Fall 2017 C-day Winners

Category: Capstone

1st place: CPSWE-30 Microservice Architecture & DevOps
by Erik Knudsen, Laura Johnson, Nate Pattharakositkul, Rony Campos, Shahnawaz Bhimani
Major: MSSWE Advisor: Dr. Hassan Pournaghshband

2nd place: CPCS-15 AI and Chess Variant
by Mitchell Weiss, Josh Cooper, Tony Khounxay, Theossie Mundy, Sean Kennedy, Tyler Crawley
Major: BSCS Advisor: Dr. Kenneth Hoganson

3rd place: CPCS-11 Fortran/Java Cross-Compiler
by Wes Groover, Elizabeth McDonald, John Monson, Nelson Tskau, Heath Worrell
Major: BSCS Advisor: Dr. Kenneth Hoganson

Category: Games

1st place: GM-07 Cop E. Wright: A Capstone Game
by Henrique Lima, Marcus Ford
Major: BSCGDD Advisor: Dr. Allan Fowler

2nd place: GM-06 Cyber
by Garrett Eddy
Major: BSCGDD Advisor: Dr. Allan Fowler

3rd place: GM-04 Little Wars
by Brandon Macauley, Brennan Sanford, Aarth Thakore, John Ellis
Major: BSCGDD Advisor: Dr. Allan Fowler

Category: Graduate Research

1st place: GRCS-23 Creating Artificial Cognition
by Oscar Garcia
Major: MSCS Advisor: Dr. Selena He

2nd place: GRCS-27 Secure protocol in Power Grids
by Uday Bhaskar Boyanapalli
Major: MSCS Advisor: Dr. Donghyun Kim

3rd place: GRCS-30 Predict and Prevent College Dropout
by Nelson Zange TSAKU
Category: Faculty Award Undergraduate Research and High School Internships

1st place: URIT-15 Performance Analysis of Brain Control Interface in Drone Applications
by Adnan Rashied, Jason Walters, Cheyenne Sancho, Josh Cooper, Ahmad Alissa, Eric Rawls, Kade Randall, Heather Rego
Major: BSCS Advisor: Dr. Sarah North

2nd place: URSWE-17 Guidelines to avoid analyst mistakes
by Ruth Petit - Bois
Major: BSSWE Advisor: Dr. Paola Spoletini

3rd place: URCS-10 Alternative Weighted Fuzzy C Means
by Michael Wong, Eric Tran
Major: BSCS Advisor: Dr. Chih-Cheng Hung

Category: Industry Award Undergraduate Research and High School Internships

1st place: URIT-16 Food For Thought
by Mizzani Walker-Holmes, Jihwan Oh, Miriam Chapellka, Dorris Scott
Major: BSIT Advisor: Dr. Carl DiSalvo

2nd place: URCS-11 Automated Macro Malware Detection
by Ruth Bearden
Major: BSCS Advisor: Dr. Dan Lo

3rd place: URCS-13 VR Locomotion and its Effects
by Mark Chamberlain, Alex Kimbell, William Dingler, Vojtech Martinek, Ryan Drumm, Troy Wu
Major: BSCS Advisor: Dr. Sarah North
Thursday, November 30, 2017

Location: Marietta Campus - Recreation Center S1 (not Gym)

<table>
<thead>
<tr>
<th>TIME</th>
<th>EVENT</th>
</tr>
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<tbody>
<tr>
<td>4:00 pm - 4:30 pm</td>
<td>Student check-in time followed by set-up (presenters only)</td>
</tr>
<tr>
<td>4:30 pm - 5:00 pm</td>
<td>Check-in judges, industry partners, Networking</td>
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<tr>
<td>5:00 pm - 5:35 pm</td>
<td>Welcome from Dean Preston followed by Flash Session</td>
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<tr>
<td>5:35 pm - 6:20 pm</td>
<td>Judging of Student Posters and Games Browsing</td>
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<tr>
<td>6:20 pm - 6:40 pm</td>
<td>Refreshments and Networking</td>
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<tr>
<td>6:40 pm - 6:45 pm</td>
<td>Introduction of Keynote Speaker (Dean Preston)</td>
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6:45 pm - 7:00 pm
Keynote Speaker: Wade Smith, Technology Manager, State Farm

7:00 pm - 7:10 pm
Recognition of Judges

7:10 pm - 7:40 pm
Presentation of Awards
- Best Game
- Best Capstone Project
- Best Undergraduate Research Project
- Best Graduate Research Project

Gigabyte Sponsor

Kilobyte Sponsor Ingenious Med

Games
- Joe Cassavaugh - Puzzles By Joe
- Andrew Greenberg - Executive Director, GGDA/HDI www.ggda.org
- Whitney Weaver - CTO, mLevel
- Diz/Disney Nguyen - Game Developer, Tripwire Interactive KSU/SPSU CGDD Alumni
- Mike Stone - Producer, Tripwire Interactive
- Shaun Sheppard - Lead Game/Software Developer, Motion Reality, Inc.

Capstone Projects
- Jim Keener - CTO, Ingenious Med
- Mike Phillips - Director, Global Talent Acquisition, InComm
- Scott Bradshaw - Application Lead, Georgia Pacific

Undergraduate Research Projects
- Andrew Hamilton - Chief Technology Officer, Cybriant
- Tommie Mack - Director IS Services, Shaw Industries
- Evanda Remington - Director of R&D, Manhattan Associates

Graduate Research Projects
- Tim Alman - Manager of IT Service Management, Aaron's, Inc
- Bruce Skillin - Technology Innovator, Georgia-Pacific
- Roger N. Mahler - AT&T Public Sector/AT&T IoT Solutions, AT&T
- Trevor Sands - Sr. Systems Developer, Shaw Industries
- Jose Garrido, Ph.D. - Professor of Computer Science & Information Systems, KSU
- Chao Mei, Ph.D. - Assistant Professor of Software Engineering and Game Design and Development, KSU

**Rubrics**

Capstone/Undergraduate/Graduate Research scale 0 - 10 with 0 representing "Poor" and 10 representation "Exceeds Expectations"

- Successfully completed stated project goals and reported deliverables (0-10)
- Methodology/Approach: All required elements are clearly visible, organized, and articulated (0-10)
- Effective verbal presentation (0-10)

Games scale 0 - 10 with 0 representing "Poor" and 10 representation "Awesome"

- TECHNICAL: Technically sound with appropriate visual & audio fidelity (0-10)
- GAMEPLAY: Engaging & Fun, with an intuitive UI. Rules of play are clear. Includes a win/lose state (0-10)
- ORIGINALITY: Sound, Art, Design, or Code (0-10)

**Capstone Projects (30)**

* Candidates for the best capstone project award

- **CPCS-01 Railspect**
  - by Cody Paul, Khao Pham, Zenga Siwingwa, Jimmy Nguyen, Justin Rose
  - Major: BSCS Advisor: Dr. Edward Jung
  - Our project is a mobile-based application designed to replace Railserve Inc.'s current track inspection process. will allow Railserve track inspectors to easily document defects, capture images and accurately record the location of defects during their inspection, and then generate a final report summarizing all of the defects found upon the completion of the inspection. The benefits include a faster and standardized workflow for track inspectors and improved communication between the inspectors and management.

- **CPCS-02 DocAudit**
  - by Robert Whitaker, Roshain Campbell, Chen Chen, Suraj Patel, Matt Simon
  - Major: BSCS Advisor: Dr. Edward Jung
  - Document Auditing solution for sponsor The Home Depot. THD will input form data as PDFs and the system will match new documents with the existing forms, and provide feedback into the integrity and completeness of the forms.

- **CPCS-03 BASICally Java**
  - by Rushabh Shah, Zane Womack, John Lotspeich
  - Major: BSCS Advisor: Dr Kenneth Hoganson
  - Take in and compile a BASIC source code file into the equivalent structured Java source code. The two programs are equivalent from the user's
perspective at runtime.

- **CPCS-04 Home Depot Capstone Project**
  by Cori Beemish, Justin Faulkner, Tim Alcorn, Eric Roberson, Nick Perez
  Major: BSCS Advisor: Dr. Kenneth Hoganson
  An application for Home Depot Audit Department that identifies several key features about each file in a database.

- **CPCS-05 RailServe Inspection**
  by Vodrie Cohen, Cameron White, Olyn Dabbs, Warren McClure, Kyle Mazlik, Christopher Owens
  Major: BSCS Advisor: Dr. Edward Jung
  Our solution allows inspectors to input inspection data, identify defects on a map, take pictures of the defects, then subsequently review them in an online portal. The solution consists of a tablet application, web service, cloud hosting, website, and data analytics.

- **CPCS-06 LexisNexis KSU**
  by Zach Gastley, Kierra Hicks, R.A. Keeling, Umar Rabanni, Kristina Larichev
  Major: BSCS Advisor: Dr. Kenneth Hoganson
  An eLearning site that is dedicated the the teaching and thorough understanding of the LexisNexis core technologies, tools, and product offerings.

- **CPCS-07 Noonday Creek Trail App**
  by Kathelyn Zelaya, Mohammed Alkhurbush, Derek McCollum, Kyle Walker, Zach Pate
  Major: BSCS Advisor: Dr. Kenneth Hoganson
  The intent of the app is to connect users to points of interest along the Noonday Creek Trail in the Kennesaw area and businesses in the Town Center area.

- **CPCS-08 TripTop Itinerary Management**
  by Michael Bourgault, Teddy Mopewou, Karl Kevin Tiba
  Major: BSCS Advisor: Dr. Edward Jung
  It's a travel itinerary management website that has a social media touch to it with a forum where users can share their travel experiences. Creating and sharing itineraries has never been easier.

- **CPCS-09 FuzeThru Security and Automation**
  by Andrew Luebke, Jason Ricker, Travis Copeland, Wes Morton, Chris Lee
  Major: BSCS Advisor: Dr. Kenneth Hoganson
  Modular and customizable home or office security and automation using Microsoft Azure cloud services and raspberry pi

- **CPCS-10 Rent 2 Go Apartment Management**
  by Andrew Owen, Nick Pound, Ross Taylor, Fabrice Bokanya, Guillermo Quintero, William Todd
  Major: BSCS Advisor: Dr. Edward Jung
  Rent 2 Go is an apartment management solution for small landlords. It is an all in one location for payment, messaging, managing tenants, work orders, and messages.
○ *CPCS-11 Fortran/Java Cross-Compiler*
  by Wes Groover, Elizabeth McDonald, John Monson, Nelson Tska, Heath Worrell
  Major: BSCS Advisor: Dr. Kenneth Hoganson
  This project takes an error-free Fortran 90/95 source code file, and generates a functionally identical Java source code file that can be compiled and run.

○ *CPCS-12 Rainway*
  by Evan Banyash, Rogelio Pineda, Ben Jibilian, Juan Roach
  Major: BSCS Advisor: Dr. Kenneth Hoganson
  A video game streaming application. Allows users to play PC games remotely from any device with a web browser.

○ *CPCS-13 Xanthan Smart Mirrors*
  by Josh Sexton, Juan Tenorio, Andrew Shatz, Craig Denney, Daniel Park, Deadric Sundby
  Major: BSCS Advisor: Dr. Jose Garrido
  A smart mirror utilizing facial authentication technology intended to simplify the user's every day routine.

○ *CPCS-14 RailServe Track Inspection*
  by Mitchel Weaver, Ben Fitzgerald, Weyman Hall, William Eggers, Chris Hamlet, Gaelen Compton
  Major: BSCS Advisor: Dr Kenneth Hoganson
  An application for generating inspection reports for railroad inspections. This application will use Google Maps to specify location of inspections and defects. User will enter description and other information regarding defects and the app will then generate a corresponding form. This app is for RailServe, Ameritrack.

○ *CPCS-15 AI and Chess Variant*
  by Mitchell Weiss, Josh Cooper, Tony Khounxay, Theossie Mundy, Sean Kennedy, Tyler Crawley
  Major: BSCS Advisor: Dr. Kenneth Hoganson
  We are creating an alternative chess game that involves two actions per turn where you face off against an AI run by a greedy-minMax algorithm.

○ *CPCS-16 Smart Parking*
  by Shahbaz Surani, Nilam Patel, Beenish Zafar, Michelle Becerra, Avani Shah
  Major: BSCS Advisor: Dr. Kenneth Hoganson
  Smart Parking, A project that aims to improve the parking efficiency of parking lots and parking decks. Smart Parking will have the capability of a better user engagement by allowing admins to manage their parking lots and parking spot for multiple locations. Admins will be able to create map of their parking lots. Using sensors throughout the parking facilities on parking spots the system will be able to track unused spots and display their location onto the web application to users. The goal is to improve the parking system efficiency and assists parking agents manage their workload better while improving the user experience of the customer. Smart Parking will serve the general public in parking facilities, both users and parking agents. Smart Parking operates in the following manner: Admins will create Parking Lot map. Users will see empty spot and its location in parking lot, on their smart phone. Users will
park on their parking spot.

- **CPIT-17 KSU MSIT Website enhancement**
  by Priya Rathnam, Nacoda Stegall, Tamara Mayfield, Mihai Slujitoru
  Major: BSIT Advisor: Dr. Ming Yang
  The project is about revamping the KSU MSIT website. The Project Owner has a specific requirement and vision for the new improved MSIT Website. The team is working towards achieving this goal through this project.

- **CPIT-18 ELSYS GTRI STEM AHEAD**
  by Andrew Chew, Justin Borsh, Billy Cabrera, Jazz Davis Cooper, Belsay Diaz-Valera, Dexter Underwood
  Major: BSIT Advisor: Dr. Ming Yang
  Our task is to provide Georgia Tech Research Institute Electronic Systems Laboratory (ELSYS, for short) a thin client solution to help support various STEM promotion programs and training hosted by ELSYS. This program is used to allow High School students the ability to work with engineers from ELSYS on small scenarios type projects. The thin client must be able to host up to at least 30 students working on various things, some being solid works, AutoCAD, PCB Design work, and Arduino coding.

- **CPIT-19 Waterbird Application Design**
  by Carl Peterson, Mikiba McCoy, Akirah Harika, Bailee Koury, Rachel Saylor
  Major: BSIT Advisor: Dr. Ming Yang
  Waterbird Application Design and Consulting Project for Plusoptix. Our goal is to provide our technical expertise in aiding in the design of the application and helping them create a software development structure they can effectively utilize to oversee that this project gets completed based on their needs when they go to an application development company.

- **CPIT-20 Plusoptix Capstone Project**
  by Denzel Maxey, Jordan Hendrix, Endia Holmes, Morgan Draine, DeAngelous Brown
  Major: BSIT Advisor: Dr. Ming Yang
  End product needs the user to be able to access the screening data after we combine the data from the device spreadsheet and the newly created database. Even if simplistic, will likely need to be in an access (or similar) format.

- **CPIT-21 Security Solution for Healthcare**
  by Polo Ortiz, Binta Dibba, Siobhan Smyth, Vriel Essome, Diamonte Thomas
  Major: BSIT Advisor: Dr. Ming Yang
  Security Solution Set for Healthcare Organizations. This project will explore security frameworks, standard healthcare architectures, risks, requirements & controls and develop a comprehensive solution set that could be used as a foundation to execute a plan for prevention, detection, and remediation.

- **CPIT-22 Hashtag Crafts**
  by Annabelle Kelley
  Major: BSIT Advisor: Dr. Ming Yang
  E-commerce website for a small business, Hashtag Crafts. We built this website using wordpress.org as per the project owner's request.
○ **CPSWE-23 GTRI-CIPHER Citrix VDI Capstone**  
by Jake Kelley, Kaiten Kala  
Major: BSIT Advisor: Dr. Ming Yang  
GTRI-CIPHER is planning to modernize its aging Citrix Virtual Desktop Infrastructure (VDI). There are several new features and capabilities in Citrix XenApp and XenDesktop that our organization is interested in taking advantage of. This VDI infrastructure will allow us to virtualize our applications, Linux, and Windows desktops in our on-premise data center. Our users will ultimately have the ability to securely access GTRI-CIPHER IT resources from any network connected device; i.e. from their Macs, Linux or Windows workstations, cell phones, and/or their iPads and tablets.

○ **CPIT-24 MSIT Data Warehouse**  
by Grant Nelson, Steve Dieyou, Darnel Kamgain, Jack Savage  
Major: BSIT Advisor: Dr. Ming Yang  
An update, combine and ETL of three separate databases used by the MSIT program instructors to one database that is searchable across multiple entities for the purpose of data mining.

○ * **CPIT-25 Deep Learning with the Jetson X2**  
by Steven Beyer, Arash Arzi, Chris Drayton, Peter Miles, Bradley Phillips, Ming Yang  
Major: BSIT Advisor: Dr. Ming Yang  
Deep Learning with the the Nvidia Jetson X2 for person and car recognition at significant distances from camera input with user detection.

○ **CPIT-26 CCSE Openstack Data Center Upgrade**  
by Stephen Winn, Craig Wilson, Chris Davis, Katuel Clery, Michael Self, Michelle Mahan  
Major: BSIT Advisor: Dr. Ming Yang  
Upgrade of the current CCSE Openstack Installation to new hardware and migration of current projects to their new home.

○ **CPSWE-27 HR Management Web App**  
by Zach Comstock, Lisian Ajroni, Benjamin Kaguwo, Ruth Petit - Bois, Eduardo Jean  
Major: BSSWE Advisor: Dr. Hassan Pournaghshband  
Web Application to manage common HR tasks, keep track of employee details, and manage employees' schedules.

○ * **CPSWE-28 HR Management System**  
by Denzel Harris, John Green, Brittany Meadows, Ronald Osei  
Major: BSSWE Advisor: Dr. Hassan Pournaghshband  
The project focuses on creating a way to track edit and view information regarding employees and their standing with the company. Most of the features are centered around keeping track of employees and the things that they are doing while also making the information readily available for managers and HR representatives to view and edit.

○ **CPSWE-29 Employee Management System**  
by Horacio Garcia, Kristin Hegna, Elijah Connor, Miguel Betancourt Jr  
Major: BSSWE Advisor: Dr. Hassan Pournaghshband
This is an employee management system that tracks employee performance, vacation days and sick days. The system allows human resources and managers to access employee data, and allows employees to file complaints regarding incorrect personal information.

* CPSWE-30 Microservice Architecture & DevOps
by Erik Knudsen, Laura Johnson, Nate Pattharakositkul, Rony Campos, Shahnawaz Bhirmani

Major: MSSWE Advisor: Dr. Hassan Pournaghshband

Software teams have traditionally developed large, monolithic applications. These applications end up difficult to maintain as their codebases grow and technology platforms become outdated. Organizations may release new versions of such software on a quarterly or monthly basis. The application of DevOps principles and microservices architecture offers an alternative to developing monolithic applications, resulting in better scalability, better maintainability, better re-use of code, and better deployability. For example, instead of one deployment every quarter, a DevOps organization can deploy multiple times per day, if needed. Microservice architecture is the concept of building an application as a suite of small services, where each service does one and only one business function. Each microservice is run by its own team of developers and operations staff with a focus on build, test, and deployment automation. Service-to-service communication occurs over a lightweight protocol such as HTTP. Containerization is used for extremely fast and efficient scalability. Our project focuses on applying microservices architecture and DevOps principles to the design of a typical enterprise-like Human Resources (HR) web application. Our model allows specific parts of the application to change independently, allows for near-instant deployment of code from GitLab to Amazon Web Services (AWS) production after a code commit, has theoretically infinite scalability via AWS Elastic Compute Cloud (EC2), and almost near-instant scalability by running each microservice in a Docker container in AWS’s EC2 Container Service (ECS). Our application can dynamically respond to increased demand faster and at a lower cost versus competitors using monolithic designs running on traditional virtual machines. We can also add functionality at any time to meet emerging market trends, beating those same competitors to the market by weeks or perhaps even months. Changes to one business function are isolated to just that microservice, reducing each team’s testing burden. Because new applications can use our microservices by making simple HTTP calls, new development projects that need to access HR services can get to production quicker. Finally, each microservice can be developed using its own programming language, allowing the best language to be chosen for a specific business problem. We believe the microservice model we have applied can be extended to the concept of foundation services. Foundation services would encompass low-level application functionality that could theoretically span multiple application domains across an enterprise, allowing new development projects a high rate of code re-use. For instance, a CRUD microservice has the potential to be used by most web applications, freeing each enterprise development team from writing the same CRUD logic and thereby avoiding duplicating that code across the enterprise many times over. Foundation services could also be applied to other areas, such as asynchronous message queuing, validation, machine learning services, cryptographic services, and others.
**Candidates for the best game award**

- **GM-01 Aegri Somnia: A 3D Puzzle Game**
  by Chelsea Engert, Blake Barfield, Cassidy Caruso, RobertNibbs, Daniel Valenzuela
  Major: BAACS & BSCS Advisor: Dr. Edward Jung
  Aegri Somnia is three-dimensional puzzle game designed in Unity Engine. The goals of the game are to test user memory and puzzle-solving skills through an entertaining medium.

- **GM-02 The Secrets of the Alluvium**
  by Alexander Dishinger, Brandon Seals
  Major: BSCGDD Advisor: Dr. Allan Fowler
  The Secrets of the Alluvium is a single player RPG. The protagonist is the ruler of a mythical race known as the Alluvium. The Alluvium are creatures that were made by combining magic and the earth. The Alluvium were created as slaves, but learned the secrets of magic and broke free from the humans. Unfortunately the Alluvium are naive and their ruler, the main character, hides some dark secrets from his/her people. The target audience are RPG players that are familiar with world of warcraft and Skyrim.

- **GM-04 Little Wars**
  by Brandon Macauley, Brennan Sanford, Aarth Thakore, John Ellis
  Major: BSCGDD Advisor: Dr. Allan Fowler
  A turn-based war game with physics elements made with the Unity engine. Makes uses of a single player AI and local multiplayer with plans for further online options and a map making toolset.

- **GM-05 Blinding Steel**
  by Eric Dillon
  Major: BSCGDD Advisor: Dr. Allan Fowler
  Blinding Steel is an endless running action game where you control an unnamed ninja fighting off enemies while jumping across tree branches. Use money collected from enemy ninjas to buy skills and armor to customize your own play experience.

- **GM-06 Cyber**
  by Garrett Eddy
  Major: BSCGDD Advisor: Dr. Allan Fowler
  Cyber is a fast-paced 3D platforming game with a focus on movement. The player uses parkour-styled abilities to traverse levels while dodging lasers and turrets.

- **GM-07 Cop E. Wright: A Capstone Game**
  by Henrique Lima, Marcus Ford
  Major: BSCGDD Advisor: Dr. Allan Fowler
  2D Action Platformer/Shoot' em Up: This game includes exploration and physical challenges such as strategic movements (dodging oncoming obstacles); it also includes physical conflict challenges like boss battles.
- **GM-08 Bloodstream VR**  
  by Kalib Crone  
  Major: BSCGDD Advisor: Dr. Allan Fowler  
  Virtual Reality project being built for students of The University of Georgia’s School of Veterinary Medicine as a lab to help students visualize and learn about different types of blood cells and how they act in different species.

- **GM-09 My Kingdom for a Sword**  
  by Seba Hirmanpour, Gavin Barnes  
  Major: BSCGDD Advisor: Dr. Allan Fowler  
  An digital based card game that includes the awesome most amount of awesomeness possible. It’s better than Magic.

- **GM-10 Hunt and Dine**  
  by Xavier Standley  
  Major: BSCGDD Advisor: Dr. Allan Fowler  
  Hunt and Dine is a side-scrolling, action, platformer where the player engages in hunting animals, using their parts to make food and delivering that food to different people.

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* Candidates for the best graduate research project award

- **GRDA-01 Threat Detection in TSA Wave Scans**  
  by Lauren Staples  
  Major: Analytics and Data Science Advisor: Dr. Mingon Kang  
  This project uses machine learning to predict the presence of threats in airline passenger scans as they progress through security. This is a Kaggle Data Competition Submission to the contest "Passenger Screening Algorithm Challenge" sponsored by the U.S. Department of Homeland Security et al. This project also serves as the final project for Dr. Kang's Big Data Analytics course CS7265.

- **GRDA-02 Image Segmentation**  
  by Mohammad Masum  
  Major: Analytics and Data Science Advisor: Dr. Mingon Kang  
  This project is about predicting an image whether it's an internet advertisement or not. There are more than 3000 observations of images are in the data set with label whether an image 'ad' or 'nonad'. Our goal is to train the data with different classifier algorithm and then test with new instances. Finally, our goal is to compare the performances of output of different algorithms.

- **GRDA-03 Image Approximation with GA**  
  by Andrew Henshaw  
  Major: Data Science and Analytics, Ph.D. Advisor: Dr. Mingon Kang  
  This project demonstrates the use of a genetic algorithm to optimize the placement and color of a small number of triangles in order to reconstruct and approximate a reference image.

- **GRDA-04 Community Crime Prevention Strategy**  
  by Sanjoosh Akkineni
Major: Ph.D. in Analytics and Data Science Advisor: Dr. Mingon Kang

Communities within the United States. The data combines socio-economic data from the 1990 US Census, law enforcement data from the 1990 US LEMAS survey, and crime data from the 1995 FBI UCR. Many variables are included so that algorithms that select or learn weights for attributes could be tested. However, clearly unrelated attributes were not included; attributes were picked if there was any plausible connection to crime (N=122), plus the attribute to be predicted (Per Capita Violent Crimes). The variables included in the dataset involve the community, such as the percent of the population considered urban, and the median family income, and involving law enforcement, such as per capita number of police officers, and percent of officers assigned to drug units. The per capita violent crimes variable was calculated using population and the sum of crime variables considered violent crimes in the United States: murder, rape, robbery, and assault. There was apparently some controversy in some states concerning the counting of rapes. These resulted in missing values for rape, which resulted in incorrect values for per capita violent crime. These cities are not included in the dataset. Many of these omitted communities were from the midwestern USA. Data is described below based on original values. All numeric data was normalized into the decimal range 0.00-1.00 using an unsupervised, equal-interval binning method. Attributes retain their distribution and skew (hence for example the population attribute has a mean value of 0.06 because most communities are small). E.g. An attribute described as 'mean people per household' is actually the normalized (0-1) version of that value. The normalization preserves rough ratios of values within an attribute (e.g. double the value for double the population within the available precision - except for extreme values (all values more than 3 SD above the mean are normalized to 1.00; all values more than 3 SD below the mean are normalized to 0.00)). However, the normalization does not preserve relationships between values between attributes (e.g. it would not be meaningful to compare the value for whitePerCap with the value for blackPerCap for a community). A limitation was that the LEMAS survey was of the police departments with at least 100 officers, plus a random sample of smaller departments. For our purposes, communities not found in both census and crime datasets were omitted. Many communities are missing LEMAS data.

- **GRDA-05 Dog breed identification**
  by Liyuan Liu, Yiyun Zhou
  Major: Ph.D. in Analytics and Data Science Advisor: Dr. Mingon Kang
  Image classification is the most important part of digital image analysis. The dog breed identification should give a huge contribution to Animal Shelter, pet adoption center and pet store to classify the dogs. This technology will also widely used in E-commerce industry and retail industry.

- **GRCS-06 Updating an IDS at Real Time**
  by Alexander Federico
  Major: MSCS Advisor: Dr. Dan Lo
  Project that develops an Intrusion Detection System to update at a set time and prevent the system from being vulnerable while updating.

- **GRCS-07 Machine Learning Movie Prediction**
  by Andrew Granr
Major: MSCS Advisor: Dr. Mingon Kang
The purpose of the project is to use machine learning techniques to determine the success of a movie on the released date.

- **GRCS-08 Analysis of hotel reviews using ML**
  by Jiaxin Chen
  Major: MSCS Advisor: Dr. Mingon Kang
  This project applied Machine Learning technology on analyzing the customers' reviews of hotels in Las Vegas strip, and which features will play a key role in influencing the scores.

- **GRCS-09 SQL Injection with FindSecurityBugs**
  by Peter Ding
  Major: MSCS Advisor: Dr. Kai Qian
  An introduction to SQL injection attacks and how to prevent them with secure mobile software development by building a SQL injection detector with FindSecurityBugs

- **GRCS-10 Titanic Survival : Machine Learning**
  by Sweta Patil
  Major: MSCS Advisor: Dr. Mingon Kang
  Use machine learning techniques to do the 'Titanic Survival Analysis' using the data sets from Kaggle.com

- **GRCS-11 NLP for SMS SPAM Messages**
  by Uday Bhaskar Boyanapalli
  Major: MSCS Advisor: Dr. Mingon Kang
  To build a Spam detection filter using a Machine Learning Algorithm, such as Natural Language Processing for UCI real data for SMS Spam Messages.

- **GRCS-12 Video Compression Optimization**
  by Wenchuan Jiang
  Major: MSCS Advisor: Dr. Ming Yang
  High efficiency Video Coding (HEVC) has been deemed as the newest video coding standard of the ITU-T Video Coding Experts Group and the ISO/IEC Moving Picture Experts Group [1]. HEVC has the potential to deliver better performance than earlier standards such as H.264/AVC. The reference software (i.e., HM) have included the implementations of the guidelines in appliance with the new standard. The software includes both encoder and decoder functionality. Machine learning (ML) works with data and processes it to discover patterns that can be later used to analyze new trends. ML can play a key role in a wide range of critical applications, such as data mining, natural language processing, image recognition, and expert systems. Deep learning refers to neural networks with multiple hidden layers that can learn increasingly abstract representations of the input data. In this research project, in compliance with H.265 standard, we are focused on improvement of the performance of encode/decode by optimizing the partition of prediction block in coding block with the help of supervised machine learning.

- **GRCS-13 Fog-Cloud Storage Audit Service**
  by Yeojin Kim, Donghyun Kim, Junggab Son, Wei Wang, YoungTae Noh
  Major: MSCS Advisor: Dr. Donghyun Kim
  The paper introduces a new fog-cloud storage architecture which will offer much higher throughput compared to the traditional central cloud storage
architecture. The proposed architecture provides transparency in a sense that an end user device does not know the existence of fog storage, and only needs to upload its request toward the central cloud. Also, it provides a stronger audit scheme which is naturally coupled with the initial data upload process and does not suffer from the replay attack using old proof of data soundness.

- **GRCS-14 Sharing Lecture Contents via Cloud**
  by Nidhi Patel, Jing (Selena) He  
  Major: MSCS Advisor: Dr. Jing (Selena) He  
  Sharing of Lecture Contents via Clouds

- **GRCS-15 Data Analysis Approaches**
  by Arialdis Japa, Yong Shi  
  Major: MSCS Advisor: Dr. Yong Shi  
  This project analyzes various data sets with different approaches. It starts with literature survey, followed by proposed algorithm to analyze big data sets.

- **GRCS-16 Credit Card Fraud Detection**
  by Amruta Mangaonkar, Mingon Kang  
  Major: MSCS Advisor: Dr. Mingon Kang  
  As part of project, we will build a machine learning model and train it to predict if a credit card transaction is fraud or not. The data-set used for training contains transactions made by credit cards in September 2013 by European card holders.

- **GRCS-17 Malware Detection**
  by Euseong Ko  
  Major: MSCS Advisor: Dr. Donghyun Kim  
  The recent years have witnessed that significant damage has been made by critical malware such as ransomware. So far, many efforts have been made to detect malware and prevent it from damaging users by monitoring network packets. Unfortunately, such approach is hardly applicable to detect the advanced malware, which utilizes encryption to hide its presence and malicious intent. Cryptoanalysis of each packet flowing over a network might be one feasible solution for the problem. However, this approach is time-consuming and not accurate, and therefore not practical. In this paper, we first conduct a comprehensive analysis to discover unique signatures of RC4 that its ciphertexts exhibit unique statistical patterns when they are encrypted with a fixed known key. By utilizing this discovery as a cornerstone, this paper introduces a novel approach to detect malware packets encrypted by RC4 without decryption. To the best of our knowledge, such unique signatures have never been discussed in the literature. Our experimental results with actual malware packets show that the proposed scheme is extremely fast and highly accurate to detect malware which exploits RC4.

- **GRCS-18 Malware Image Classification by ML**
  by Jhu-Sin (Samuel) Luo  
  Major: MSCS Advisor: Dr. Dan Lo  
  Malware classification is a critical part in the cybersecurity. Traditional methodologies for the malware classification typically use static analysis and dynamic analysis to identify malware. In this paper, a malware classification methodology based on visualizing the malware and extracting local binary
pattern (LBP) features is proposed. Firstly, malware images are reorganized into 3 by 3 grid which is mainly used to extract LBP feature. Secondly, LBP is implemented on the malware images to extract features in that it is useful in pattern or texture classification. Finally, Tensorflow, a library for machine learning, is applied to classify malware image with the LBP feature. Performance comparison results among different classifiers with different image descriptors demonstrate that our proposed approach outperforms others.

- **GRCS-19 MOEA in Image Segmentation**
  by Wajira Abeysinghe
  Major: MSCS Advisor: Dr Chih-Cheng Hung
  Multi Objective Evolutionary Algorithm (MOEA) is using for optimizing multiple objectives in Image Segmentation.

- **GRCS-20 Security Risks in EHR Applications**
  by Maryam Farhadi, Dr. Hisham Haddad, Dr. Hossain Shahriar
  Major: MSCS Advisor: Dr. Hisham Haddad
  The project is to study electronic medical record application (Known as OpenEMR) and assess security and privacy risks associated with OpenEMR. This work is part of a thesis project, during which we will examine a number of common open source OpenEMR applications for the presence of security and privacy vulnerabilities and their compliance with the Health Insurance Portability and Accountability Act (HIPAA) regulations.

- **GRCS-21 Training at the Poles**
  by Michael Kranzlein
  Major: MSCS Advisor: Dr. Dan Lo
  Analyses the effects of omitting non-polar training data for review sentiment polarity classification using SVMs.

- **GRCS-22 Malware Detection Using Gspan**
  by Nusrat Asrafi
  Major: MSCS Advisor: Dr. Dan Lo
  The project is about malware detection using Frequency Based Graph Mining and Machine Learning Algorithm. We used Gspan algorithm to malware behavior data for finding the pattern and Applying machine learning for detecting malware.

- **GRCS-23 Creating Artificial Cognition**
  by Oscar Garcia, Jing (Selena) He
  Major: MSCS Advisor: Dr. Jing (Selena) He
  Creating Artificial Cognition: A Neural Network to Solve Synthesis Insight Problems

- **GRCS-24 Roof Image Classification**
  by Rehnuma Afrin, Mingon Kang, Chih-Cheng Hung
  Major: MSCS Advisor: Dr. Mingon Kang, Dr. Chih-Cheng Hung
  We are using two types of roof images. We will align the images before training them. Finally we will apply Convolutional Neural Network (CNN) based classification of the images in CAFFE.

- **GRCS-25 Compressed Sensing of MRI**
  by Srivarana Settisara Janney, Dr. Sumit Chakravarty
Major: MSCS Advisor: Dr Chih-Cheng Hung
Applying Compressed Sensing to Medical images (MRI) offers potentially significant scan time reductions, with benefits for patients and retain good quality images for accurate diagnoses by doctors. We are using weighted tree wavelet based sparsity matrix to reconstruct images with fewer errors in less time.

- **GRCS-26 Identifying GBM Cancer Subtypes**
  by Tejaswini Mallavarapu, Mingon Kang
  Major: MSCS Advisor: Dr. Mingon Kang
  Glioblastoma multiforme (GBM) is the most fatal malignant type of brain tumor with a very poor prognosis and with a median survival of around one year. Identifying tumor subtypes may play important roles in determining the survival rates in GBM. We developed pathway-based clustering method using Restricted Boltzmann Machine (RBM), called R-PathCluster, for identifying unknown subtypes with pathway markers of gene expressions and performance of R-PathCluster is assessed several clustering methods such as k-means, hierarchical clustering, and RBM models with different input data. R-PathCluster showed the best performance in clustering long-term and short-term survivals, although its clustering score was not the highest among them in experiments.

- **GRCS-27 Secure protocol in Power Grids**
  by Uday Bhaskar Boyanapalli
  Major: MSCS Advisor: Dr. Donghyun Kim
  Power Grids are using Open protocol, such as DNP3 which will be vulnerable to cyber attacks. This communication protocol is secured by Securing communication protocol in the Power grid grid network. For this project I have built a Power grid communication as Master and Outstation on DNP3 protocol on Raspberry Pi (RPI) and did a penetration testing. For securing the communication, I am building the Public key Infrastructure (PKI) on the DNP3 protocol.

- **GRCS-28 MRF and BA in 3D Image segmentation**
  by VAIBHAV PANDEY
  Major: MSCS Advisor: Dr. Chih-Cheng Hung
  This research project introduces a new 3D segmentation technique that utilizes bees algorithm as optimization tool in the Markov Random Field (MRF) model. For image segmentation, image labeling is performed, wherein each pixel is associated with a label pertaining to a class or region. The problem here is how to choose a label for a pixel. To overcome this problem, a probabilistic image model is built using MRF, wherein most likely labeling is selected for each pixel based on the neighborhood pixels.

- **GRCS-29 Secure Mobile Software Development**
  by Xianyong Meng, Kai Qian
  Major: MSCS Advisor: Dr. Kai Qian
  In this project we present a static security analysis approach with open source FindSecurityBugs plugin for Android Studio IDE. We categorized the common mobile vulnerability for developers based on OWASP mobile security recommendations and implemented and developed detectors with FindSecurityBugs to meet the Secure Mobile Software Development (SMSD)
needs in industry and education field.

- **GRCS-30 Predict and Prevent College Dropout**
  by Nelson Zange TSaku
  Major: MSCS Advisor: Dr. Mingon Kang
  Predictive model to predict college dropout at Kennesaw State University, specifically in the College of Computing and software engineering

- **GRCS-31 Panorama image auto scroll**
  by Kritika Garg, Mingon Kang
  Major: MSCS Advisor: Dr. Mingon Kang
  Title: Android application: Panorama image auto scroll with face movement.
  Description: There will be two layouts, one for camera which will detect the face and second one for Panorama Image. Initially, Panorama Image will be on its center view. After that if the face will move to the left then image will scroll to the right and will show the left view of the image. Similarly, if the face will move to the right then image will scroll to the left and will show the right view of the image. It will also display the age and gender of the face while detecting.

- **GRIT-32 Object recognition using Visual C++**
  by Anil Kumar Sreedharala
  Major: MSIT Advisor: Dr. Ming Yang
  This project will utilize Neural Network (NN) and Deep Learning to improve the mortgage/loan application and approval processes

### Internships/Student Chapters (8)

- **OTHER-01 Travelport Internship Opportunity**
  by Victoria Williams
  Major: BSSWE Advisor: Professor Dawn Tatum
  This summer and fall I interned at Travelport as a Soft. Systems Engineer. So far, I have completed two main projects, a cloud data aggregation mechanism and an adapted Agile Scrum framework.

- **OTHER-02 ServiceNow Projects at Aaron's Inc.**
  by Benjamin Kaguwo
  Major: BSSWE Advisor: Professor Dawn Tatum

- **OTHER-03 Technical Support Engineer at ServIT**
  by Tommy Mallis
  Major: BSIT Advisor: Professor Dawn Tatum

- **OTHER-04 HP Internship**
  by Jere'l McElroy
  Major: BSIT Advisor: Professor Dawn Tatum

- **OTHER-05 Ventiv Technology Internship**
  by Michael Olivier
  Major: BASIT Advisor: Professor Dawn Tatum

- **OTHER-06 SVK Systems IT Admin and Data Analysis Internship**
  by Harika Parvathareddy
  Major: BSIT Advisor: Professor Dawn Tatum

- **OTHER-07 Keystone Games Internship**
  by Davison Schuitema
  Major: BSCCGD Advisor: Professor Dawn Tatum
• OTHER-08 UPS Internship - Customer Engagement Platform  
  by Kyle Mayes  
  Major: MSCS Advisor: Professor Dawn Tatum

Undergraduate Research and HS (17)

* Candidates for the best undergraduate research project award

• URHS-01 Smart Smoke Detector  
  by Ashwin Kannan, Jing (Selena) He  
  Major: Kennesaw Mountain High School Advisor: Dr. Jing (Selena) He  
  Smart Smoke Detector

• URHS-02 EEG Readings to Satisfaction  
  by Aaron Smith  
  Major: High School Intern Advisor: Dr. Hossain Shahriar  
  My research investigates the potential link between Electroencephalography and general satisfaction of a consumer in a market scale. This is done using a EEG reader interface to quantify the satisfaction of the consumer, and in turn, develop an opinion of the quality of the product without asking the consumer a question (providing a more reliable source of consumer satisfaction).

• URCS-03 VR Applications in Training  
  by Anthony Schell  
  Major: BSCS Advisor: Dr. Sarah North  
  A research project for my User Interface Engineering course outlining the potential benefits and drawbacks of virtual technology in the workplace. Specifically, the experiment targets the training of employees compared to the experience done with another human being, and data collected on the efficiency of the training as well as the experience each employee had as a result of the training.

• URCS-04 Analysis of Allstate Claims  
  by Joshua Saxton  
  Major: BSCS Advisor: Dr. Mingon Kang  
  Big Data analysis using some machine learning algorithms to help Allstate manage different claim data and predict which factors influence a loss in their insurance business.

• URCS-05 A Threat to Safety and Privacy  
  by Mohamed Kabad, Shainu Vazhathil, Matt Hull, Aniruddh Kathiriya, Shivani Patel, Mark Hutto  
  Major: BSCS Advisor: Dr. Sarah North  
  Our research project is about the safety and security requirements of drone usage, specifically the DJI Phantom 4, while focusing on the main processes used to.

• URCS-06 Research on DJI Phantom 4  
  by Wei Chen  
  Major: BSCS Advisor: Dr. Sarah North
The main purpose of this study is to discover the new unmanned aerial vehicles called DJI Phantom 4 Advanced Quadcopter Drone by the means of studying the academic journals and real experience of using this device. DJI Phantom 4 Advanced Quadcopter Drone is one of the most popular unmanned aerial vehicles that provide people an amazing experience of enjoying the fantastic view brought by drones. Its powerful features allow people to explore more amazing things of this world. The future of DJI Phantom 4 Advanced Quadcopter Drone is very promising as this kind of technology will keep creating more good features beyond our imaginations; however, it also brings concerns to public that whether the use of drones will violate people's privacy.

- **URCS-07 Impact of Drone on Agriculture**
  by John Lee, Abdullah Alamri, Caylor Sirk, Francesco Benjamin, Ashley Archibald, Daylon Janis & Yekta Yalcin
  Major: BSCS Advisor: Dr. Sarah North
  The goal of this paper is to explore the impact of unmanned aerial system drones in agriculture. This paper provides detailed understanding on agriculture drone under logical headings, which will help the reader in interpreting the future scope of using drones in the agriculture sector. We specifically zoom in on the aid that drones give other than just flying. Drones can survey large areas of land without the inherent safety risks and high costs involved with the use of much larger manned aircraft, and the use of these UAV Systems can provide real time imagery and sensor data from farm field areas, which cannot be quickly accessed on foot or by vehicle.

- **URCS-08 IoT-based Motion Control System**
  by Deja Tyla Jackson, Zoe Cesar, Jacob Martinez
  Major: BSCS Advisor: Dr. Selena He
  Our project involves an IoT based Motion Control System. This system is a Proof-of-Concept Implementation on Robotics using Internet-of-Things (IoT) Technologies. Technologies involved include an Arduino 101, Raspberry Pi 3 controlled robot and cloud server.

- **URCS-09 Applications of AugmentReality in Education Using HoloLens**
  by Quinten Whitaker, Trevor Bradford, Ronald Brooks, Tyler Crawley, David Howard
  Major: BSCS Advisor: Dr. Sarah North
  In this study we look at the history of augmented reality up until where it is today, and then we look into the potential future applications and implications primarily within the realm of education. We explore one particular medical study that surveyed the realism of holographic simulation to visualize internal body parts. We also explore an implementation, loading a hologram into a virtual environment to understand the technology better.

- **URCS-10 Alternative Weighted Fuzzy C Means**
  by Michael Wong, Eric Tran
  Major: BSCS Advisor: Dr. Chih-Cheng Hung
  With our project, we are performing image segmentation with our new algorithm AWFCM(alternative weighted fuzzy c means)

- **URCS-11 Automated Macro Malware Detection**
  by Ruth Bearden
  Major: BSCS Advisor: Dr. Dan Lo
This project demonstrates the effectiveness of automating Microsoft Office macro malware using machine learning classifiers.

- **URCS-12 Develop UI for Drone on the Apps**
  by Kelly Duong, Solyana Ayele, Somone Letman, Justin Moon, Allan Gao, Zach Black & Erik Baker
  Major: BSCS Advisor: Dr. Sarah North
  Professional videotaping is a costly and time consuming process. With the availability of inexpensive and powerful drones, it is possible to let drones automatically follow a user for videotaping. The objective of this study is to describe the techniques used to create a drone application that can follow its subject without the use of GPS, but instead through the utilization of a mobile device such as a smartphone or tablet computer.

- **URCS-13 VR Locomotion and its Effects**
  by Mark Chamberlain, Alex Kimbell, William Dingler, Vojtech Martinik, Ryan Drumm, Troy Wu
  Major: BSCS Advisor: Dr. Sarah North
  With the recently growing phenomenon of Virtual Reality (VR) as a popular form of entertainment, researchers are now placing their efforts in developing ways to use Virtual Reality practically as well as for leisure. VR opens new means through which real activities can be simulated, opening opportunities not only for entertainment but for training and education. In recent years there has been an explosion in the production and design of Virtual Reality software and gaming apparatus, and with any development thorough examination is required.

- **URCS-14 Unmanned Security Drones**
  by Tyrone Marshall, Jayson Swartz, Justin Comer, Tong Chen, Janelle Bright, Micah Veale
  Major: BSCS Advisor: Dr. Sarah North
  The Primary objective of this research is to the use of small drones for personal security uses. We will create a prototype GUI that is connected to a Bebop 2 drone. Features will include are the ability to take a picture though the drone, see live feedback to the drone, and make the drone turn around. In addition to the app, we’ll determine how effective a security drone will be, and we will send a survey to the public to see if the public will want to buy a security drone.

- **URIT-15 Analysis of Brain Control Drones**
  by Adnan Rashied, Jason Walters, Cheyenne Sancho, Josh Cooper, Ahmad Alissa, Eric Rawls & Kade Randall
  Major: BSIT Advisor: Dr. Sarah North
  The main objective of this study is to find efficient ways to utilize brain control headsets in conjunction with unmanned aerial drones. This study will research how effective the EPOC+ is by challenging users of different genders and ages to complete tasks using mental commands or facial expressions to control a Parrot AR-Drone 2.0.

- **URIT-16 Food For Thought**
  by Mizzani Walker-Holmes, Jihwan Oh, Miriam Chapellka, Dorris Scott
  Major: BSIT Advisor: Dr. Carl DiSalvo
This project explores public opinion on the Supplemental Nutrition Assistance Program (SNAP) in news and social media outlets, and tracks elected representatives' voting records on issues relating to SNAP and food insecurity. We used machine learning, sentiment analysis, and text mining to analyze national and state level coverage of SNAP in order to gauge perceptions of the program over time across these outlets. Preliminary results indicate that the majority of news coverage is negative, more partisan news outlets have more extreme sentiment, and that clustering of negative reporting on SNAP occurs the South. Our final results and tools will be displayed in an on-line application that the ACFB Advocacy team can use to inform their communication to relevant stakeholders.

- *URSWE-17 Guidelines to avoid analyst mistakes*
  
  by Ruth Petit - Bois  
  Major: BSSWE Advisor: Dr. Paola Spoletini  
  In a previous study involving student analysts conducting requirements elicitation interviews, several common mistakes were identified and catalogued after a thorough analysis was made by the study's contributors. The analysis revealed that there were 9 major points of contention that prevented the student analysts from resolving all ambiguities from their requirements gathering interview. The issues as follows: (1) Wrong Opening, (2) Ambiguity Not Leveraged, (3) Implicit Goals, (4) Implicit Stakeholders, (5) Limitation in Terms of Resources Not Considered, (6) Non-Functional Requirements Not Considered, (7) Interrogation-like Meetings, (8) Problems Phrasing Questions, & (9) Wrong Closing. This research goes into detail as to what these problems mean as defined in the referenced paper, and provide ways to prevent or recover from those mistakes once they are made in an interview. The guidelines were established after combing through several reliable resources using a systematic literature review on the guidelines.