modes to change their weapon's rate of fire. By using the alternative fire button, the player can throw grenades at the robots, which bounce off and roll around the environment. These grenades will flash with red lights several times before exploding. Enemy robots wield weapons (that the player can eventually obtain) and have 3D models with custom idle, walking, and running animations. A simple level was constructed with several rooms that contain either destructible objects or spawn points for enemy robots. Upon losing all their health, an animation triggers which causes the player to crash onto the ground before seeing the "GAME OVER" screen. Overall, BadDroid is an ongoing project whose development promotes research in many areas of computing, such as rendering graphics and lighting, optimizing code, and computer-aided design.

Mathematics and Science.Computer Science.11

NicholasMcDaniel

Southwestern Oklahoma State University

Constrained K-Means Clustering Validation Study

Machine Learning (ML) is a growing topic within Computer Science, and has applications in many fields. One classical problem in ML is the question of separating data, and this process is now known as clustering.

One interesting application of data clustering is making insurance adjustments for hail damage to crops. Our project is a validation study of, "Constrained K-means Clustering with Background Knowledge by Wagstaff et. al.

Here we show that a modified k-means clustering approach can outperform more general unsupervised learning when some domain information about the problem is available. In Wagstaff et.al, machine learning was applied to the problem of predicting what soybean production would have been if hail had not damaged crops. Because this is an estimation that many crop insurance agents have had to make, it is a relatively large data set that has been labeled by human experts. Our data suggests that k-means clustering augmented with domain information can be a time efficient means for segmenting data sets.

Our validation study focused on six classic data sets and does not consider the GPS data of the original study. We have published our code onto a SWOSU Github repository to enable other researchers to use our code as a starting point.

Validation studies such as this provide great learning opportunities for students interested in working with Machine Learning, Artificial Intelligence, and other related applications.

Mathematics and Science.Computer Science.12

MarcoMartinez

Southwestern Oklahoma State University

A Validation Study of Time Series Data Forecasting Using Neural Networks

Artificial Intelligence (AI) is a growing topic in Computer Science, and has many uses in real world applications. One application is using AI, or more specifically Neural Networks, to model data and predict outcomes. Neural Networks have been used in the past to predict weather changes, create facial recognition software, and to create self-driving cars. Our project is a validation study of, "Modeling Time Series Data With Deep Fourier Neural Networks" by Gashler and Ashmore, 2016. Gashler and Ashmore trained a Deep Fourier Neural Network to fit time-series data, such as weather. Their method was demonstrated with the weather data obtained from Anchorage, Alaska over a five year period beginning in April of 2009. In our research, we attempt to fit a simpler neural network to the Alaska weather data. We first fit our data with traditional neural network training algorithms. We then expand our research to use machine learning to train the neural network to the Alaska weather data. We believe that we can create a simpler neural network that is still as effective as Gashler and Ashmore's neural network. This validation study provides a useful introduction to Artificial Intelligence for upper level undergraduate students. Completed code will be made public on the SWOSU Github repository. As computing resources and programming environments continue to improve, the value of forecasting will continue to increase. One may see this research as a way to improve famili

JacobMiller, JeremyEvert

Southwestern Oklahoma State University

Validation Study of Image Segmentation Algorithms

Developments in machine learning and computing capability in recent years have created opportunities that were previously not cost effective. One such area is image recognition and computer vision, where a machine analyzes an image and classifies it. After classification, the machine can pass the information off to a different algorithm for decision making. Before a machine can classify parts of an image as a human does, it must break down the image in a process called image segmentation. This task is an open research area. Many algorithms exist to determine how pixels are grouped. This research poster details a validation study of related papers on image segmentation algorithms for machine learning. The first author has selected three different image segmentation approaches. Algorithms for this study will be reproduced in Python and utilize many pre-existing libraries. Our team has acquired a small robotic research platform to provide evaluation of our research. A Robot Operating System based robot will be assembled and tested with the three different algorithms to assess their real-world effectiveness. This study may lead to more research platforms. Additionally, this undergraduate research study opens opportunities for students to work with sophisticated code first-hand.

Mathematics and Science.Computer Science.14

Ren JianLee

University of Central Oklahoma

First-Person Perspective Tower Defense Game

The aim of this research project is to create a unique style of gameplay for traditional tower defense games. The project will attempt to include a first-person perspective into tower defense gameplay by allowing the player to control a character that can assist the turrets in eliminating waves of enemies. Two different camera views will need to be created for this purpose: first-person perspective for player-controlled shooting and third-person perspective for the turret building mode. Unity provides many helpful tools to accomplish this and will be utilized throughout the course of this project. The game will also include features such as wave spawns of enemies, a shop for turrets, and currency. The enemies will have set health values and movement speeds; the turrets will have set costs, fire rates, and damage values. The waves of enemies will increase in number as each round is completed. This project involves numerous scripts that provide various functions such as animating the bullet projectiles, camera movement, spawning of enemy waves, and waypoints that control the enemies' pathing. The player will be able to walk around the map and work together with the turrets to kill the enemy units before they travel to the end of the path and reduce the player's health. The results of this project are a newly acquired skill-set and a better understanding of game development using the tools provided by the Unity Engine.

Mathematics and Science.Computer Science.15

RadAlrifai

Northeastern State University

Drifting Simulator and Score Calculator

The Drifting Simulator and Score Calculator is designed to simulate data of a car drifting around a track and to calculate a score based on that data. In drifting, cars are modified to have very little rear wheel traction, allowing them to oversteer and slide around a corner at an angle. This program is designed to score drifters by how fast they take turns, how close they get to scoring pins, and at what angle they take the turns. The program is currently a basic, standalone program for demonstration purposes only. In the future the program could be implemented into hardware that could be attached to cars in order to get real-world information. The program is written entirely in Java as it is a flexible and easily portable language; the program is intended to run on different types of machines.

Mathematics and Science.Computer Science. 16

RadAlrifai

Northeastern State University

Stock Trading Emulator

The project's goal is to provide a platform to practice and learn more about stock trading in the form of a game. The stock emulator in its final form would work as a web application built into a server. For this project's scope, the application runs on a single machine within a web browser. Our stock emulator was built using Microsoft's ASP.NET platform with C# as the main programing language for the back-end processes, and the graphical user-interface was made with HTML and CSS. Our project is divided into two sections, the ASP.NET application that contains the front-end and all user interaction, and a separate C# program that is used to obtain the current stock data from the Alpha Vantage API and then store that data into a database. The data for the stock emulator is saved using a MySQL relational database that is accessed by the ASP.NET application and the C# back-end process. The MySQL database was set up on the development machine using XAMPP as an interface to install and manipulate the database.

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AbigailKern, JichengFu

University of Central Oklahoma

Application of A Smart Phone's Built-In Barometer Sensor for Indoor Localization

The goal of our research was to determine if the built-in smart phone barometer sensor could be applied to indoor localization for determining which floor a person is on in a multi-story building. Since the barometer sensor reads pressure, and pressure changes based on elevation, our idea was that the readings should change drastically enough per floor to be able to determine which floor a person is on in a building. To achieve our goal, we created an android mobile app that saves raw data from the barometer sensor into a csv file, allowing for comparison between floor values later. To collect data, we used two different android phones and collected a large data set on three different floors in the same stairwell of a building. Then, we looked at the differences between each floor to see if the amounts were drastic enough for values to be unique to each floor. We observed the difference between consecutive floors to be 0.3 and 0.5 (hPa), which is a large enough difference to identify a floor. However, the two smart phones had data that differed by 5 hPa, and the base readings of each phone would vary by 12 hPa on different days. However, the actual difference between the floors was always between 0.3 and 0.5 (hPa). Therefore, the barometer can be used to determine which floor a smart phone, and thus a person is on. Future research needs to be done to determine the direct relationship of temperature and pressure readings, since pressure increases as temperature increases.

JacobHooper

Cameron University

Authentication Methods

Every day, people encounter some sort of authentication, whether it be logging into a computer using their username and password, unlocking their phone, entering their PIN to access a bank account, swiping a card for access to a building, and more. We are investigating the most reliable and secure methods of authentication by analyzing studies on the subjects. We present traditional methods such as passwords and PINs, as well as more recent technology, such as facial recognition, fingerprints, and more. We compare the different methods in multiple situations.

Mathematics and Science.Computer Science.20

ClintFerguson, SachetanTuladhar

Cameron University

DDOS: Prevention and Detection

Distributed denial-of-service is one of the most common and most highlighted attacks of today's cyberworld. With simple but extremely powerful attack mechanisms, it introduces an immense threat to our current Internet community. In our research, we present a comprehensive survey of distributed denial-of-service attack, mitigation techniques, and ways to prevent future attacks. We provide a systematic analysis of this type of attacks including motivations and evolution, analysis of each different attack methods, protection techniques and mitigation techniques, and possible limitations and challenges of existing research. Lastly, we highlight the future of Distributed denial-of-service attacks and ways to counter and defend against them.

MicheleTilley

Cameron University

Data Security in the Cloud

Cloud computing is a network of offsite servers hosted on the internet to store, manage, and process data. Cloud usage has become one of the most popular services used by many companies, as well as for personal use. With such a high volume of users, security has become a major issue in preventing the loss of data or stolen data. Some of the key aspects that must be accounted for when dealing with security are confidentiality, integrity, and availability. In this paper, we distinguish between the different types of security vulnerabilities and the threats that are associated with the security of data stored in cloud services. We also examine possible methods to enhance the security of data stored in the cloud.

Mathematics and Science.Computer Science.22

GregoryNorton

Cameron University

Social Media and Big Data

Big data is the colloquial term for information that is gathered into large data sets and then analyzed in order to determine patterns and trends. Big data utilizes various algorithms built around volume, velocity, and variety that are used by companies such as Cambridge Analytics and Google. Data is sourced from search engines, social media, stock exchanges, and black boxes like those seen in airplanes. Many industries such as governments, social media, health care, and finance analyze big data for their use. Our research will focus on the use of big data in social media marketing. Social media is an ingrained part of many people's lives and provides prime real estate for companies to find a target audience for their products. We will focus on algorithms used by companies advertising on social media and how they predict spending and browsing habits.

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JerallJones

Cameron University

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JerallJones

Cameron University

Virutal Reality in Medical Applications

Mathematics and Science.Computer Science.25

KeiTamura

Cameron University

Deep Learning in AI

Just as humans process a lot of information, machines and computers are now able to analyze, identify and distinguish various characteristics of objects, images, colors and patterns of words in a timely manner. This might take the form of completely new learning paradigms or continued refinement of existing principles. The objective of this research is to explain deep learning in artificial intelligence. Deep learning imitates the process of human thinking by analyzing complex data. Also, we present and compare the framework based on neural networks which is a system of hardware and/or software patterned after the operations of neurons in the human brain. Deep learning is applicable across various works of life i.e. commercial applications and in medical researches.

Mathematics and Science.Computer Science.26

Robert Arreola, Alex Berg, Jerall Jones and Dr. Jawad

Cameron University

Virtual Reality in medical applications

Virtual Reality technology has become increasingly effective in training and education, especially in the medical field. Using virtual reality, the medical profession has improved in the areas of medical treatment, recovery and patient awareness. This study outlines the framework and components used in medical training procedures, such as programming languages, software and hardware. We describe the use of the Unity software in a number of virtual reality applications. We present the use of virtual reality to decrease the cost of spatial co-registration of electrode positions with individual head models (EEG). We present a new method for building virtual assembly applications which is more efficient than traditional.

Mathematics and Science.Computer Science.27

CameronSmith

Cameron University

The Development and Applications of 3D Printing Technology

3D printing is a revolutionary new way to create objects that are first designed and modeled using 3D software before using a printing machine to create objects. Original development began as early as 1986 and has continued to grow and evolve since then. In our paper, we explore the creation, development, and future aspects of 3D printing. 3D printers can create a physical 3-dimensional object ranging from toys to prosthetic limbs. Many types of materials and printing methods are used depending on the intended use or purpose of the object. 3D printed objects are first modeled in a computer program that then converts that design into an STL file. This file is read by a machine that uses successive layers of material to create the final object. Additive manufacturing is widely used in the fields of biotechnology and many other fields. These applications continue to increase, and additive manufacturing is proving to be an exciting technology for the future.

Mohammad AbdulBaset, JichengFu

University of Central Oklahoma

Indoor navigation for people with disability(Wheelchair)

Purpose: There are no better ways to navigate indoor areas. It is certainly a necessity for people with disability, specially wheelchair users. The purpose of this research is to develop an indoor navigation software which uses smartphone and machine learning to help users navigate indoor efficiently.

Relevant Research Context: There are some research work done for indoor navigation which uses magnetometer. It is more accurate than Wi-Fi and GPS and saves energy. My research mentor uses accelerometer for tracking wheelchair user's mobility for improving healthy life style of wheelchair users.

Description: First step, building a mobile application (currently using Android) that can collect accelerometer, gyroscope and magnetometer data.

Second step, based on those data, we will create segments about stationary, moving and turning. We will use those segments as training data for machine learning algorithms.

Third step, by using machine learning techniques, we will accurately determine a wheelchair's moving status.

Fourth step, we will use path finding for better user navigation.

Last step, we will combine wheelchair's moving status and path finding to determine the real time updating location of the user and instruct him accurately.

Conclusion: people with disabilities, especially wheelchair users, have hard time navigating in indoor areas. This application will help those people easily navigate indoors.

HaydenWebb, JeremyEvert

Southwestern Oklahoma State University

Adapting NASA's MAPSS Databases to Desktop Computing

The capability of desktop computers has increased greatly over the past several decades, even outpacing some of the first supercomputers. A standard Intel i7-4790 processor can run at 90 Gigaflops. This means it can complete almost ten to the tenth operations per second. Hence, in a time when you can buy a new 8th generation intel processor for a few hundred dollars, an older 4th generation intel processor is more powerful than the most powerful computer in the world in 1993. In this research, we examine code developed for a NASA supercomputer and run it on a standard personal computer. Our results suggest that for simple tasks, such as pulling down information from the servers, the software is capable of running on a standard desktop. This demonstrates that when NASA produced code is adapted to a modern desktop computer, the computer can process the given information. In summary, we can show that modern desktop computers not only have more processing power than some of the first supercomputers, but can easily handle applications attended for processing large sums of data. From a larger perspective, this shows how computers evolved to the point where what is considered an outdated processors is still leagues above what was first produced. This material is based upon work supported by the National Aeronautics and Space Administration under Grant No. NNX15AK02H NASA Oklahoma Space Grant Consortium.

Mathematics and Science.Computer Science.30

EzgiGursel

Southwestern Oklahoma State University

The Future of High Performance Computing at NASA

Computers are a growing part of everyday life in many ways.

For some of the biggest and most interesting problems, people have used some of the biggest and most interesting computers. This is the general area of High Performance Computing (HPC) or Supercomputing. Supercomputing has many uses in corporations and government organizations. One organization with a long and storied history with supercomputing is the National Aeronautics and Space Administration (NASA). The NASA Advanced Supercomputing Division has created or incorporated techniques and technology that has changed the course of supercomputing. The supercomputers at NASA have a variety of missions including weather forecasting and climate change predictions to helping astronauts at the International Space Station. As long as humans continue to explore and think of bigger questions, supercomputing will continue to grow.

This poster provides a literature review of documentation relating to current and past supercomputers at NASA, as well as a discussion of the future of supercomputing at NASA by looking at the trends in the current market. This material is based upon work supported by the National Aeronautics and Space Administration under Grant No. NNX15AK02H NASA Oklahoma Space Grant Consortium.

AlexandraCassidy, SamanthaCowan, JacksonEngland, MirandaWoodard, KamronFakhrshafaei

Southwestern Oklahoma State University

Is your shopping cart empty? Factors affecting expected enjoyment and purchase of video games

Overall males and females play video games in similar numbers (ESA, 2017) but play and prefer different games. The features of games that appeal to different gamers are relatively unexplored. Females report preferring fantasy based games and female gamers rate the availability of a female protagonist as a play option very important in their game experience. It is also well documented that video game covers often depict sexualized females (Lynch et al, 2017). We explored the effect of genre, gender of character on cover, and sexualization of cover character on ratings of expected enjoyment for self and others. Participants viewed a series of covers that varied on these variables and rated for how much they thought others who varied by age (college, high school, middle school) and gender would enjoy the game.

UPAMANEUPANE

Cameron University

Pricing European and American Options Using Numerical Methods

This article introduces numerical methods for pricing both European and

American options governed by the Black-Scholes equation. After a careful

treatment on boundary conditions, we use explicit, implicit, and Crank-Nicolson

schemes for numerical solutions to the resulting problem. We present a computational algorithm and display numerical results. We

estimate the relative error in L1 norm to test the accuracy of the schemes.

MirandaBabb

University of Central Oklahoma

High School Outreach with Mobile App Programming

The objective of our research is to promote interest in Computer Science (CS) among high school students, specifically female students, students of minor ethnic diversities, and students from rural schools or schools that do not provide programming in their CS courses. Our approach resulted in the development of coding workshops to teach beginning programming concepts while also introducing several applications of programming in the working world. This project, dubbed Code Okie: One Line at a Time, has since used the drag-and-drop programming environment Scratch to introduce beginning programming concepts at the start of our workshops. Due to positive responses to Scratch from students who attended these workshops, we believe that App Inventor, another drag-and-drop programming environment but on mobile app platform, can be used to generate more interest in CS among high school students, especially in returning students. Previous studies have taken a similar approach of utilizing Scratch and App Inventor, in some cases both, to increase interest in CS and motivate students to study CS related disciplines. Our study is unique in that it relies on self-taught, undergraduate instructors to teach high school students programming concepts. This workshop also differs in that it consists in several platforms, in which App Inventor will serve as an introduction to Python programming with Raspberry Pi and Robotics. Currently, we are developing projects that also promote math concepts.

Mathematics and Science.Computer Science.34

PatrickParizek

University of Central Oklahoma

Space Miner

Space Miner is a 2D Java game made in the Object Oriented Programming class at UCO. The goal of the game is to move a spaceship up and down and fire missiles at enemy ships and "space rocks" to earn points. The idea is that the player is mining the rocks for minerals and earning points based on the value of the minerals. Black rocks score 10 points, silver rocks score 25 points, and gold rocks score 50 points. Hitting an enemy ship scores 1 point. The player must avoid direct contact with the rocks as well as the enemy ship's missiles, which are fired any time the player fires missiles. The player also has a limited number of special items: shields, which absorb damage and heal the player, and special missiles, which can be fired in any direction and are not detected by the enemy ship.

SilaTamang

University of Central Oklahoma

Network Server Connection using Raspberry Pi to compute the dust level

Internet of things, the advancement in computing devices and web services, the notion to make a network of wireless sensors has enabled us to connect, interact and exchange data. In our study, we quantify the residue level through dust sensors with the utilization of Raspberry Pi(RPi). We conjecture various places even in UCO campus would carry different levels of dust collection. The purpose is to compute data from these places and display the result through Network sever while tinkering with (RPi). The framework of this system includes sensor web nodes using RPi, dust sensors for the analyzation of dust levels, Wi-Fi for the data communication between web node and server and the utilization of MySQL database for the storage of the data gathered. The framework is considered as minimal effort and exceptionally versatile both as far as sensors and the number of sensor hubs, which makes it appropriate for a wide assortment of utilizations identified with natural observing. The plan eventually is to display the data with the visualization software which shows the significant dust level of various places.

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RashedAlrashed

University of Central Oklahoma

Leibstien

Leibstien is a shooting game in which the player uses weapons to shoot at enemies. One weapon shoots fast with small bullets, while the other shoots a large and slow missile that explodes at the target. Enemies hide behind walls for cover while shooting at the player, and if the player destroys the cover, the enemy looks for another cover, if available, to protect themselves. Featuring multiple levels and using Java as programming language with object oriented programming concepts to develop the game.

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HaganHolsapple, JeremyEvert

Southwestern Oklahoma State University

Penetration Testing using a Raspberry Pi

The problem for companies is that they are constantly being attacked by hackers, some companies actually lose sensitive information. This can lead to identity theft, compromised bank accounts and other problems for companies. In order to ensure this situation is avoided, penetration testing has become a enormous opportunity for companies to find exploits within their own software. The goal of this research is to show how easy it is to use an inexpensive Raspberry Pi for penetration testing for beginners as well as experts looking for alternative methods. By researching the book Penetration Testing with Raspberry Pi by Michael McPhee and Jason Beltrame, I want to show the benefits of using this software and how to perform this type of test in order to inform those who are interested and looking for an inexpensive way to practice cyber defense.