

COMPUTER SCIENCE

Undergraduate

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| Title: A GPU-Accelerated Neural Network In Python | | Presentation ID: A21 – LS |
| Author: Christian Hacker | Discipline: Computer Science | |
| Campus: Texas A&M University – Texarkana | Student Level: Undergraduate | |
| Co-Authors: | Mentor(s): Dr. Igor Aizenberg | |
| Abstract Artificial neural networks (ANNs), as formulaic implementations of their biological analogues, can be used to solve problems that conventional mathematical methods are incapable of solving. In particular, ANNs are well-suited for pattern recognition and prediction. The total number of neurons and how those neurons are interconnected - the network's topology - impacts the versatility of the ANN. The multi-layer neural network with multi-valued neurons (MLMVN) is an ANN that uses complex-valued weights and a backpropagation learning algorithm. Because the learning algorithm for a MLMVN is highly sequential, simulating increasingly large networks (e.g. 10000+ neurons) becomes computationally costly and exponentially increases the runtime until convergence. Here is presented an MLMVN implementation in the Python scripting language with processor-heavy operations performed by a general-purpose graphical processing unit (GPGPU). Nvidia's C UDA framework lets the simulator utilize multiple computing cores running in parallel, as opposed to a single CPU core executing sequential commands. The use of GPGPUs increases the utility of MLMVNs and makes them more suitable for deep learning applications, which require large-scale network topologies. A GPU-accelerated simulator experiences a nontrivial speedup versus a purely CPU-bound implementation. Where a CPU-bound simulator would take days to converge, a GPU-bound simulator would take hours. | | |

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| Title: Development And Simulation Of Adaptive Traffic Signal Control Algorithms | | Presentation ID: A22 – LS |
| Author: Edgar Hernandez | Discipline: Computer Science | |
| Campus: Texas A&M University International | Student Level: Undergraduate | |
| Co-Authors: Dr. Muhammad Z. Hasan | Mentor(s): Dr. Muhammad Z. Hasan | |
| Abstract Many traffic control systems use sensors to make timing decisions. However, problems of maintenance, limited traffic information, and non-real time data become an issue. Today vehicle to infrastructure (V2I) communication has eliminated some of these problems. With the use of SAE J2735 Standard and IntelliDriveSM, real time as well as vehicle specification information is made available to traffic signal controllers. Information like the vehicle occupancy and the engine capacity are supported by the standard traffic signal controller. This new technology enables an early and periodical detection of approaching vehicles which provides new possibilities of optimization of traffic signals. The main objective of designing a new adaptive traffic signal control is to take advantage of the more complete traffic data. In this research, simulation using adaptive traffic algorithms has shown that performance metric (such as total emission, average person delay) can be improved as compared to conventional fixed-time systems. According to the 2015 Urban Mobility Scorecard, traffic congestion caused drivers to waste billion gallons of fuel and extra hours. The total nationwide price tag is \$160 billion. This engineering approach can lead to efficient ways of controlling traffic. | | |

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| Title: An Intelligent Unmanned Emergency Response System (Uers) Development | | Presentation ID: A23 – LS |
| Author: Richard Ingolia | Discipline: Computer Science | |
| Campus: Texas A&M University – Corpus Christi | Student Level: Undergraduate | |
| Co-Authors: | Mentor(s): Dr. Hao Xu | |
| <p>Abstract</p> <p>The purpose of this research is to integrate different unmanned systems (e.g. Unmanned Aircraft Systems, Unmanned Ground Vehicle and Underwater Robot) to develop an intelligent unmanned emergency response system (UERS) which can significantly reduce the risk and damage caused by disasters such as flooding, hurricanes, and so on. Specifically, proposed intelligent unmanned emergency system can inspect and rebuild the city’s critical infrastructure after a natural disaster to assess damages, such as rebuilding emergency wireless communication networks. Moreover, proposed unmanned emergency response system can be used for disaster search and rescue effectively. Furthermore, by implementing different types of unmanned systems to pinpoint distressed persons and damage to infrastructure, we can more efficiently direct our human resources; quickening the city’s recovery, as well as ultimately improving disaster readiness while saving time and money. To evaluate the effectiveness of proposed intelligent unmanned emergency response system, we will test it in real-time through several experiments.</p> | | |

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| Title: Mobile Application Development For Voice Production For Aphonic And Dysphonic Individuals | | Presentation ID: A24 – LS |
| Author: Cory Johnson | Discipline: Computer Science | |
| Campus: West Texas A&M University | Student Level: Undergraduate | |
| Co-Authors: | Mentor(s): Dr. Sean Humpherys | |
| <p>Abstract</p> <p>This research discusses people who cannot produce a voice (aphonic) or who have significant voice impairment (dysphonic). The impact of not being able to communicate with verbally capable people is regarded as a major problem in group collaboration, education, and employment. Speech Generating Devices (SGDs) have been found to increase communication effectiveness among this population. However many SGDs are also designed for the aphonic with cognitive or motor impairments. Individuals without these impairments may be hindered by the device because the features do not match the user’s capabilities. The goal of this research is to design a mobile, text-to-speech app for the aphonic and dysphonic with full cognitive and motor functions by including features that maximize the communication rate. An expert in communication disorders evaluated the app as “far superior to pen and paper”, as well as superior to texting or to having hearing individuals read the text messages. As a clinician, the most important feature she recommends is to align the synthesized voice with the gender and age of the user. If possible, the user could prerecord common phrases or phonemes to be used before a known event causing loss of voice, e.g., surgery. The app gives a person a voice to use throughout their day to achieve their goals, connect with people, and help form their social identity. Research supports that language and voice are critical to identity formation. Future research will evaluate the SGD within group collaboration to evaluate conversation rate, task effectiveness, communication qualities, and perceptions.</p> | | |

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| Title: Behavior-Based Navigation For Autonomous Mobile Robot | Presentation ID: A25 – LS |
| Author: Colby LaRue | Discipline: Computer Science |
| Campus: Tarleton State University | Student Level: Undergraduate |
| Co-Authors: | Mentor(s): Dr. Mircea Agapie |
| <p>Abstract</p> <p>The goal of this project was to design and implement a behavior-based algorithm for robot navigation in a simple, static environment, such as an uncluttered corridor or hallway, without moving objects. For actuation, the robot has a 4-wheel differential drive, and for sensing it has a top-mounted Hokuyo laser range sensor that is used to scan the environment. The main control program runs on a stationary PC, which communicates with the robot via wireless Ethernet (Wi-Fi); the communication is two-way, with motion commands going from PC to robot, and sensor readings going from robot to PC. The final algorithm consists of five “behaviors” and a decision mechanism that switches among them according to what the robot is “seeing” with the laser sensor. The robot is able to veer away from lateral obstacles; when encountering a frontal obstacle, it stops and spins, searching for a new direction, and then resumes navigation. The manufacturer’s API (Application Program Interface) was used to implement the navigation algorithm in C++, under the .NET framework.</p> | |

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| Title: A Crosstalk-Based Linear Filter Design In Biochemical Signal Transduction Pathways | Presentation ID: A26 – LS |
| Author: Kyle Price | Discipline: Computer Science |
| Campus: Texas A&M University – Texarkana | Student Level: Undergraduate |
| Co-Authors: Daniel Mahan | Mentor(s): Massimiliano Laddomada |
| <p>Abstract</p> <p>Biological cells have the natural ability to sense and release information from/to the environment, and communicate with each other through molecules with a bio-communication paradigm called Molecular Communication (MC).</p> <p>The possibility to manipulate the biochemical processes underlying MC, and control the way cells sense and respond to biochemical information, has the potential to revolutionize medical therapy by enabling the realization of uniquely identifiable biological computing devices, or genetically-engineered cells, and their interconnections and interactions with the environment.</p> <p>In this work, we analyze sequences of chemical reactions embedded in biological cells (signal transduction pathways) for the manipulation and transformation of biochemical signals from a signal processing perspective. Through these pathways, cells respond simultaneously to multiple external stimuli by sensing the time-varying pattern of specific molecule concentrations surrounding the cells. Pathways regulate each other through crosstalk towards the goal to transduce external and internal information into vital cellular decisions.</p> <p>The goal of this study is to design a biochemical filter based on signal transduction pathways and their crosstalk interactions able to suppress external biochemical signals that oscillate around a predetermined frequency. This type of filter is called notch, or bandstop filter, and it has important applications in communication systems for bioengineering.</p> | |

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| Title: An Intelligent Computer Vision-Based Fast Sense And Avoid Strategy For Unmanned Aircraft Systems (UAS) | | Presentation ID: A27 – LS |
| Author: Jared Stowell | Discipline: Computer Science | |
| Campus: Texas A&M University – Corpus Christi | Student Level: Undergraduate | |
| Co-Authors: | Mentor(s): Hao Xu | |
| <p>Abstract Examination of the primary complications with the increasing usage of Unmanned Aerial Systems has exhibited an drastic need for active obstacle avoidance measures in commercial off-the-shelf multi-copters. The purpose of this research is to develop a series of intelligent computer vision-based obstruction detection algorithms to improve UAS safety. To improve sensing accuracy, development of a novel sensing platform will allow combing of multiple cameras, while enhanced data processing enables increased system speed. In order to evaluate the algorithms more effectively, multiple UAS platforms will be used for experimental testing. The conclusion of these experiments will allow the developed sense-and-avoid algorithms to maneuver through multiple obstacles for use in common off-the-shelf UAS with minimal latency and sensible flight speed.</p> | | |

Master's

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| Title: Image Enhancement Using Adaptive Unsharp Masking By Different Optimization Techniques | | Presentation ID: A28 – LS |
| Author: Muhammad Samer Abbas | Discipline: Computer Science | |
| Campus: Texas A&M University – Kingsville | Student Level: Master's | |
| Co-Authors: | Mentor(s): Dr. Nuri Yilmazer | |
| <p>Abstract</p> <p>In this study, we have investigated the performance of different optimization techniques to enhance the images for specific applications by using Adaptive unsharp masking. Image enhancement techniques find its applications in many fields such as Border security, Biomedical applications, Industrial quality assurance, counterfeiting of artwork, etc. Adaptive unsharp masking enhances the contrast of the image and the simulations are conducted in MATLAB. Adaptive unsharp masking technique sharpens the images in high detail areas and does little or no sharpening in smooth areas. Adaptive unsharp masking is one of the improvement in linear unsharp masking, it has an adaptive filter in which we apply different optimization techniques like Gauss Newton Optimization algorithm, Particle Swarm Optimization, Davidon–Fletcher–Powell formula, and Gradient method optimization, etc. The simulation results of different techniques have been compared for the performance evaluation, and it was shown that images can be enhanced by using adaptive unsharp masking.</p> | | |

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| Title: A New Method For Regular Expression Matching On Preprocessed Text | | Presentation ID: A29 – LS |
| Author: Fatma Abu Hawas | Discipline: Computer Science | |
| Campus: Texas A&M University – Commerce | Student Level: Master's | |
| Co-Authors: | Mentor(s): Abdullah Arslan | |
| <p>Abstract</p> <p>The problem is to search for a specific string within a text file and to find all the locations of this string in the text. We introduce a new method for solving the classical regular expression string searching problem to speed up the regular expression matching in texts such as Google Docs, and biological sequence databases where regular expression searches are numerous and frequent. Ultimately the developed method and results can be used on internet searches.</p> <p>We will make use of the closure properties of regular expressions (complement and intersection operations), equality and emptiness tests for regular expressions.</p> <p>The general idea of this work is to use an automaton to scan the large text file. Searching large files requires an extensive amount of time. To avoid that, a table will be created to store all the previous regular expressions that have been searched together with their results. This will accelerate the search.</p> <p>An input regular expression will be compared with the regular expressions stored in the index table. The method will identify which previous regular expressions are related to the new regular expression the user has input, and will generate a solution by making use of the results found earlier for these selected regular expressions.</p> <p>For example: On a new input regular expression E, we will find the entries e_1, e_2, \dots, e_n in the search table B such that $L(e_i) \sqcap L(E)$; where $1 \leq i \leq n$, that is we find all the positions where e match E.</p> | | |

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| Title: Building A Cloud-Based Video Streaming Analytics Platform With Apache Spark | | Presentation ID: A30 – LS |
| Author: Saheed Adepoju | Discipline: Computer Science | |
| Campus: Prairie View A&M University | Student Level: Master's | |
| Co-Authors: Jamail LaVan | Mentor(s): Dr. Lei Huang | |
| <p>Abstract</p> <p>Big data analytics continues to help businesses and companies to dig insights from the large scale of data. The cloud-computing Platform as a Service (PaaS) makes it easier for these businesses and companies to access big data set and conduct analytics. Video represents the big frontier in big data analytics and outlines use cases in retail, security, military and other sectors. Our research aims to extend video big data analytics capability by creating a web-based PaaS dedicated to facilitate the real-time video analytics research.</p> <p>Our research will build a scalable cloud-based video streaming analytics platform, which takes real-time video as well as stored video from discrete sources, and analyze them using the Apache Spark streaming platform. The platform will be able to analyze the video stream at real-time using OpenCV and machine learning algorithms to support research such as object recognition and tracking. Our platform is designed to meet both productivity and real-time processing requirements with elastic computing.</p> | | |

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| Title: Gaze-Based Numeric Password Entry Using A Real-Time Smart Camera Eye-Tracking System | | Presentation ID: A31 – LS |
| Author: Smaran Aerramsetty | Discipline: Computer Science | |
| Campus: Texas A&M University - Corpus Christi | Student Level: Master's | |
| Co-Authors: Ruby Mehrubeoglu | Mentor(s): Ruby Mehrubeoglu | |
| <p>Abstract</p> <p>A real-time iris detection and tracking algorithm has been developed using a smart camera and LabVIEW graphical programming software. This system enables the user to have a hands-off gaze-based password entry experience. This is important for both user-friendliness and security in password entry systems, since hand-pressed key methods have many security flaws, including key capture by unauthorized users. In this project the smart camera is used to detect the eye center across multiple frames using tracking algorithms. Image processing is performed on board the smart camera to detect the position of the gaze. The gaze location is mapped with a key (digit) that is the most probable of possible digits that forms a password. The successive keys gazed at by the user is locked and recorded. Switching to a new key is accomplished using blinking of the eye, or timing the gaze at each location. The algorithms designed are tested with different users to optimize viewing parameters.</p> | | |

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| Title: Predicting Protein Flexibility And Disorder | | Presentation ID: A32 – LS |
| Author: Varun Agrawal | Discipline: Computer Science | |
| Campus: Texas A&M University – Kingsville | Student Level: Master's | |
| Co-Authors: Gaurav Dokania | Mentor(s): Dr. Ashraf Yaseen | |
| <p>Abstract</p> <p>The fluctuation of atoms about their average positions in protein structures provides important information about protein dynamics. This flexibility of protein structures is associated with various biological processes. Moreover, protein flexibility is strongly correlated with protein disorder, which in turn is associated with critical biological functions such as regulation and signaling. Predicting flexibility and disorder of residues from protein sequences</p> | | |

is significant for analyzing the dynamic properties of proteins which will be helpful in predicting their functions. In this work, first, we introduce an approach of enhancing flexibility prediction accuracy. A neural network based method for predicting flexibility in 3 states is implemented. The method incorporates sequence and evolutionary information, context-based scores, predicted secondary structures and solvent accessibility, and amino acid properties. Second, the predictions of protein flexibility will be used along with other sequence and structure information in predicting protein disorder. Our computational results have shown that the context-based scores and the predicted structural states are effective features to enhance the prediction accuracy of protein flexibility; the 7-fold cross validated Q3 accuracy reached 61%. Our flexibility prediction algorithm is implemented on a web server named "FLEXc" available at: <http://hpcr.cs.odu.edu/flexc>. Our disorder prediction method is under construction.

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| Title: Security Analytics For Iot Devices | | Presentation ID: B21 – LS |
| Author: Mohan Balaji Areti | Discipline: Computer Science | |
| Campus: Texas A&M University – Commerce | Student Level: Master's | |
| Co-Authors: Trivikram Molala and Neelima Devana | Mentor(s): Dr. Urcun Tanik | |
| <p>Abstract Nowadays devices around us getting smarter. They are connected to internet, where they are collecting and managing the massive amounts of data from a rapidly growing network of devices and sensors, processing that data, and then sharing vital information with other connected devices. This new reality in technology called the Internet of Thing. Attackers can perform many ways to exploit many ways ie:- polymorphic, randomized, zero day vulnerabilities, APT, protocol, application, hardware and operating system vulnerabilities. To demonstrate IoT device I designed prototype by using Raspberry pi B-model and Camera module. User can access the device through network to capture the Images. As a network connected device attackers have the chance to disable the functionality by using the DOS/DDOS attack.</p> | | |

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| Title: Surgically Altered Face Detection Using Log-Gabor Wavelet | | Presentation ID: B22 – LS |
| Author: Suvagata Biswas | Discipline: Computer Science | |
| Campus: Prairie View A&M University | Student Level: Master's | |
| Co-Authors: Yonghui Wang and Suxia Cui | Mentor(s): Yonghui Wang | |
| <p>Abstract Face recognition in real-world applications is often hindered by uncontrolled Variations in pose, expression, illumination, aging and disguise which act as major challenges in face recognition application. Several techniques have been proposed to address these challenges. Plastic surgery, on the other hand, can be reconstructive to correct facial features. Both corrective and cosmetic surgeries modify the original facial information to a large extent thereby posing a great challenge for face recognition algorithms. This paper employs an edge-based Log-Gabor feature representation approach for the recognition of surgically altered faces. It propose a Histogram of Log-Gabor Magnitude Patterns (HLGMP) which is very simple but effective. It views the Gabor filters as codewords and the Gabor magnitudes of each point as the responses of the point to these codewords. Then the point is coded by the orientation normalization and scale non-maximum suppression of its magnitudes, which are efficient to compute. To ensure that the edge information richly captures significant features of the faces, a simple illumination normalization process is proposed prior to edge information extraction. Experimental results on plastic surgery database shows that the proposed method performs well in comparison to existing plastic surgery, face recognition methods reported in the literature.</p> | | |

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| Title: A Cloud-Based Workflow Platform For Big Data Analytics With Apache Spark | | Presentation ID: B23 – LS |
| Author: Chao Chen | Discipline: Computer Science | |
| Campus: Prairie View A&M University | Student Level: Master's | |
| Co-Authors: Lei Huang and Yuzhong Yan | Mentor(s): Lei Huang | |
| <p>Abstract</p> <p>As research and business becomes more data-intensive, the complexity of data scientific software has significantly increased, which leads to wide requirements of user-friendly data-scientific tools. Workflow is a software service that combines and automates processes of a series of specific tasks. Our research aims to build a user-friendly cloud-based workflow platform to facilitate big data analytics research on top of Apache Spark. Our current work is built on top of open source workflow platform Clowdflows, and we have extended it by integrating with Apache Spark and HDFS to support big data analytics workflow.</p> <p>In order to do so, we have created several Spark configuration and machine learning widgets, such as Linear Regression and SVM. These Spark widgets are implemented using Scala/Java/Python, executed and managed via Spark, YARN and Django scripts. Scientists could drag and drop these widgets and connect them through a web interface to construct and execute their workflows on Spark platform. Users can upload data to our HDFS filesystem or database, and easily import data into workflows via relative widgets. Moreover, we have integrated D3 as the visualization tool to visualize data at any stages of a workflow.</p> | | |

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| Title: ANTLR V3 And ANTLR V4 Appropriate Usage Identification Through Quantitative Analysis | | Presentation ID: B24 – LS |
| Author: Neha Chokkalingam | Discipline: Computer Science | |
| Campus: Texas A&M University – Kingsville | Student Level: Master's | |
| Co-Authors: | Mentor(s): Dr. Wei-Da Hao | |
| <p>Abstract</p> <p>ANTLR is a powerful parser generator for reading, processing, executing, or translating structured text or binary files. It is used to build languages, tools, and frameworks. Though ANTLR V4 was developed to overcome some of the drawbacks of ANTLR V3, ANTLR V4 has its own drawbacks. We look forward to effectively determine which version of ANTLR is to be used at what circumstances, we plan to achieve this through quantitative analysis . Two graphs are to be plotted to indicate the speed of both versions of the ANTLR for different sizes of the grammar and for different lengths of code, for both, grammars with direct left recursion and indirect left recursion respectively. Hence these graphs can help to determine depending on the grammar's size , length and type as to which version of ANTLR can be used to generate the parser more efficiently.</p> | | |

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| Title: Secure computing by Exploring MMORPG | | Presentation ID: B25 – LS |
| Author: Anam Choudhury | Discipline: Computer Science | |
| Campus: Texas A&M University – Kingsville | Student Level: Master's | |
| Co-Authors: | Mentor(s): Dr. Wei-Da Hao | |
| <p>Abstract</p> <p>This research aims to discover the security threat of current and future computing system via the weakness in the design of MMORPG (Massive Multiplayer Online Role Playing Game) on both client and server sides. MMORPG is a paradigm in the software design, and can be the bellwether of the coming computing system,</p> | | |

including cloud. The more we know about weakness of MMORPG, the more we can identify the possible security threats and prevent the disaster caused by the security flaw in the computing system. By collecting information from ethical hackers, weakness in the design of MMORPG is itemized. The influence of each item to the current and future computing system as well as the resulting security threat is addressed in detail.

In conclusion, this research suggests strongly that more encryption measures should be imposed to both client and server sides.

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| Title: Controlling A Wheelchair By Wearable Technology | | Presentation ID: B26 – LS |
| Author: Jeet Desai | Discipline: Computer Science | |
| Campus: Texas A&M University – Kingsville | Student Level: Master's | |
| Co-Authors: | Mentor(s): Dr. Lifford Mclauchlan | |
| <p>Abstract</p> <p>In today's world, technology has surrounded us everywhere. From cellphones to satellites, computers to robotics, there are advancements and improvements in all areas. These can not just be used by a normal person but also by the handicap and physically challenged. With this motivation, this presentation is a proposal for a self-controlled wheelchair for individuals who are restricted to it. The wheel chair may be controlled by movements of the tongue, eyes and finger tips. By adding a miniature camera in front of the eyes, sensors on the teeth and fingers, the person seated on the chair may control its movement as well as speed. The sensors send their collected data to a control unit which controls the movements of the wheels of the chair. In this way, the chair may be self operated without being monitored by another person.</p> | | |

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| Title: Security Analytics For Iot Devices | | Presentation ID: B27 – LS |
| Author: Neelima Devana | Discipline: Computer Science | |
| Campus: Texas A&M University – Commerce | Student Level: Master's | |
| Co-Authors: Mohan Balaji Areti and Trivikram Molala | Mentor(s): Dr. Urcun Tanik | |
| <p>Abstract</p> <p>We are in information and computational world where every IoT device is generating deluge of data. So, we adapting Big Data as alternative for traditional approach of the data storage. By using open source cloud storage to save the collected log files periodically from IoT Devices using scripting language like Python, Ruby etc... We can use security analytic algorithms to extract information about the compromised techniques and attacking methods. So, we can find the loop holes of its functionality and perform forensics after attack, by analyzing the log files. Data Analytics is the application for intelligence for large number of data-sets. Integrating Analytics for stronger stealth protection and these reports give eagle eye about the advanced vulnerabilities and threats to manage infrastructure before cyber-attack.</p> | | |

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| Title: An Animated Active Contour Implementation | | Presentation ID: B28 – LS |
| Author: Abdulmutalip Dirik | Discipline: Computer Science | |
| Campus: Texas A&M University – Commerce | Student Level: Master's | |
| Co-Authors: | Mentor(s): Mutlu Mete, Ph.D. | |
| <p>Abstract</p> <p>An Active Contour (AC) model, also called a snake, is a mathematical approach for image segmentation and target recognition using deformable curves that enclose the target object over a time function. It relies on a deformable model controlled by an evolution equation and a stop condition. The output of the function depends on image data and also parameters of deformable contour. In last decades, AC algorithms are widely used in many areas such medical imaging using partial differential equations control of AC method, in areal imaging to calculate distance distances of between landmark objects (roads, sea, river, etc.), in transportation and smart vehicle operation to recognize traffic signs.</p> <p>We present this very paramount algorithm in an animated fashion for the scientist from many diverse areas, especially Mathematics and Computer Science. The graphical user interface we develop takes all parameters from the user as well as the image where the target will be sought. Animation parameters and all numerical outputs are optionally available in the software. This project is implemented using Python, a free, platform independent and opensource programming language. Also it is very flexible to use third-party tools that can be implemented in many different studies, such as numpy and pygame. The study extensively employed Python's image processing (PIL) library. We demonstrate how deformable model changes the resulting boundary on the targeted object, as well as some other limitation, such as multiple objects in the scene, misaligned objects, cut-through targets. This project will benefit many early scientists who are ...</p> | | |

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| Title: An Efficient Approach To Remove Code Smell | | Presentation ID: B29 – LS |
| Author: Aritra Ghosh | Discipline: Computer Science | |
| Campus: Texas A&M University – Kingsville | Student Level: Master's | |
| Co-Authors: | Mentor(s): Dr. Young Lee | |
| <p>Abstract</p> <p>A software clone is a code fragment identical or similar to another in the source code. Clones are considered harmful for code maintenance and evolution because it increases complexity of the system; therefore the software maintenance costs. Many code clone detection techniques have been proposed to detect clones like text based, token based, metric based, AST based and PDG based. These techniques have been critically evaluated based on a no. of efficiency measure parameters like metric value evaluation, runtime etc. In this paper, we will propose a way for detecting clones for software system. The clones are detected by using hybrid approach. We have found our technique better compared to the existing ones in respect to precision, recall, metric value evaluation and runtime.</p> | | |

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| Title: Predicting Protein Solvent Accessibility | | Presentation ID: B30 – LS |
| Author: Anurag Gupta | Discipline: Computer Science | |
| Campus: Texas A&M University – Kingsville | Student Level: Master's | |
| Co-Authors: Hridya Gopalakrishna | Mentor(s): Dr. Ashraf Yaseen | |
| <p>Abstract</p> <p>Solvent-accessible surface areas of residues in proteins are key factors in protein folding. Predicting solvent accessibility of residues from protein sequences is significant for modeling protein structures in 3D and helpful in</p> | | |

predicting functional characteristics of many proteins. In this work, we extend our previous approach of enhancing solvent accessibility prediction accuracy. We derive pseudo-potentials, by considering high-order-inter-residue interactions, according to the amino acid environment around protein residues from larger number of protein samples. These context-dependent pseudo-potentials are integrated as scores to estimate the favorability of a residue in solvent accessibility state. The context-based scores are then incorporated as features together with other sequence and evolutionary information to train 2-stage neural networks for solvent accessibility prediction. The 7-fold cross validated Q2 accuracy reached 80.76% when context-based scores are incorporated in the training process of the solvent accessibility predictor. Our computational results have shown that the context-based scores are effective features to enhance the prediction accuracies of protein solvent accessibility. Our prediction algorithm is implemented on a web server named "CASA" available at: <http://hpcr.cs.odu.edu/casa>.

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| Title: A Cognitive Approach Of Micro-Operating System Crash Analysis From Core Dump Files | | Presentation ID: B31 – LS |
| Author: Israrul Haque | Discipline: Computer Science | |
| Campus: Texas A&M University – Kingsville | Student Level: Master's | |
| Co-Authors: | Mentor(s): Dr. Gahangir Hossain and Dr. Rajab Challoo | |
| <p>Abstract Core dump file includes the main memory contents of a certain process or part of an address space of the process and values of processor registers, which can be used to analyze the cause of the dump, viewed as text or printed – and sometimes vary big-data. Research on the cause of the micro-operating system crash or abnormally terminated program, depends on the dump analysis. More specifically, a cautious analysis of dump trends from files can help to uncover the actual cause of system crash. This project uses a cognitive approach of failure localization, the multinomial processing trees – which is applied on core dump data files. The main hypothesis is that what causes the dump may cause the crash. This project localizes the early failure from dump analysis and take care of the causes, trends and effects in whole operation, thereby improves system reliability. From a user study on micro-operating system (iOS and Android) it is observed that the maximum dump or failure occur due to page fault and running state of the operation. Sometimes it becomes more panic resulting in the deadlock situation. Early discovery of this type of failure will improve the reliability of the modern operating system. Keywords: Micro-Operating System; Core dump; MPT model; Failure analysis;</p> | | |

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| Title: Disease Spread Model | | Presentation ID: B32 – LS |
| Author: Jiangcheng Liu | Discipline: Computer Science | |
| Campus: Texas A&M University – Kingsville | Student Level: Master's | |
| Co-Authors: Ahnam | Mentor(s): Wei-Da Hao | |
| <p>Abstract When scientists study diseases spread, they tend to model the process of diseases spread. By modeling infectious diseases, they are able to predict the outbreak, evaluate epidemic control strategy and analyze the properties of the disease. Naturally, the first part, modeling diseases spread, becomes the most important step for all other afterwards studies. How to create the high quality model to simulate diseases spread? This is the key of our research! There are two main purposes of this project. The first one is that we are trying to provide a way to make abstract theory more understandable and acceptable by normal people. For example, if I was a strategy maker of CDC, I wouldn't be interested in those mathematics epidemic models. The only thing I want to know is how the disease or virus would spread in this situation. Therefore, visualization is one solution to represent abstract theory. Another purpose of this project is how to visualize a model with existing resource in an effective way.</p> | | |

The main function is to visualize the model correctly in a 3-D video game platform. So the people who are not familiar with the mathematics model can have a better understanding of the disease spread model. Besides, the visualization model can simulate different virus spread model by changing parameters of the original S.I.R model. Third, the observer can control the running speed of the model. Fourth, the user can get data in real time; meanwhile, the model supports graphic display of statistic data.

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| Title: PID Controller Based Line Tracking Robot | | Presentation ID: C7 – LS |
| Author: Safat Mahmood | Discipline: Computer Science | |
| Campus: Prairie View A&M University | Student Level: Master's | |
| Co-Authors: | Mentor(s): Dr. Lijun Qian | |
| <p>Abstract</p> <p>A robot which can follow a line using a simple microcontroller that will use a sensor array to detect the line and a PID (Proportional, integral and derivative) control to follow that line. The advantage of building the robot using a microcontroller is we can use the microcontrollers ALU (Arithmetic Logic Unit) to calculate different equation to perform PID control. PID control allows the robot to control the direction, speed and to keep it on the right track. This process helps the robot to follow the line smoothly not by oscillating to the left or right like a clumsy line tracker.</p> <p>PID control of line following robot is an autonomous robot which is able to follow a black line that drawn on the floor while smoothing its tracking motion. The robot is using several infrared sensors to identify the black line avoid the robot to steer away from its track. The robot is driven using motors to control the movement of the wheels. The microcontroller will be used to perform PID algorithms control the speed of the motors steering the robot to travel along the line smoothly. PID control has superior performance compared to conventional controllers. The advantage of using PID closed loop control system is the gain can be controlled in a closed loop control system. This concept can be applied for an autonomous vehicle by applying the similar PID control method. Besides that, it also can apply in automated cars or planes running on roads with embedded magnets.</p> | | |

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| Title: Evaluating Test-Driven Development Through Object Oriented Metrics | | Presentation ID: C8 – LS |
| Author: Dhanunjaya Bhargavan Marepalli | Discipline: Computer Science | |
| Campus: Texas A&M University – Kingsville | Student Level: Master's | |
| Co-Authors: | Mentor(s): Dr. Young Lee | |
| <p>Abstract</p> <p>Several studies have examined the benefits of teaching test-driven programming techniques to undergraduate student programmers, with generally positive results. However, most of them did not evaluate the effect of Test Driven Development upon object oriented metrics. The goal of this thesis is to obtain empirical evidence on how the code quality of undergraduate student programmers will be improved by integrating Test Driven Development into their programming assignments. In Test-Driven Development, students write tests before implementing the corresponding code fragment. This kind of practice helps the students to consider the desired result of the program before delving into the actual implementation. As the part of the experiment, two student groups will be requested to code the programming assignments with Test-Driven Development style and without it. Both codes are collected and object oriented metrics will be calculated to determine the effect of Test-Driven Development on the undergraduate students.</p> | | |

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| Title: Security Analytics For Iot Devices | | Presentation ID: C9 – LS |
| Author: Trivikram Molala | Discipline: Computer Science | |
| Campus: Texas A&M University – Commerce | Student Level: Master's | |
| Co-Authors: Mohan Balaji Areti and Neelima Devana | Mentor(s): Dr. Urcun Tanik | |
| <p>Abstract</p> <p>Due to huge amount of the network traffic, it is very cumbersome to detect the compromised node in the network world. So, I am demonstrataing by using analytics over the compound data to visualize data flooding ipaddresses, gelocations, vulnerable ports and services. I am using the cloud based services to compute and visualize the obtained data. By using cloud based visualization it is easy to view and access the scenario of an Organization. This will give better perspective towards future security measures to implement in the organization.</p> | | |

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| Title: Enhancing Object-Oriented Programming Education Using Static And Dynamic Visualization | | Presentation ID: C10 – LS |
| Author: Swetha Murthy | Discipline: Computer Science | |
| Campus: Texas A&M University – Kingsville | Student Level: Master's | |
| Co-Authors: Saikiran Bramhadandi | Mentor(s): Young Lee | |
| <p>Abstract</p> <p>While Object-Oriented programming in Java has been widely adopted as an introductory programming course in Computer Science, it is considered difficult to teach and learn. Studies have identified that the difficulty is from the underlying Object-Oriented concepts and principles. To help student programmers better understand the structure of a program and the concepts of Object-Oriented design, visualizations in various formats have been applied to programming environments. This paper presents a web-based interactive educational programming environment, JavlinaCode, and its unique design principles. JavlinaCode is designed for teaching object-oriented programming in Java. It aims to enhance student programmers’ programming skill and to help them understand object-oriented design concepts. It provides integrated static and dynamic visualizations: the static state of a Java program in an UML class diagram and the dynamic run-time state of the program execution. With the synchronized multi-view real time visualization along with source code, JavelinaCode is highly expected to reduce student programmers’ cognitive workload in Java programming and to enhance comprehension of the object-oriented programming and design concepts.</p> | | |

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| Title: Influence Of SCIG And DFIG Based Wind Turbine On The Voltage Stability Of A Weak Distribution Power Grid | | Presentation ID: C11 – LS |
| Author: Geethika Nannapaneni | Discipline: Computer Science | |
| Campus: Texas A&M University – Kingsville | Student Level: Master's | |
| Co-Authors: | Mentor(s): Dr. Tarek Masaud | |
| <p>Abstract</p> <p>The penetration level of conventional and renewable distributed generation (DG) has increased recently. Voltage stability is a key factor in determining optimal location and size of DGs in the electric grid. DGs connected to distribution networks are potential to improve the system voltage stability. Placing DG units at weakest load buses (candidate buses) is a widely used technique which requires utilizing an effective voltage stability index. A wind-driven squirrel cage induction generator (SCIG)-based distributed generator (DG) is widely used to support the voltage in the distribution grid due to its advantages such as robustness, easy and relatively cheap mass production. It also operates at a constant rotating speed when it is connected to a large grid, providing stable</p> | | |

frequency control. However, the poor reactive power capability is the main disadvantage of SCIG-based DG. In other hand, Variable speed wind turbine with a Doubly Fed Induction Generator (DFIG) has advantages over SCIG such as the capability to supply a reactive power and a higher wind speed operation range. However, high cost of DFIG is the main disadvantage of DFIG over SCIG. This work investigates the influence of fixed and variable speed wind turbine-based DG on the voltage stability of the distribution considering line outage and load uncertainty. A probabilistic load flow and voltage index is used to determine the optimal location of DG installation with an objective function of improving voltage profile.

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| Title: Map Scanning Project | | Presentation ID: C12 – LS |
| Author: Son Nguyen | Discipline: Computer Science | |
| Campus: Texas A&M University – Corpus Christi | Student Level: Master's | |
| Co-Authors: | Mentor(s): Dr. Richard Smith, Ph.D. | |
| <p>Abstract</p> <p>The Special Collections and Archives Department of The Mary and Jeff Bell Library contains nine collections of land surveying maps and documents of Corpus Christi, Nueces County, and the surrounding region from the late 19th century to the late 20th century. These collections are currently only available to in-person library visitors, which restricts the availability of these maps to those who are able to travel to Corpus Christi. The Conrad Blucher Institute, in collaboration with the Mary and Jeff Bell Library, and the Harte Research Institute, are scanning these map collections so an online digital map library can be established. Scanning, cataloging, and managing such a large collection of documents required the creation of two custom computer programs: a map scanning web application, and an auto-cropping application. The Map Scanning web application concurrently allows internal users to upload maps' data to the library and gives users permission to access the published data. Additionally, an auto-cropping application precisely refines post-scanning documents without affecting the image quality to help reduce a fairly large amount of time spending on cropping image files manually. These two applications have helped build a large database which stores a terabyte of data and more than 20,000 documents.</p> | | |

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| Title: Low Cost Radar Queing | | Presentation ID: C13 – LS |
| Author: Chinedum Onyekwelu | Discipline: Computer Science | |
| Campus: Prairie View A&M University | Student Level: Master's | |
| Co-Authors: Jourdan Harris, Taylor Holland, Malik McCoy, Christian Lenior, and Steven Woods II | Mentor(s): Dr. Pamela Obiomon | |
| <p>Abstract</p> <p>The scope of our project revolves around the concern with excess amounts of data that requires human interpretation from surveillance systems. In today's society, most monitoring systems are inefficient when it comes to storing data because cameras are constantly recording and saving unnecessary data day in and day out. It makes it difficult for a person to review specific data that may be trapped in the archives.</p> <p>We were tasked to design a radar system that can control a camera and then embed the information from the radar (range and range-rate) into the video (closed caption).</p> <p>We coupled the radar system and camera system designs using a field-programmable gate array that will calculate the necessary thresholds and parameters needed. The actual radar hardware is based on an existing design that is currently being used in a Massachusetts Institute of Technology Lincoln Laboratory Open courseware course. The existing design only has the function to store radar data to a PC via the audio line-in port. The data is saved on the</p> | | |

PC as a .wav file. The final system needed to display range and range rate in real time as well as store the data for later use. Also, the resolution of the system can be sufficiently improved as to allow the user to identify the targeted object as a pedestrian, bicycle, automobile or other moving target. The graphical user interface will classify these objects based on their velocities, which will be integrated within the camera of our choosing.

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| Title: Are We Positive? : Exploiting Positive Sentiment From Tons Of Tweeter Data | | Presentation ID: C14 – LS |
| Author: Rakshith Padmanabha | Discipline: Computer Science | |
| Campus: Texas A&M University – Kingsville | Student Level: Master's | |
| Co-Authors: | Mentor(s): Dr. Gahangir Hossain and Dr. Rajab Chaloo | |
| <p>Abstract</p> <p>Twitter hosts platform to various comments, posts and free flowing tweet. Considering a specific area of interest tons of data can extracted from Twitter and passed through parser to extract subject specific or group sentiment. Concentrating on sentimental data, positive sentiments can be extracted to show the groups’ interest on a subject area or on a product. This can be used by various services or E-Commerce industry to analyze the trend and positive feedbacks on the product. To achieve this twitter provides API interface either to extract data based on a particular #tag or event on batch or real-time mode. This can be parsed through pre-trained parser set and sentiment matching automaton to count only positive feedbacks. This project uses a compiler design techniques, specifically, finite automata and predictive parsing to explore group sentiments. The data received is so huge requires immense processing which calls for a columnar data storage for faster response. Analysis of such sentiments enables effective decision making and even possible improvements at products or services front. Sentiments can also be mapped to trends to analyze variations over time or demography, in instances where changes are made post initial feedbacks. This act as an eagle eye system that churns reports from analytics, pre-improvement and post-improvement results/acceptance – providing ongoing Business Intelligence.</p> | | |

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| Title: A Light Weight Ios App: Icon Chat | | Presentation ID: C15 – LS |
| Author: Mahesh Babu Paritala | Discipline: Computer Science | |
| Campus: Texas A&M University – Commerce | Student Level: Master’s | |
| Co-Authors: | Mentor(s): Dr. Mutlu Mete | |
| <p>Abstract</p> <p>Ignited with affordable cellphones, network enabled mobile devices have become indispensable part of daily life all around the world. iOS and Android are the foremost industry leaders in the market of mobile operating systems supported easy data sharing over wireless network. Chat apps are known as non-voice communication happened between a pair of a group of users. Overall user experience with all chat applications depends on various features however the modality of multimedia usually is emphasized first being text, voice, image, and even video.</p> <p>Social interactions through chat app on the mobile devices are raising dynamics in our society. The peer-pressure among even underage population makes chat apps almost inevitable for them. However, the virtually limitless interactions between connected users cost productivity in daily life of individuals. Keeping this social problem in mind, we developed a chat application for iOS limits the interactions between users: Icon Chat. The app allows its users to transmit only the most significant news.</p> <p>The app, Icon Chat, starts with asking user ID and password. We do not keep email addresses. Each user may have up to 50 users. Following the login screen, a user can select a friend</p> | | |

and send one of 16 predefined messages that are coded via iconic pictures in the app. The 16 icons are customizable. A pair of friends should agree on 16 icons selected from a set of 32. The Icon Chat is designed not only to keep users connect but also promote a productive daily life.

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| Title: Collapsible Visualization Of Aspects In Object Oriented Programming | | Presentation ID: C16 – LS |
| Author: Md Nahid Rahman | Discipline: Computer Science | |
| Campus: Texas A&M University – Kingsville | Student Level: Master's | |
| Co-Authors: | Mentor(s): Dr. Young Lee | |
| <p>Abstract While working with Aspect Oriented Programming (AOP), due to its implicit invocation nature, it is extremely difficult to realize which aspect is executing at which join point. Hence, it becomes difficult to understand the application’s flow and behavior. Several AOP visualization tools are available but each one has its own limitations such as high dependency on other tools, confusing and excessive use of color to represent aspects, using out-dated version of AspectJ and so on. Here, we have proposed a new approach to visualize and represent AOP features to aid the programmers in better understanding AOP applications. We have come out of traditional color based aspect visualization and proposed tabular representation of aspect in an easy to understand manner. We have developed a tool, AspectViz, to implement our approach and used a sample AOP application to test it. At the end, we have compared its performance with existing AOP visualization tools and showed how it outperformed in many cases. We have used AspectJ framework for developing the test application and AspectViz has been developed as a Java web application.</p> | | |

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| Title: Investigating Seven Process States In Lost-And-Found Management In Crowded Environment | | Presentation ID: C17 – LS |
| Author: Saurabh Sakalkar | Discipline: Computer Science | |
| Campus: Texas A&M University – Kingsville | Student Level: Master's | |
| Co-Authors: | Mentor(s): Dr. Gahangir Hossain and Dr. Rajab Chaloo | |
| <p>Abstract Finding a specific person in the public, with a few taps of a smartphone or clicks of a mouse became challenging research out of lost-and-found. The system needs to be highly efficient, accurate, scalable and just-in-time in lost and found management process. However, existing systems are not unified mobile and web-based platform that brings efficiency to the management of lost, misplaced and unwanted incidences in the crowd. We propose seven state process management system including two more states (‘held’ and ‘active’) in addition to five process states to design the novel lost-and-found process management. A simulation of 1000 processes and yield their corresponding statuses from the proposed seven states viz. state1 to state7 in very accurate and timely manner and provide the status of the interdependent process to each other so that they can run smoothly. The proposed system can be applied to varied environments and shall track and retrieve accurate status of the dependent processes by collaborative filtering and get these processes to run smoothly. Keywords: Crowd Management; Process Management; Missing Value Problem; Scheduling; Deadlock;</p> | | |

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| Title: Development Of Clutter Maps Within Complex Terrain Using Airborne Lidar Data | | Presentation ID: C18 – LS |
| Author: Michael Schwind | Discipline: Computer Science | |
| Campus: Texas A&M University – Corpus Christi | Student Level: Master's | |
| Co-Authors: | Mentor(s): Dr. Michael Starek | |
| <p>Abstract</p> <p>This project’s purpose was to develop a framework for characterizing near-ground object occlusion solely from airborne light detection and ranging (lidar) data for mobility applications. Airborne and terrestrial lidar data collected in the Shenandoah National Park, VA were used for this project. This work will detail the terrain modeling component of the developed framework. First, non-ground points were segmented from the 3D point cloud data using a TIN densification filtering algorithm. This is a necessary step for the creation of accurate bare-earth digital elevation models (DEMs). The filter settings were optimized by conducting a sensitivity analysis whereby multiple combinations of parameters were tested and their results analyzed to determine the best combination for sampling of the underlying surface. After the optimal set of parameters had been chosen, bare-earth models were created using a regularized spline with tension interpolation approach. A cross-validation method was implemented to determine the best DEM based on minimization of the RMSE between the DEM estimated values and a random sample of known lidar elevation points. The developed method provided a smoothed surface representation of the underlying terrain whereby detailed surface clutter objects, such as boulders and low lying vegetation, are appropriately captured as near-ground obstructions.</p> | | |

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| Title: Design And Implementation Of Hybrid Driven Test Automation Framework For Regression Testing | | Presentation ID: C19 – LS |
| Author: Madhusudan Srinivasan | Discipline: Computer Science | |
| Campus: Texas A&M University – Kingsville | Student Level: Master’s | |
| Co-Authors: | Mentor(s): Dr. Paul Singh | |
| <p>Abstract</p> <p>Software testing involves testing a software in order to identify bugs, so that quality of the product can be improved. Our proposed covers the functional testing of web application using Test Automation Framework developed using HP quick test professional.</p> <p>Manual testing is a laborious and time consuming process. In addition, it may not be effective in finding certain defects. Therefore, we introduce an efficient framework for automated testing to help solve such problem. Test automaton tools helps tester to automate the entire application, but adopting automated testing is not easy and unsuccessful due to a lack of key information and skills. In order to help solving such problems, we have designed a hybrid driven framework to support automating tests in various environment to help professionals with limited programming skills and also aid beginners with an automation tool. Test automation framework once developed can be of great use during regression testing, as the time consumed for executing regression test cases can be minimized by using the test automation framework.</p> | | |

Doctoral

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| Title: Resource Allocation For Mitigating Air Pollution-Related Mortality | | Presentation ID: C20 – LS |
| Author: Xiangting Hou | Discipline: Computer Science | |
| Campus: Texas A&M University – Kingsville | Student Level: Doctoral | |
| Co-Authors: | Mentor(s): Dr. Kuo-Jen Liao | |
| Abstract Ozone and PM2.5 are two air pollutant affects human health significantly and they share the common precursors NOx and VOC. Reduction of the precursors may lead to different responses to ozone and PM2.5 levels. This project focus on the optimal method to reduce the ozone and PM2.5 simultaneously to achieve the maximum human health benefits. The regional air quality model system was used to simulate the air pollutant concentration and a mathematic model was estimated to maximum reduction of both ozone and PM2.5. | | |

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| Title: A Discrete Wavelet Transform For Enhanced Security In Steganography | | Presentation ID: C21 – LS |
| Author: Ashley Kelsey | Discipline: Computer Science | |
| Campus: Prairie View A&M University | Student Level: Doctoral | |
| Co-Authors: | Mentor(s): Dr. Cajetan Akujuobi | |
| Abstract Technology is improving drastically everyday and there is an increase in the amount of data being transmitted and as a result the security of data and information is decreasing. This poses serious threats to obtaining the secured data or information. Techniques for hiding information have emerged as a significant research field to help decrease or eliminate problems in network security and secure communications through public and private channels. Steganography is a process of hiding the existence of information or data in another medium and is a method for securing data or information transmitted over the Internet. The proposed system combines wavelet fusion and encryption in order to have multiple layers of security to create a highly secure steganographic method. The wavelet coefficients of the payload and cover image are fused into a single image using embedding strength factors alpha and beta. These factors are manipulated in order to in crease the overall imperceptibility, hiding capacity, security, and robustness of the final steganographic image to create a more efficient and secure steganography process. | | |