

MICHIGAN STATE
UNIVERSITY

The Capstone Experience



From Students...to Professionals

COMPUTER SCIENCE AND ENGINEERING 2016-2017

Auto-Owners
INSURANCE

LIFE • HOME • CAR • BUSINESS



The Capstone Experience



CSE498, Collaborative Design

Dr. Wayne Dyksen

Professor of Computer Science and Engineering

The Capstone Experience provides the educational capstone for all students majoring in computer science at Michigan State University. Teams of students build software projects for corporate clients.

During the Capstone Experience, students

- design, develop, debug, document, and deliver a software project for a corporate client,
- work in a team environment,
- develop written and oral communication skills,
- become proficient with software development tools and environments, and
- consider issues of professionalism and ethics.



Corporate clients are local, regional, and national including Amazon, Auto-Owners Insurance, Boeing, Bosch, Chrysler, Dow Chemical, Electronic Arts, Ford Motor Company, GE, General Motors, Google, IBM, Meijer, Microsoft, Mozilla, MSU Federal Credit Union, Quicken Loans, Spectrum Health, Symantec, TechSmith, TWO MEN AND A TRUCK, the Union Pacific Railroad, Urban Science, Whirlpool and Yello.

At the end of each semester, the College of Engineering sponsors Design Day, at which student teams from throughout the college showcase their Capstone projects throughout the Engineering Building.

Computer science capstone teams demonstrate the software projects that they have designed, developed, and delivered for their corporate client. Teams compete for four awards, which are conferred by a panel of corporate judges.

We thank Auto-Owners Insurance of Lansing, Michigan for their continued support of Michigan State University and the Capstone Experience, including the printing of this Capstone Experience booklet.

Check out the Capstone Experience web site at www.capstone.cse.msu.edu.

For more information about the capstone experience or becoming a capstone project sponsor, contact Dr. Wayne Dyksen by email (dyksen@msu.edu) or by phone (517-353-5573).

The Capstone Experience, 2016-2017

Department of Computer Science and Engineering Michigan State University

<i>Comments from Corporate Sponsors</i>	2
<i>Comments from Capstone Alumni</i>	3
<i>Project Sponsors, Fall 2016</i>	4
<i>Projects, Fall 2016</i>	
<i>Amazon: Asa:Your Amazon Shopping Assistant</i>	5
<i>Auto-Owners Insurance: Mobile Event App</i>	6
<i>Avata Intelligence: Security Analytics Suite: Dataset Merger Tool</i>	7
<i>Ford Motor Company: SYNC Calendar</i>	8
<i>General Motors: Gemini: Predictive Rich Cards</i>	9
<i>Meijer: Intelligent Shopping List</i>	10
<i>Mozilla Foundation: Improvements to Select Dropdown for Firefox</i>	11
<i>MSU Federal Credit Union: Member Ratings and Reviews</i>	12
<i>Quicken Loans: Pharos: Hiring Process Automation</i>	13
<i>Rook Security: Anomaly Detection Suite v2.0</i>	14
<i>Spectrum Health: Healthier Communities Time Banking</i>	15
<i>Symantec: Web Frameworks for Multi-Factor Authentication</i>	16
<i>TechSmith: Video Sentiment Analysis</i>	17
<i>Urban Science: Dealership Simulator 2017</i>	18
<i>Whirlpool: Mooch</i>	19
<i>Yello: Visualizing Dynamic Data Exploration</i>	20
<i>Photos from Design Day, Fall 2016</i>	21
<i>Comments from Corporate Sponsors</i>	22
<i>Comments from Capstone Alumni</i>	23
<i>Project Sponsors, Spring 2017</i>	24
<i>Projects, Spring 2017</i>	
<i>Amazon: ACRA: Amazon Customer Review Analyzer</i>	25
<i>Auto-Owners Insurance: Location-Based Services Mobile App</i>	26
<i>GE: PETT: Predix-Enabled Toy Train</i>	27
<i>General Motors: GM Transportation Experience App</i>	28
<i>Humana: Humana Kids</i>	29
<i>Meijer: MyMeijer: Crowdsourcing Shopping</i>	30
<i>Michigan State University: CATALyst: Mapping CATA Buses in Real-Time</i>	31
<i>Microsoft: Intune Company Portal Helper Bot</i>	32
<i>Mozilla Corporation: Improvements to Firefox's about:preferences</i>	33
<i>MSU Federal Credit Union: Banking with Amazon's Alexa and Apple's Siri</i>	34
<i>Rook Security: Force Platform Ingestion Tool (PIT)</i>	35
<i>Spectrum Health: Resident Physician Tracking</i>	36
<i>TechSmith: Teacher's Virtual Toolbelt</i>	37
<i>TWO MEN AND A TRUCK: Mobile Mini "Movers Who Care"</i>	38
<i>Union Pacific: Learning New Train Routes</i>	39
<i>Urban Science: Real-Time Ad Campaign Management</i>	40
<i>Whirlpool Corporation: Commercial Laundry Dashboard</i>	41
<i>Yello: YelloVision: Career Fair Augmented Reality App</i>	42
<i>Photos from Design Day, Spring 2017</i>	43
<i>Design Day Award Winners from Fall 2016 and Spring 2017</i>	44

Corporate Sponsors

Peter Faricy

Vice President
Amazon Marketplace

Amazon
Seattle, Washington



“Capstone courses provide students with real-world experiences within the global online retail industry. Students get to apply what they’ve learned in the classroom to actual business problems. The most recent Amazon student Capstone team produced a software system that is designed to improve and optimize the experience of Amazon’s third-party sellers.”

Elizabeth Klee

Chief Information Officer

Urban Science
Detroit Michigan



URBAN SCIENCE.

“Our mission at Urban Science can only be accomplished with the best and brightest problem solvers, innovators and analytical thinkers, which is why we partner with The Capstone Experience at Michigan State University. We’ve sponsored sixteen projects in the past eight years and have hired thirty-seven MSU graduates.”

April Clobes

President and
Chief Executive Officer

MSU Federal Credit Union
East Lansing, Michigan



“As a Design Day judge, I have evaluated Capstone projects from many of the corporate sponsors. The software systems produced by the MSU students rival that of professional developers. Our latest Capstone project, Banking with Amazon’s Alexa and Apple’s Siri, will expand our banking offerings to voice-controlled smart devices such as Amazon Alexa-enabled devices, Apple Watch and Android Wear.”

Terry Ledbetter

Senior Vice President,
Chief Information Officer

Meijer
Grand Rapids, Michigan



“Meijer is proud to have sponsored MSU computer science capstone projects over the past eight years. We have been impressed with both the capabilities of the students and the quality of the solutions they have developed. The latest project, MyMeijer: Crowdsourcing Shopping, will improve our customers’ shopping experience.”

Capstone Alumni

Mairin Chesney

Software Engineer

Google
Mountain View, California



“The Capstone Experience at MSU was invaluable on multiple fronts. From a technical perspective, we learned about the software design process from conception to completion. From an interpersonal perspective, we learned about the trials and joys of working on a team. On all fronts, this experience was phenomenal preparation for my job as a Google software engineer.”

BS, CSE: May 2015
Hometown: Brighton, Michigan

Max Goovaerts

Software Engineer

Facebook
Menlo Park, California



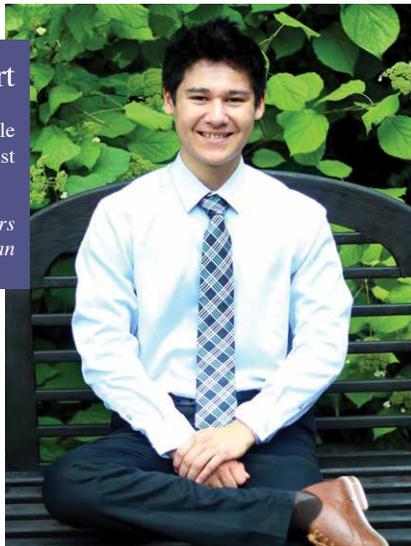
“Software development in the business world differs from class. You’re developing a solution to solve a business need, the requirements aren’t always clear and change throughout the development cycle. The Capstone Experience allows students to learn this first-hand in order to prepare them for the real world and set them up for success.”

BS, CSE: May 2015
Hometown: Ann Arbor, Michigan

Andrew Davenport

Autonomous Vehicle
Technologist

General Motors
Warren, Michigan



“The Capstone Experience gave me the opportunity to interface with accomplished business clients and present multiple technical presentations within a team. By being part of the GM capstone team, my interest in joining the automotive industry was reinforced. Overall, the experience did an exceptional job at preparing me for my position at GM.”

BS, CSE: December 2016
Hometown: Troy, Michigan

Auto-Owners
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MICHIGAN TECHNOLOGY OFFICE

Josh Schwallier

Associate Software Developer

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Auto-Owners
INSURANCE

“The Capstone Experience provided me with real-world experience as a software developer while I worked on a team to deliver a finished software product within a set time constraint. The skills and experience that I gained prepared me for starting my career as a software developer at Auto-Owners.”

BS, CSE: May 2017
Hometown: Marne, Michigan

The Capstone Experience

Fall 2016

Project Sponsors



Detroit, Michigan & Seattle, Washington



Detroit, Michigan



Lansing, Michigan



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Venice, California



Grand Rapids, Michigan



Dearborn, Michigan



Mountain View, California



Warren, Michigan



Okemos, Michigan



Grand Rapids, Michigan



Detroit, Michigan



Mountain View, California



Benton Harbor, Michigan



East Lansing, Michigan



Chicago, Illinois

Amazon

Asa: Your Amazon Shopping Assistant

Amazon is the largest e-commerce company in the world, accounting for 1 in 3 shopping transactions in North America.

The number of active users on messaging platforms reached 3 billion in 2015. Asa is a shopping assistant chatbot who allows Amazon to access this market. She helps users discover and purchase items through conversations on Facebook Messenger.

Asa's core functionality enables users to search for items and ask for product recommendations.

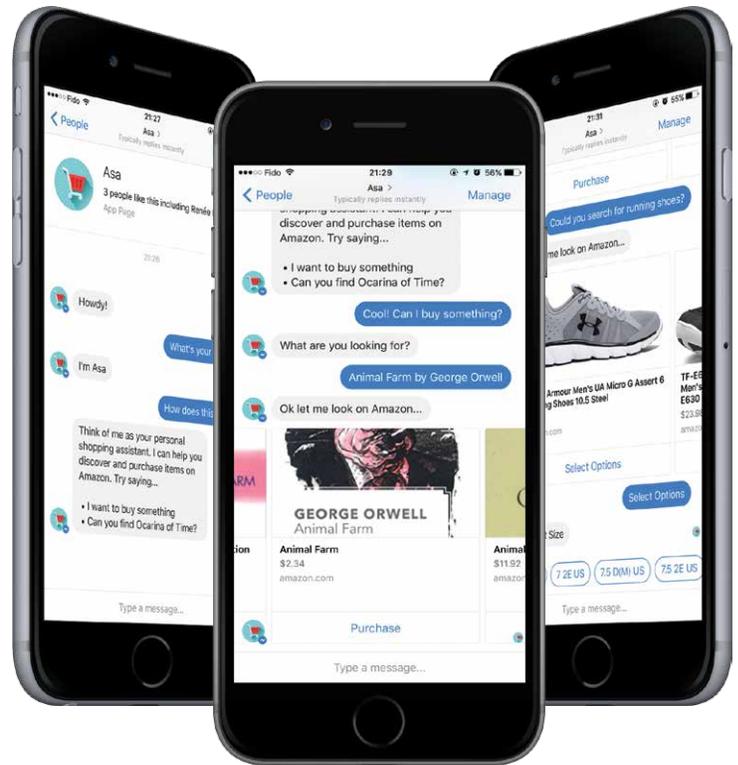
For example, if a user says, "I'm looking for Animal Farm by George Orwell," Asa replies with a collection of Amazon listings for the book Animal Farm along with purchase links.

Through these conversations, Asa learns about each user and tailors future product recommendations based on what she learns. If a user asks, "Can you recommend a good book?" Asa sends a list of books based on that user's past purchases.

Users can also ask Asa to remind them to do something, such as buying a gift for their mother or purchasing textbooks before the start of the semester.

To learn how to shop with Asa, users can ask her for help at any time. Asa responds with an instructional message that gives examples of ways to chat with Asa, including examples of how to ask Asa questions.

Asa is written in JavaScript and hosted on AWS Lambda. Asa uses Wit.ai for natural language processing and AWS DynamoDB for persisted data storage.



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Auto-Owners Insurance Mobile Event App

Celebrating its 100th anniversary, Auto-Owners Insurance is a Fortune 500 company working with more than 6,200 independent agencies in 26 states.

Auto-Owners regularly hosts events ranging from conferences for their associates to golf outings for their agents to recruiting events for prospective employees, as well as many others.

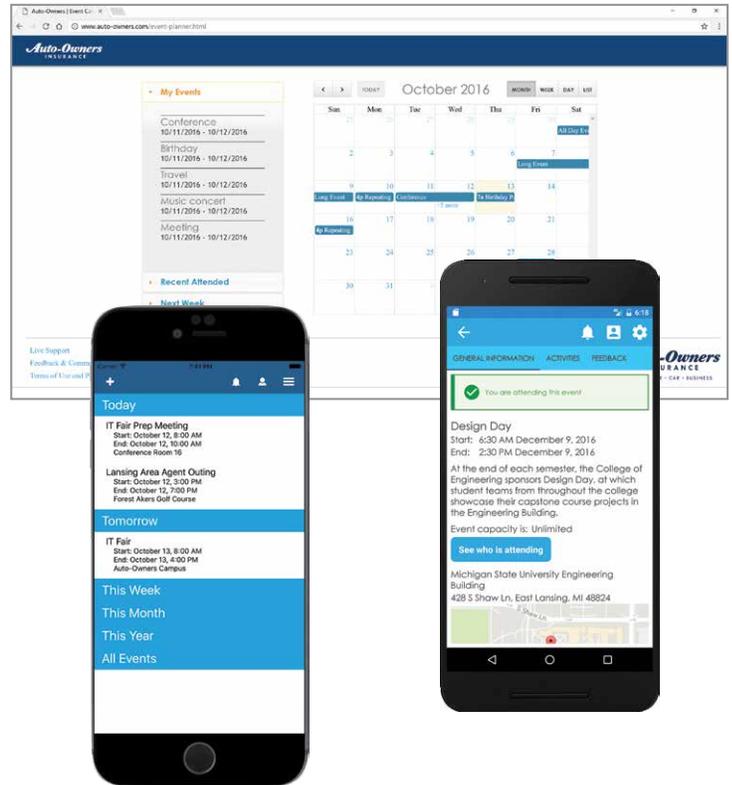
These events vary significantly, with each designed for a specific purpose. Distribution materials describing an event may be a brochure or a website. Variations include other things like maximum capacities or options like breakout sessions.

Our Mobile Event App with its companion web app enables Auto-Owners and their guests to manage events.

Event administrators use our web app to create events including all of the relevant information and to send invitations to prospective attendees. Administrators can view lists of registered attendees along with waiting lists for events over capacity. They can create customized surveys to garner feedback about events in order to improve future events.

After receiving an event invitation, attendees use our mobile app to view the event details and RSVP. If the event is at capacity, an invitee can be placed on a waiting list and get information about similar future events. Attendees can view a list of the specific event activities so they can build a personal agenda for the event.

Our Mobile Event App, written in Swift and Java, runs on most iOS and Android devices. Our web app, written in PHP, runs on most browsers. They connect through an SQL database hosted on a Microsoft 2012 R2 server.



Auto-Owners INSURANCE

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Avata Intelligence Security Analytics Suite: Dataset Merger Tool

Avata Intelligence leads the security industry in artificial intelligence and advanced analytics, supporting world organizations with integrated data-driven solutions.

For example, law enforcement units can use Avata's platform to analyze crime records to predict when and where future crimes will occur. Rather than patrolling randomly or uniformly, officers can patrol when and where crimes are more likely to occur, thereby increasing safety and security.

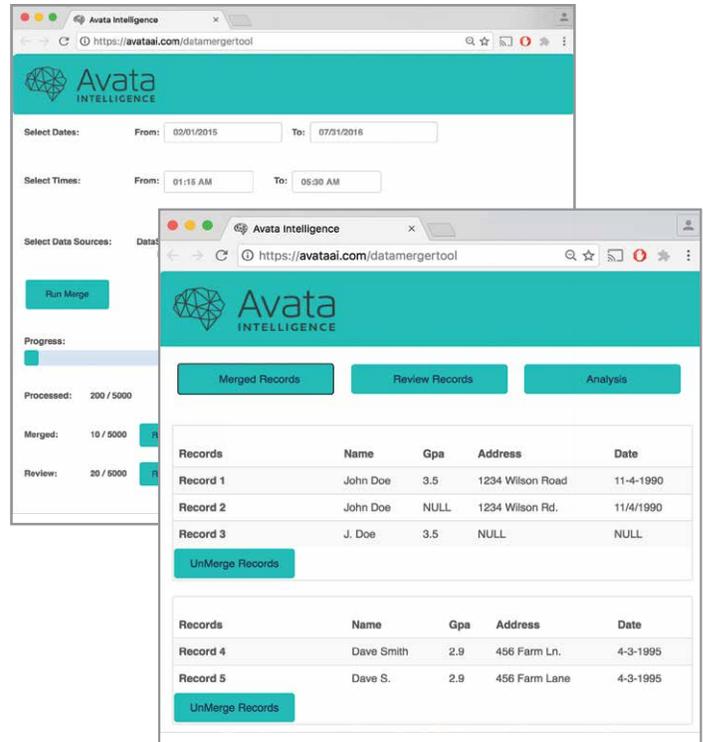
Accurate analysis of crime records depends on having accurate data. Slightly different entries from different sources often represent the same crime. If there are duplicate copies of the same incident, the system may falsely predict this crime to be more common than it truly is. Unfortunately, such datasets are way too large to be checked manually for duplicates.

Our Dataset Merger Tool is a web app that automatically identifies and merges duplicate records within and across datasets in the Avata platform.

After a user selects data sources to be merged, our system uses advanced algorithms to identify duplicate records. When records are identified as duplicates with high similarity, the records are merged automatically. Potential duplicates that fall below a certain similarity threshold are presented to the user for approval before merging.

Upon completion, our system produces a report containing information useful for analyzing the resulting data integrity.

Our Dataset Merger Tool is written in ReactJS for the front-end and Java for the back-end, utilizing the Spring Boot framework. Datasets are stored in a MySQL database.



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The Capstone Experience

Ford Motor Company SYNC Calendar

Ford Motor Company is a Fortune 500 company headquartered in Dearborn, Michigan. Last year, Ford sold over 3 million vehicles in North America while employing over 199,000 employees worldwide.

The average American spends over five hundred hours per year in their car, time which is often time wasted. For many, time is their most precious resource.

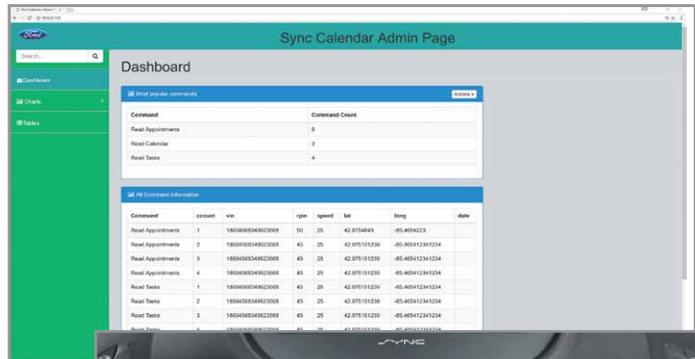
SYNC Calendar enables drivers to interact with their mobile calendar while driving in their Ford vehicle. With SYNC Calendar, the time spent driving may be used more productively.

SYNC Calendar is a SYNC AppLink application, which connects a third-party calendar service, such as Google Calendar, with the Ford SYNC onboard vehicle system.

Upon entering a vehicle, a driver is automatically prompted to sign in with their Google Calendar login credentials. Once connected, the driver can access and update their calendar using SYNC voice commands and the SYNC dashboard.

Using our companion web app, Ford analysts can view vehicle usage statistics related to SYNC Calendar, such as the most frequently used commands. Our web app presents data visually with user-friendly charts and graphs. These analytics enable Ford to optimize and improve the app in the future.

SYNC Calendar is a mobile app for Android and iPhone devices, written natively in Java and Objective-C, respectively. The administrative web app stores all data in a Microsoft SQL database.

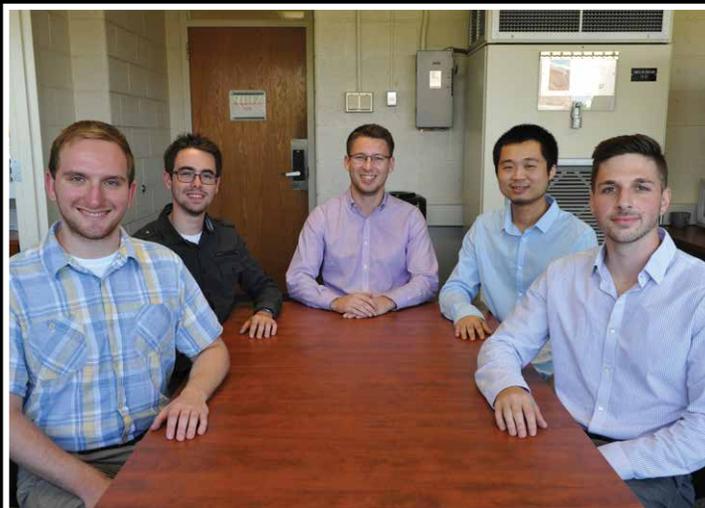


Sync Calendar Admin Page

Dashboard

Command	Command Count
Read Appointments	3
Read Calendar	3
Read Tests	4

Command	count	vin	type	speed	lat	long	date
Read Appointments	1	1800A00048020008	50	42.8754843	-85.4654273		
Read Appointments	2	1800A00048020008	45	42.87519208	-85.465412341234		
Read Appointments	3	1800A00048020008	45	42.87519208	-85.465412341234		
Read Appointments	4	1800A00048020008	45	42.87519208	-85.465412341234		
Read Tests	1	1800A00048020008	45	42.87519208	-85.465412341234		
Read Tests	2	1800A00048020008	45	42.87519208	-85.465412341234		
Read Tests	3	1800A00048020008	45	42.87519208	-85.465412341234		
Read Tests	4	1800A00048020008	45	42.87519208	-85.465412341234		



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General Motors

Gemini: Predictive Rich Cards

General Motors is one of the world's foremost designers and manufacturers of cars and trucks sold in more than 120 countries. Headquartered in Detroit, GM has over 215,000 employees.

GM's Warren Technical Center comprises over 40 buildings covering one square mile, and is home to one out of ten GM employees.

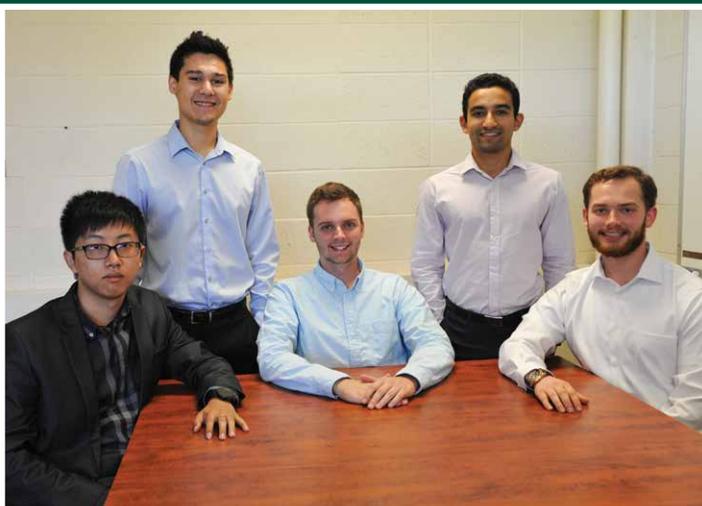
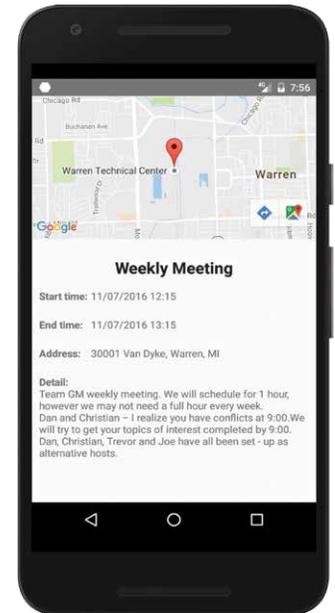
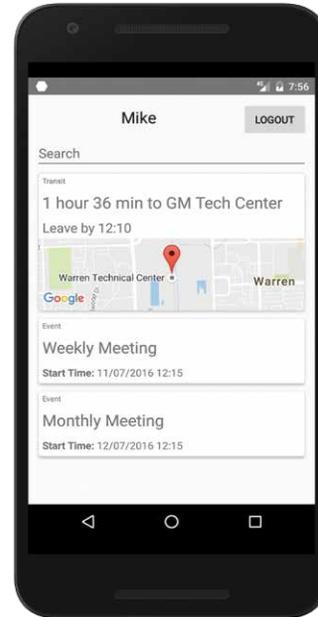
Our Gemini mobile app uses predictive rich cards to help GM employees navigate the expansive Warren campus and to manage their busy workday efficiently.

After learning about a GM employee and their typical workday, Gemini provides many helpful services. For example, it may remind them to send a follow-up email, suggest they schedule a shuttle to a distant meeting, or provide a list of close and available conference rooms when creating a meeting.

Employees using Gemini are able to spend more time on their work and less time on repetitive tasks. By drawing from geographic location, emails, search history and calendars, Gemini is able to assist users by suggesting what they may want to do next. This predictive nature is the focus of Gemini's user experience.

A central aspect of Gemini's interface is the use of cards. Similar to a physical notecard, Gemini's cards present a summary of information to the user and, when selected, present a more detailed view of that information.

Written using Xamarin, a cross platform framework, our Gemini app runs on both Apple iOS and Google Android devices.



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- Dan Rudman**
Warren, Michigan
- Christian Stier**
Warren, Michigan

Meijer Intelligent Shopping List

Meijer is one of the country's largest supercenter chains, providing high quality food and merchandise in six states across the Midwest. Meijer is leading the fast moving retail market with innovative products and services.

Our Intelligent Shopping List app automatically generates a personalized shopping list for Meijer customers, thereby streamlining the time spent on repeat purchases and potentially eliminating the need to go to the store all together.

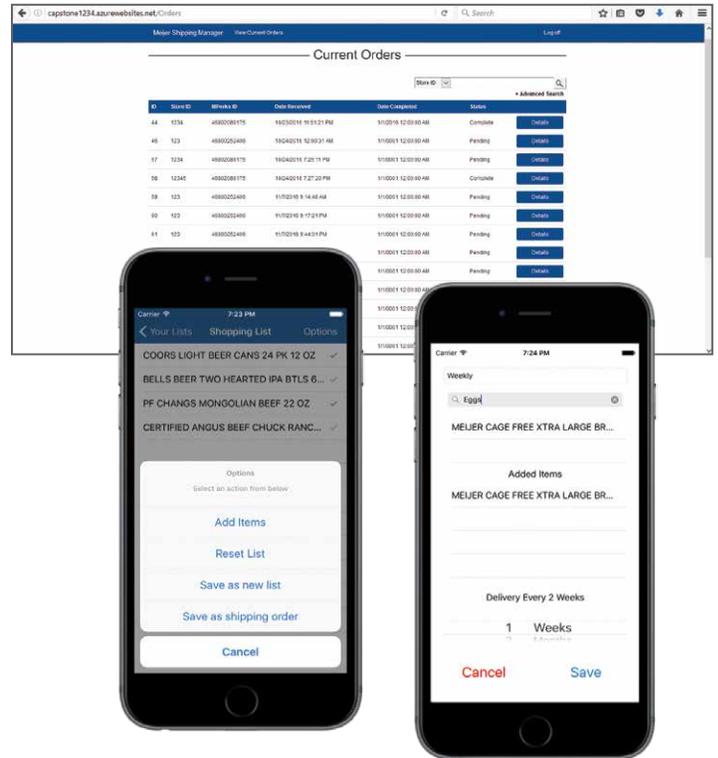
mPerks is Meijer's customer loyalty program. Among other features, customers use mPerks to receive and redeem coupons at checkout.

Our app uses a customer's mPerks account history to create a personalized shopping list based on previous purchases and buying habits. It uses frequency of purchases, quantity of items purchased and time of year. Once automatically created, Meijer customers can edit their shopping list.

In addition to in-store shopping lists, customers can create shipping lists to have items shipped directly to their home at a frequency of their choosing. Deliveries can be suspended and resumed at any time.

Meijer associates use a companion web app for home delivery order fulfillment. With it, they view all pending and completed orders.

Our Intelligent Shopping List app is written using Xamarin and runs on any iOS device. Our companion web app uses Microsoft's .NET framework and is deployed in Microsoft Azure cloud services.



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Mozilla Foundation

Improvements to Select Dropdown for Firefox

Mozilla is a global, nonprofit organization dedicated to improving the World Wide Web. Mozilla's international community of developers creates open source software such as Firefox, which is the second most popular web browser with about 16% of worldwide usage.

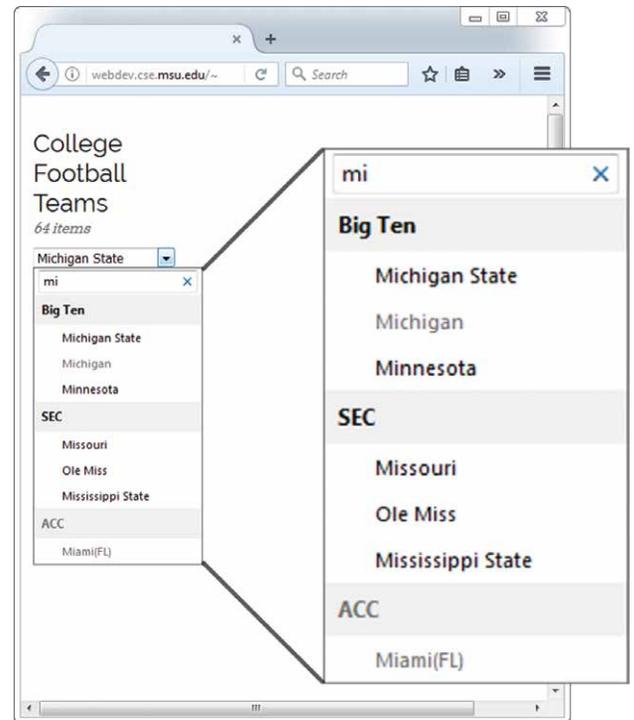
Currently, Firefox is undergoing the largest redesign in its history. This redesign involves new styling, new features and new ways for Firefox to do multiple tasks simultaneously.

Options in Firefox are often presented to users in the form of a list like the one at the right, which is called a "select dropdown." Our improvements to the select dropdown implement the new Firefox styling and add new search features. Our improvements provide a more modern and faster web browsing experience.

With our new search functionality, users can find items in a long dropdown list quickly by typing a few letters from the item of interest, like the example of typing "mi" shown at the right. Only the list items that contain these search letters appear in the list, thereby shortening the list and making it much easier to find the desired item.

Our improved select dropdown also features enhanced styling with modern web fonts used by the computer on which Firefox is running, which gives a more seamless and familiar browsing experience to roughly half a billion Firefox users worldwide.

Our improvements to the select dropdown require the addition of code in many sections of Firefox's 4.5 million line code base. Our code is written in C++, JavaScript and XUL. The new styling is accomplished with CSS.



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Mozilla

Project Sponsors

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The Capstone Experience

MSU Federal Credit Union Member Ratings and Reviews

Founded in 1937, Michigan State University Federal Credit Union serves the Michigan State community, as well as the Oakland University community. MSUFCU provides financial security and exceptional service to its members. MSUFCU has 17 branches, over 228,000 members, and more than \$3.28 billion in assets.

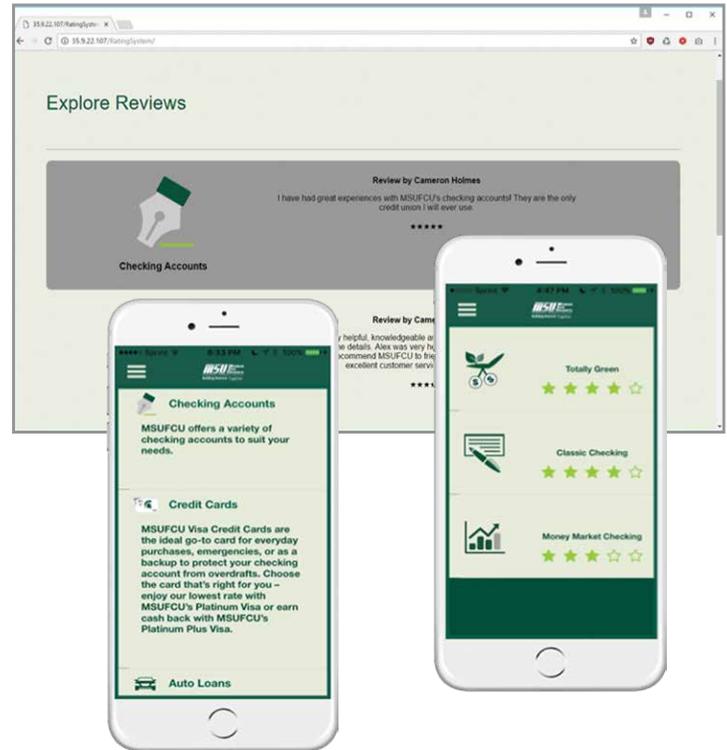
Our Member Ratings and Reviews system enables MSUFCU members to provide feedback on MSUFCU products and services. Members can give ratings from one to five stars and write reviews for any product or service, or the customer service related to any product or service.

MSUFCU members can browse reviews by category, sort them by rating or helpfulness, and filter them by keyword. Members can comment on or rate the helpfulness of a review.

A user preferences page allows members to upload a profile picture or set a display name. Members can also check a box to remain anonymous to other members when posting.

An administrative dashboard gives MSUFCU staff access to detailed information about the reviews for each product. MSUFCU staff can reply to member reviews to get more information from members about their experiences, or to assist with members' issues or concerns.

Our Member Ratings and Reviews web app is written in HTML, CSS, JavaScript and PHP. The mobile versions are native apps written in Swift for Apple iOS and Java for Google Android devices. All three interface with a MySQL database.



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Quicken Loans Pharos: Hiring Process Automation

Quicken Loans, based in Detroit, Michigan, has been providing affordable mortgages and award-winning client service for more than 30 years. It is the nation's largest online mortgage lender.

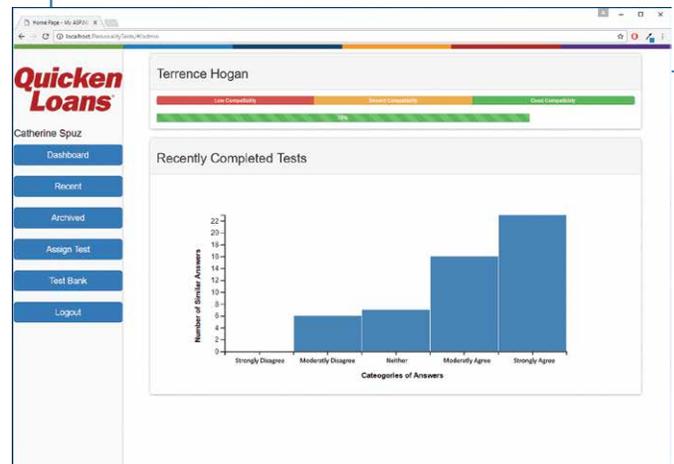
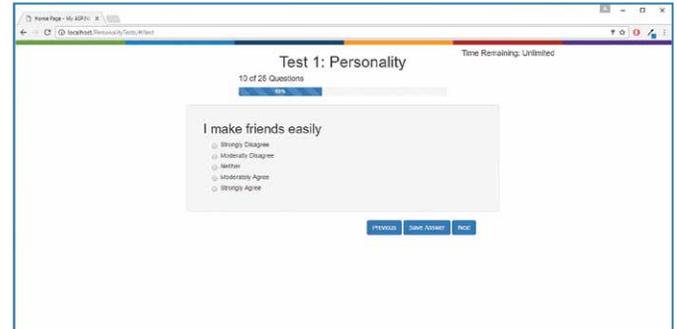
Identifying and recruiting the very best talent is key to Quicken Loans' success. Unfortunately, the interview process is not an exact one and has the potential to produce inconsistent results.

Our Pharos software system removes the potential subjectivity of interviews by administering personality and intelligence tests to job candidates. In addition, our app determines whether or not a recruit is compatible with Quicken Loans' corporate culture.

After logging into Pharos, recruits are presented with a dashboard of the tests that they can complete. For timed tests, a clock appears indicating the time remaining. A progress bar indicates how many questions are left. When a test is completed, the test link on the dashboard is disabled, thereby preventing users from retaking a test.

Quicken Loans associates use our Pharos' administrative dashboard to create a test, view available tests, assign a test to a recruit, and view test results. The test results are summarized graphically in a clear and concise manner, which gives the Quicken Loans associate an easy way to digest large amounts of data.

Our Pharos web app is written in C#. It runs on the ASP.NET Web API and uses JavaScript with an AngularJS frontend framework. D3.js is used to handle data analytics and visualization. Our platform is supported by a MySQL database which stores recruit information.



Quicken Loans®
Engineered to Amaze®



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Spectrum Health Healthier Communities Time Banking

Spectrum Health, located in Grand Rapids, Michigan, provides high quality, high value healthcare through its seven hospitals, more than 140 service sites, and Priority Health, a health plan with nearly 500,000 members.

Spectrum Health's patients include homebound adults who often lack family and friends to care for them. Without caregivers, homebound adults can become lonely and even depressed, resulting in a poor quality of life.

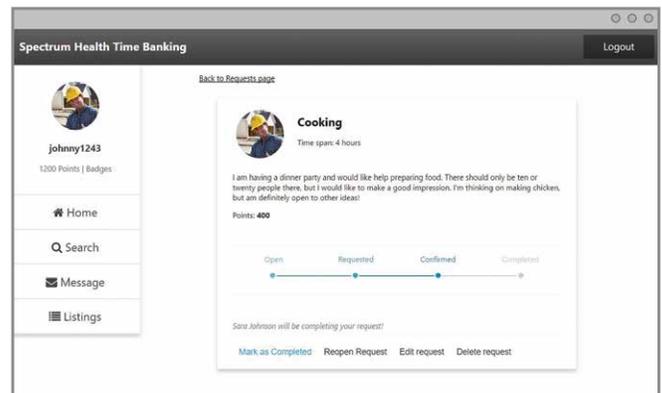
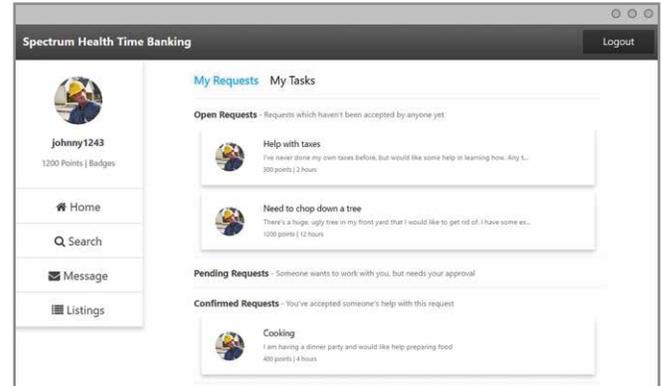
Our Healthier Communities Time Banking social web app connects homebound adults with volunteer caregivers. Homebound adults can post requests for services. Volunteer caregivers are able to browse these requests and respond.

For example, homebound users themselves may be able to fulfill requests of other homebound adults by providing help with using a computer. Users requesting a service can offer payment in the form of "time banked" when helping others, thus giving them the much needed feelings of being useful and having a purpose.

Our chat system also enables homebound adults and volunteer caregivers to chat with each other. Users can set up fulfillment of requests or just talk with each other and get the socialization that all humans need.

By enabling caregivers to provide for their needs, our app is improving the lives of homebound adults throughout West Michigan.

Our Healthier Communities Time Banking web app utilizes Angular 2 and .Net Core for MVC and WebAPI utilization.



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Symantec

Web Frameworks for Multi-Factor Authentication

Countering the threats of tomorrow, Symantec Corporation is a global leader in cybersecurity technologies. Located in Silicon Valley, Symantec offers software solutions and services related to information and computer protection.

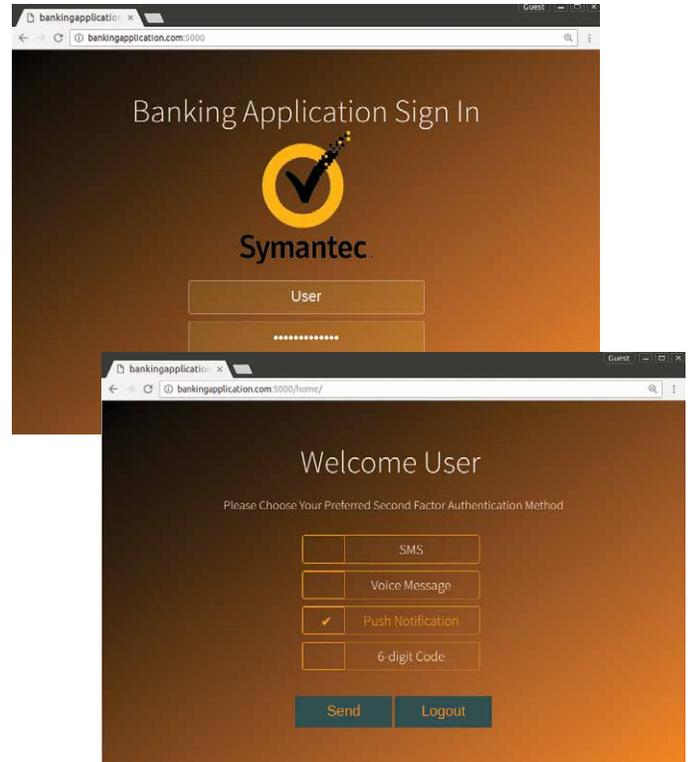
Currently, users' data is protected often with only a password, which is no longer adequate. One approach to increase security is to use two-factor authentication (2FA), which adds a second factor such as a security code sent as a text message.

Symantec provides a 2FA product called Validation and ID Protection, also known as VIP Service, which is a Simple Object Access Protocol (SOAP) web service. Unfortunately, using the XML-based SOAP APIs is challenging in modern web frameworks, creating a barrier to entry that is significant enough for most developers to choose a competitor's 2FA product.

Our Web Frameworks for Multi-Factor Authentication enables developers to integrate Symantec's VIP easily into any modern web framework. We provide software development kits (SDKs) for three of the most widely used web technologies: Ruby, Python and Node.js. Using our SDKs, developers can implement Push, SMS, voice code or VIP 6-digit security code methods as a second factor of authentication.

Sample applications demonstrate the ease of making and receiving function to VIP Service calls in native programming language. Along with these sample applications, documentation is available on the GitHub.

Open-source SDKs are provided for Ruby, Python and Node.js on the Ruby Gems, PyPi and NPM repositories, respectively.



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TechSmith Video Sentiment Analysis

Located in Okemos, Michigan and founded in 1987, TechSmith creates software platforms that enable users to share ideas and information in dynamic and engaging ways.

One of TechSmith's flagship products, Camtasia, makes video creation easier now than ever before. Yet, producing good content is still a challenge because it's very difficult to obtain accurate feedback from viewers. Often, comments and ratings reveal very little about a video's actual impact on viewers.

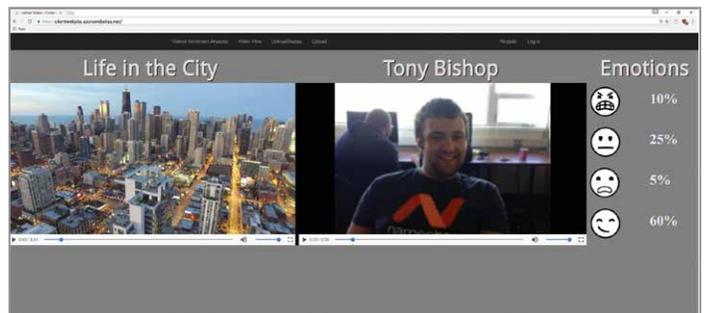
Our Video Sentiment Analysis (VSA) system records reactions of a viewer to a video without any interactions other than watching the content using our player app.

VSA determines the viewer's emotions automatically by analyzing a video recording of the user watching the video. VSA also records the viewer's usage of media controls including playing, pausing and skimming.

In addition to our video player, our VSA system provides a web app for video authors. Viewers are selected and sent an email invitation to view a video using our player app. As part of accepting the invitation, viewers agree to return their usage data and webcam footage for analysis.

The video author then uses our web app to analyze a viewer's responses. By looking at a specific response, an author can see the emotional state of the viewer, and determine whether or not the video is eliciting the desired reaction.

Video Sentiment Analysis is comprised of a Universal Windows app and a website. The app is developed with C# and XAML. The website is built with ASP.NET on Azure.



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Urban Science Dealership Simulator 2017

Urban Science delivers consulting and software solutions that help automotive clients increase market share and boost profitability through high performing retail networks.

In order for all Urban Science associates to be most effective, it's important for them to understand how automobile dealerships work. In particular, it's important for them to understand how different factors, called key performance indicators (KPIs), affect the success of a dealership.

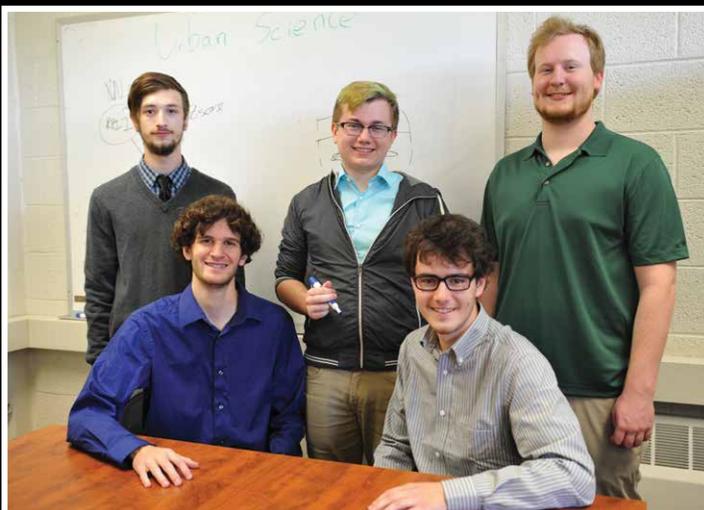
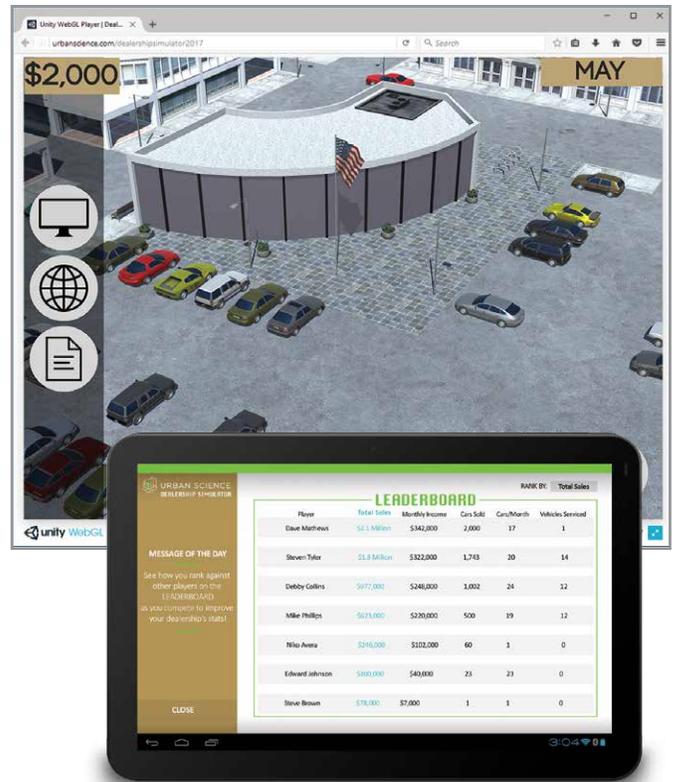
Urban Science associates learn about running an automobile dealership by playing our video game, Dealership Simulator 2017. With each turn, players adjust KPIs on a month-by-month basis to see the effects on their dealership.

Our game provides very accurate business scenarios since the calculations for the simulated dealership in the game are based on data from actual dealerships in the real world. Players quickly learn that some KPIs have a much greater impact than others on a dealership's profitability.

Dealership Simulator 2017 is easy for anyone to learn how to play. In addition to profitability, players see the cars in their lot, depending on how many and what type of cars they buy each turn.

Our game runs in any web browser as well as on Apple iPads and on Google Android devices.

Dealership Simulator 2017 is written with the Unity3D game engine and C# scripting. Our backend uses a Windows Server with PHP and SQL to implement our database.



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Whirlpool Corporation Mooch

The Whirlpool Corporation is the world's leading manufacturer of major appliances. With over \$20 billion in annual sales, Whirlpool's extensive brand portfolio includes Whirlpool, KitchenAid, Maytag and more.

The food market in the U.S. is a \$1 trillion business. Yet, only half of this figure is attributed to eating at home, and nearly 40% of all food goes to waste.

Our mobile app Mooch makes it easy for people living in housing communities like apartment buildings or condominium complexes to share and sell food.

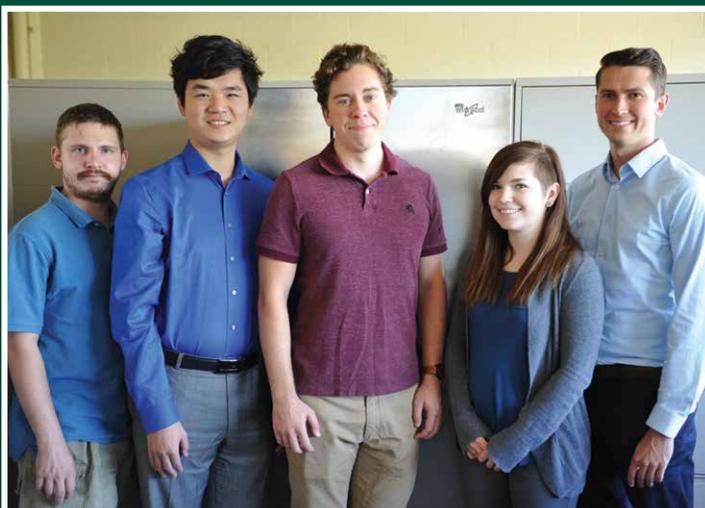
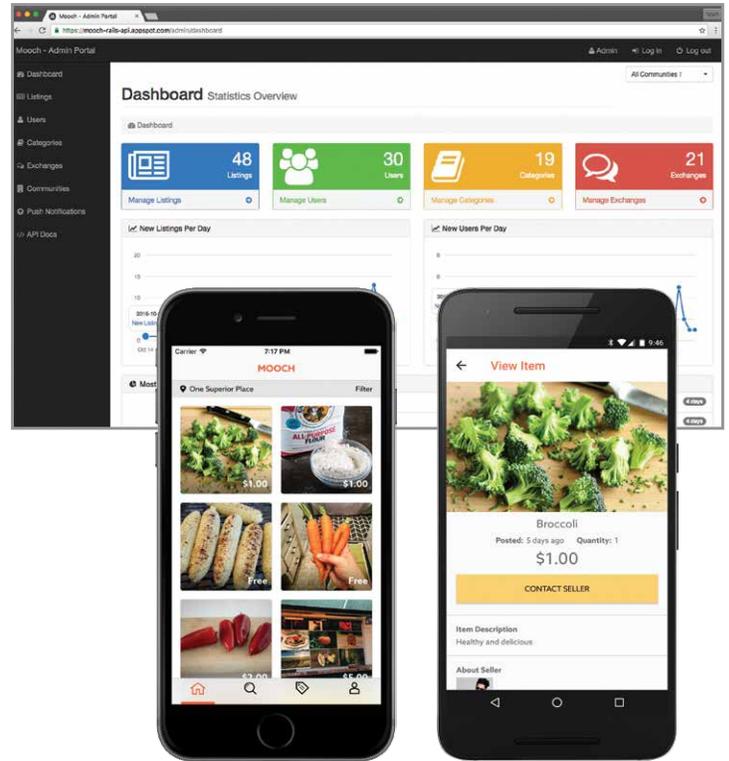
Extra food is not wasted when it's easy to find someone who wants it. And, cooking at home with Whirlpool appliances is a breeze when nearby neighbors provide the missing ingredients.

Mooch users find their housing community based on their current location or based on a specific address. Scrollable lists of food items for sale or for sharing are displayed on Mooch's home screen. Users can scroll through the list, search for specific items, or explore preset categories.

Tapping on a food item brings up more details such as a description, posting date, quantity, price and seller information. Items are claimed with the simple press of a button.

Administrators use our Mooch web portal to manage listings, users, categories and exchanges, and to view usage statistics.

Mooch is based on Ruby on Rails. The iOS and Android apps are written in Swift and Java, respectively. Data is stored using MySQL and NoSQL, which are hosted on Google App Engine.



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Yello

Visualizing Dynamic Data Exploration

Overlooking Millennium Park in downtown Chicago, Yello provides talent acquisition software to assist companies with filling their most challenging job openings.

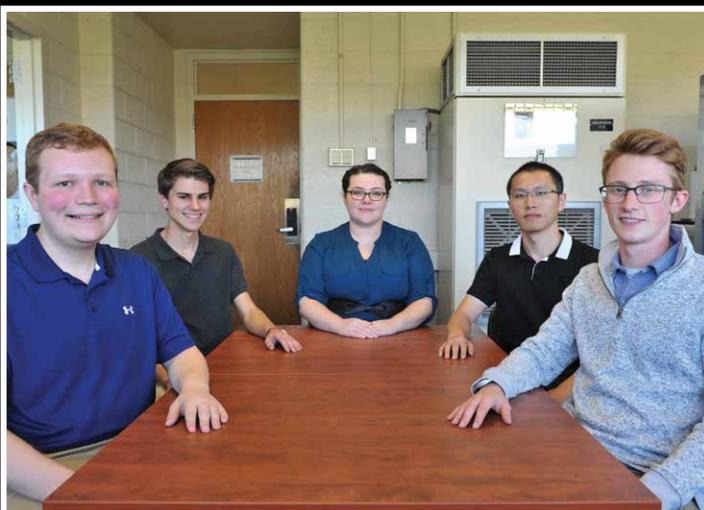
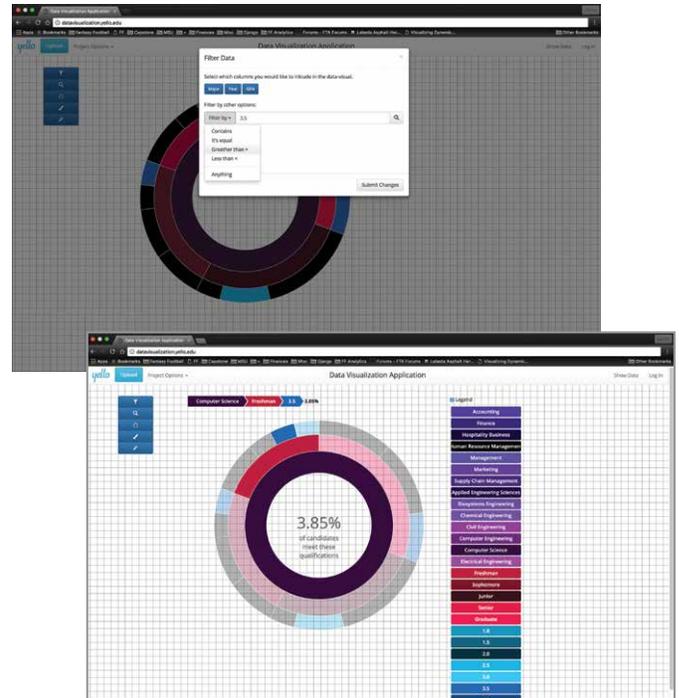
Yello's software is used by companies and candidates around the world. Each candidate inputs their contact information, academic profile and career profile, as well as uploads a digital copy of their résumé. Companies download candidate information, process candidate evaluations, and do outreach.

As Yello's software is used by hundreds of companies and many thousands of candidates over numerous years, very large amounts of useful and informative data are collected. Unfortunately, large datasets are notoriously hard to explore and even harder to comprehend.

Our Visualizing Dynamic Data Exploration app provides the means for recruiters to analyze large datasets and to discover underlying trends. The data is visualized by converting it to an infographic that is dynamically viewable and editable.

A user of the app imports the data, selects what information to visualize, and then generates the infographic. Once generated, the app allows for filtering and selection of the represented data, manipulation of the infographic to help with understanding, and cosmetic adjustments to assist in the presentation of the data.

Our Visualizing Dynamic Data Exploration app is written in Python, Django, JavaScript, CSS and HTML. Additionally, SQLite is used for our database and the open-source D3 JavaScript library is utilized for the visualizations.



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Corporate Sponsors

Linglong He

Chief Information Officer

Quicken Loans
Detroit, Michigan



Quicken Loans
Engineered to Amaze

“Michigan State’s Capstone project plays a vital role in ensuring our young, talented men and women receive the hands-on experience and contacts needed to lay the foundation for a great career in technology. We’ve hired several Capstone students that now work on critical projects at Quicken Loans and contribute to Detroit’s technology-driven resurgence.”

Jim Schumacher

Senior Vice President,
Information Systems
and Technology

Auto-Owners Insurance
Lansing, Michigan



Auto-Owners
INSURANCE

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“Auto-Owners Insurance is proud to be a long-term capstone project sponsor. The business-like environment of the capstone experience provides a unique opportunity for students to develop into professionals. Our strategic partnership has enabled us to identify and recruit many outstanding Michigan State University graduates.”

Randy Mott

Senior Vice President and
Chief Information Officer

General Motors
Detroit, Michigan



“General Motors looks to Michigan State University to hire outstanding computer science graduates. Students in the Capstone course gain valuable experience with a wide diversity of state-of-the-art information technologies being used at GM. This is a tremendous chance for students to network with IT professionals and benefit from a powerful learning opportunity.”

Wendy Hamilton

Chief Executive Officer

TechSmith
Okemos, Michigan



TechSmith

“TechSmith is a global technology company located just five miles away from MSU in Okemos. Our Capstone projects give students real-world experience with some of the latest trends including multimedia technologies, cloud computing and mobile applications, all of which add to their marketability. We also recruit the majority of our software engineers from MSU, so the Capstone Experience gives us a meaningful connection to many prospective employees.”

Capstone Alumni



Luke Pritchett
Software Development Engineer
Amazon
Seattle, Washington



"The MSU Capstone Experience took the strong foundation I had gained as a computer science student of MSU and applied it to a real-world business problem. By being able to work on the entirety of the design and development process, and by focusing on issues such as scalability, modularity and reusability, I am much more prepared for my work at Amazon."

BS, CSE: May 2015
Hometown: Midland, Michigan

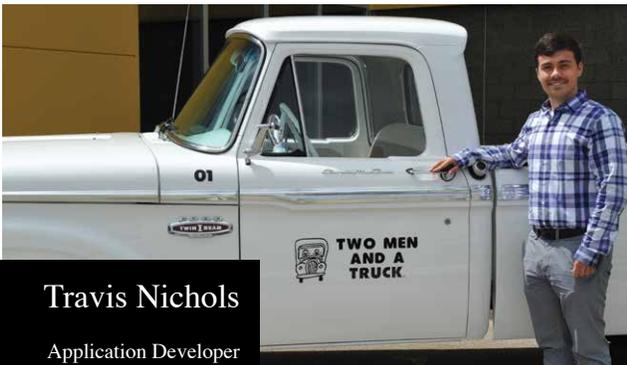


Vince Cogswell
Software Engineer
Microsoft
Redmond, Washington



"Learning how to give and defend technical presentations is a key feature of the capstone experience, which I use often in my work at Microsoft."

BS, CSE: May 2017
Hometown: Kalamazoo, Michigan



Travis Nichols
Application Developer
TWO MEN AND A TRUCK
Lansing, Michigan



"Movers Who Care."

"The MSU Capstone Experience was the perfect transition from a student environment to a professional setting. Being on the TWO MEN AND A TRUCK capstone team provided me with valuable work experience that led to the beginning of my career at TWO MEN AND A TRUCK as an Application Developer."

BS, CSE: May 2017
Hometown: Commerce, Michigan



Adam Schoonmaker
Software Engineer
Apple
Cupertino, California



"The Capstone Experience at Michigan State University gave me real-world experience creating a social food sharing application by combining the requirements of separate product, design, and engineering teams into finished software. This prepared me for my job at Apple where I work on the iTunes Media Apps team, collaborating across teams to provide the frameworks used by many different Apple products."

BS, CSE: December 2016
Hometown: Haslett, Michigan

The Capstone Experience

Spring 2017

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TWO MEN
AND A
TRUCK

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CHICAGO, ILLINOIS

Amazon

ACRA: Amazon Customer Review Analyzer

Amazon, the largest online retailer in North America, sells a large variety of products. After a sale, customers may post reviews related to all aspects of the sale. On average, users write millions of reviews per year.

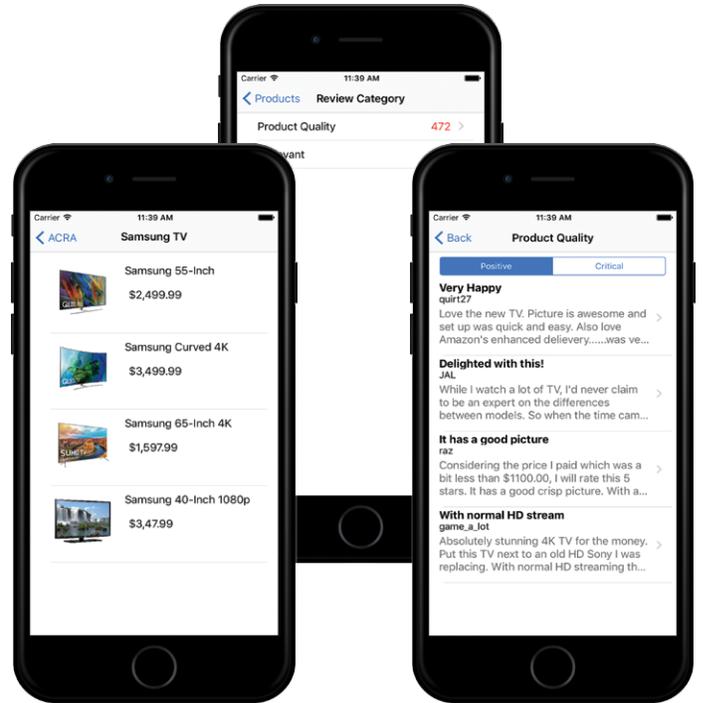
With the large number of reviews posted, the likelihood that customers encounter reviews unrelated to product quality is high. Without an automated way of classifying reviews, customers may have to sift through many useless reviews when researching a big-ticket item.

Our Amazon Customer Review Analyzer, ACRA, automatically classifies customer reviews into two categories, those related to product quality and those unrelated to product quality. To do so, ACRA uses natural language processing and machine learning.

This automatic classification of reviews allows Amazon shoppers to focus only on reviews that are relevant to product quality, thereby enhancing their shopping experience.

Amazon shoppers can search for products using our ACRA iPhone app, which separates reviews into product quality and non-product quality categories. Additionally, users can report misclassified reviews to refine and crowdsource our classifier's performance.

Our iPhone application is written in Swift and communicates with our backend using API Gateway and Lambda hosted on Amazon Web Services (AWS). Amazon Machine Learning and Python's NLTK library are used to classify reviews hosted in AWS's S3 and DynamoDB.



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The Capstone Experience

Auto-Owners Insurance Location-Based Services Mobile App

Auto-Owners Insurance is a Fortune 500 company that celebrated its 100th anniversary in 2016. Auto-Owners Insurance employs over 4,500 associates in 26 states.

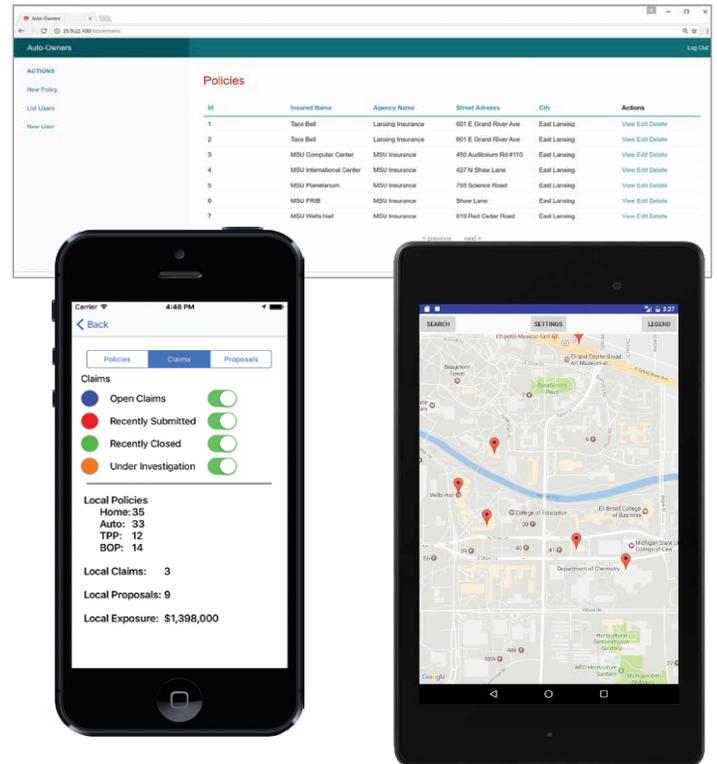
Auto-Owners representatives often need to access their customers' information while they are out in their community. Our Location-Based Services Mobile App enables Auto-Owners employees to view customers' information wherever they are.

Our app shows a map of the user's location along with all nearby addresses that have policies, claims or proposals through Auto-Owners. A user can customize what information is shown on the map such as all local policies of a certain type or all claims above a certain dollar amount.

When a specific location is selected on the map, the app displays the details about that address, including current and past policies and claims. A representative can submit a new claim for review and send notes to the underwriting department, thus enabling Auto-Owners to be more responsive to their customers' needs.

Our system is managed by our companion web app with which Auto-Owners administrators create and update a customer's insurance information. Accounts for new Auto-Owners representatives are created using the web app, which determines what information they can access using the mobile app.

Our Location-Based Services Mobile App is written in Swift and Java, and runs on Apple iPhone (iOS) and Google Android devices. Our web app, written in CakePHP, runs on all modern web browsers. Our apps connect through a MySQL database hosted on a Microsoft 2012 R2 server.



Auto-Owners INSURANCE

LIFE • HOME • CAR • BUSINESS



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GE

PETT: Predix-Enabled Toy Train

General Electric is the leading digital industrial company in the world, transforming the industry with software-defined machines and solutions that are efficient and predictive.

GE Digital's Predix platform is a purpose-built, hardened cloud platform that provides the connectivity, security and performance needed to drive advanced industrial applications.

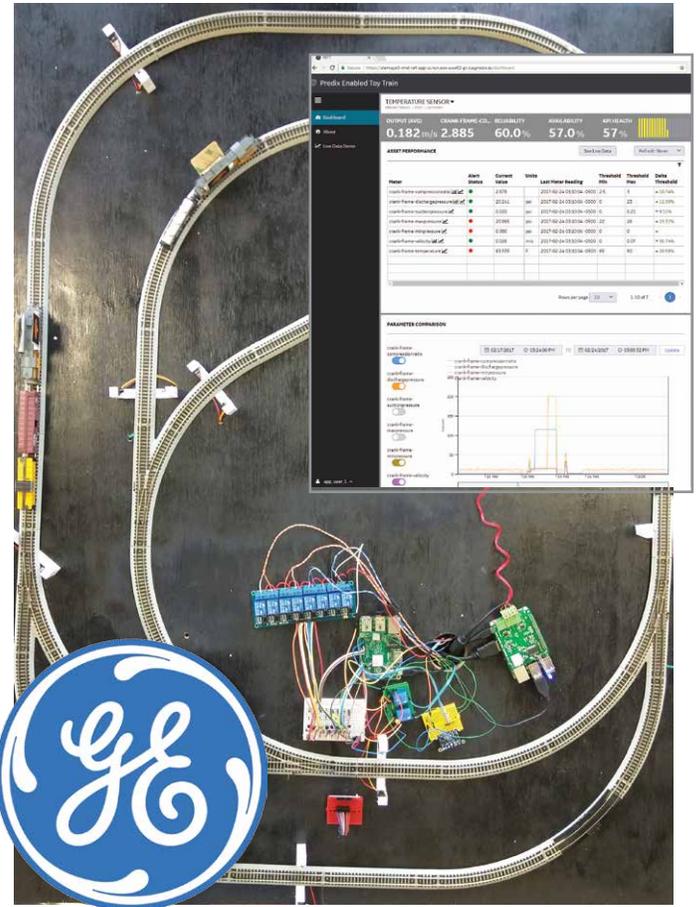
Our PETT, Predix-Enabled Toy Train, is a model train setup that demonstrates the capabilities of Predix. PETT uses multiple sensors including beam breakers, RFID reader-writer modules and tags, a multi-sensor and more to record data about the location of the moving trains and the state of the track.

Data from the PETT sensors is collected and sent continuously to the Predix Cloud, which analyzes it and visualizes it. Predix's predictive analytics determines potential train collisions and other possible problems with sensors, track and trains.

Based on the feedback from Predix, PETT controls the running trains by sending signals using Digital Command and Control (DCC) to the train engines and the track switches.

Our PETT provides GE with a visual and interactive way to showcase Predix to potential customers at their Digital Hub in Detroit and a fun way to inspire young people to pursue careers in engineering at fairs like the Maker Faire in Detroit.

Two Raspberry Pis read data from sensors using Python. One Raspberry Pi is connected by Pi-SPROG to the DCC track and sends commands with Jython. The data is displayed on a Predix machine using a web browser.



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The Capstone Experience

General Motors

GM Transportation Experience App

Founded in 1908 and headquartered in Detroit, General Motors designs and manufactures a wide variety of vehicles that meet the needs and expectations of drivers around the globe. With a passion to earn customers for life, GM is always working to improve their driving experience.

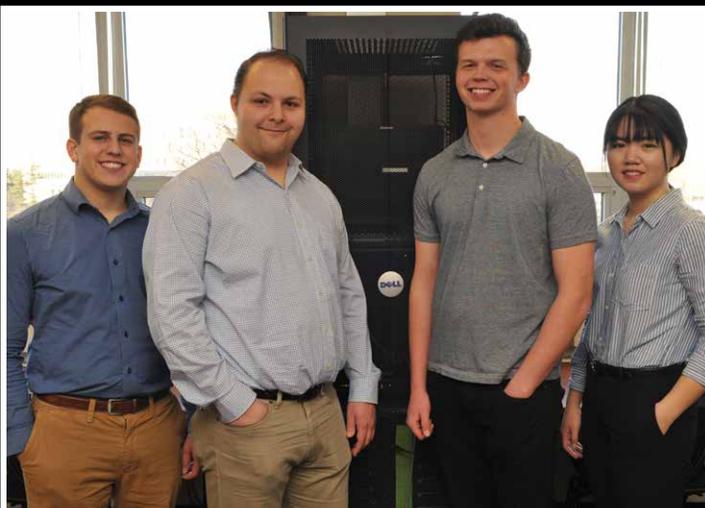
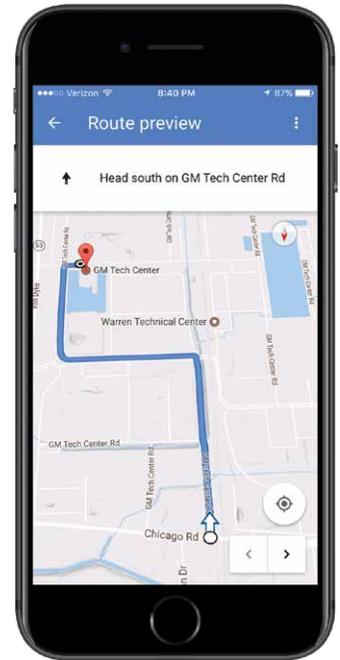
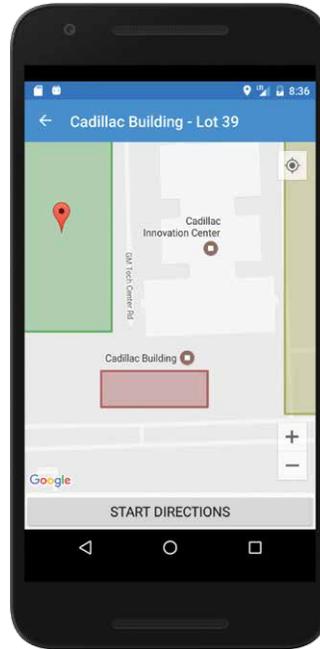
The GM Technical Center, located in Warren, Michigan, is the heart of the company's engineering effort. Consisting of 38 buildings and housing over 21,000 employees, the campus spans 710 acres.

Our GM Transportation Experience App is designed to ease the stress that comes with navigating the large GM Technical Center campus by guiding drivers to a parking lot with open spaces that is near their destination.

After a user selects a building destination, our app finds the parking lots within the proximity of that building and analyzes historical data associated with those lots to determine which lot has the highest chance of containing an open parking spot. The user is then directed to this lot via Google Maps.

Since our app is intended for use primarily while driving, a key component to its design is simplicity. Users enter their destination building before driving. While driving, our app guides them with voice prompts to the best parking lot for their building destination on the GM Technical Center campus.

Written using Xamarin, the GM Transportation Experience mobile application runs on both Apple iPhones (iOS) and Google Android devices.



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Humana Humana Kids

Humana provides many innovative products, services and business practices that help consumers make healthcare decisions with confidence.

As one of its goals, Humana aims to improve the health of their members by 20%. With childhood obesity doubling in children and quadrupling in adolescents, there is a need to counteract the recent growth of unhealthy lifestyles.

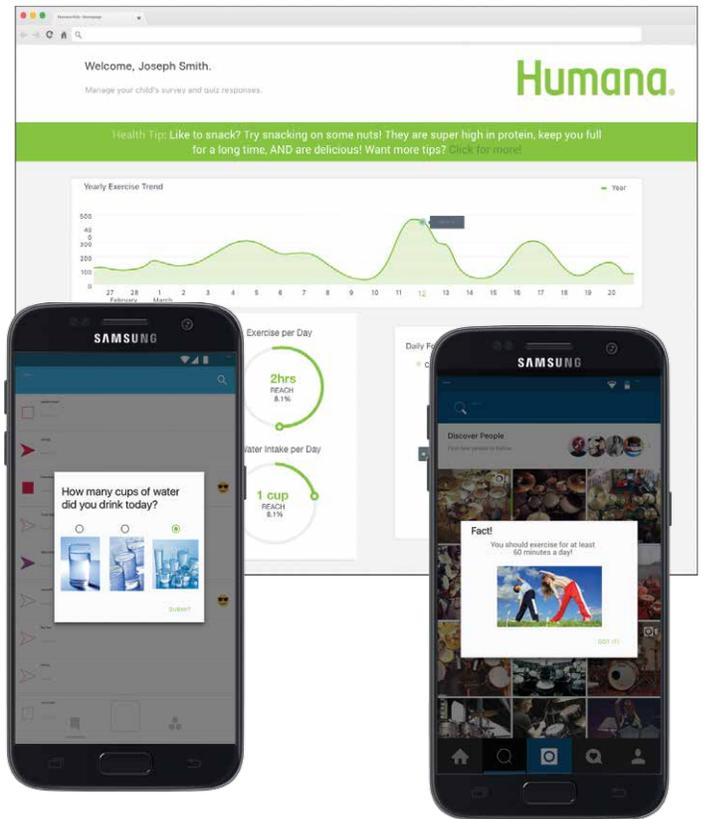
Our Humana Kids Android mobile app educates children and parents about nutrition and exercise through a series of pop-up surveys, tips and challenges that promote healthy living.

Humana Kids allows parents to switch our app to “Child Mode” in which health and exercise related pop-ups appear while their child uses their device. To incentivize children to make healthy choices, coins and badges are awarded for positive responses on surveys, which determine their ranking compared to other users.

Parents view their child’s health trends through our companion web app. Graphs generated from their child’s responses visualize the current results. Parents receive tips tailored to their child to promote further healthy choices.

Humana administrators use our companion web app to view graphs displaying general health trends of all users. Humana administrators can modify and add surveys, tips and recipes.

Our mobile app is written in Java and runs on any Android device. Our web app is written in Python and utilizes the Django framework. Both are interfaced with a REST API connected to a SQLite database.



Humana



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The Capstone Experience

Meijer MyMeijer: Crowdsourcing Shopping

Meijer is a large supercenter chain located in the Midwest. With over 200 stores, Meijer is one of the largest retailers and private companies in the nation.

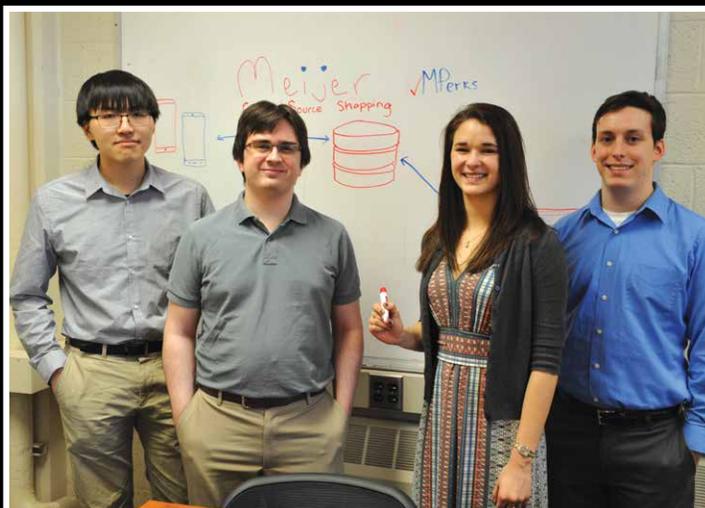
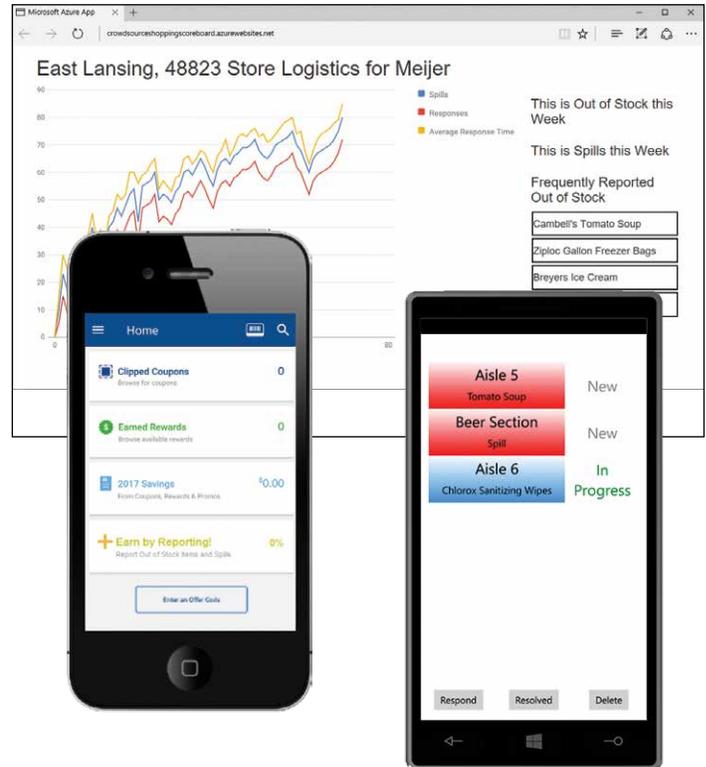
Our MyMeijer Crowdsourcing Shopping mobile app improves the shopping experience at Meijer stores by enabling customers to report potential issues within the store to Meijer team members immediately so they can be resolved quickly. Issues may include out-of-stock merchandise, spills or any other hazards.

Customers use Meijer's mPerks loyalty program to save money by redeeming digital coupons and rewards. Customers can now earn mPerks points toward rewards by using our MyMeijer app to report issues while shopping.

Meijer in-store team members use our companion Bluebird mobile app to respond quickly to push notifications sent to them by our system about issues noticed by shoppers.

All reported issues and resolutions are logged in a central Meijer database. Meijer managers use our companion Corporate Scoreboard app to detect frequently out-of-stock items and issues at Meijer stores across the country. It displays statistics collected from the customer reports, which assist Meijer management in running their stores efficiently.

Our MyMeijer Crowdsourcing Shopping system is written using Xamarin. The customer app runs on Apple (iOS) and Google Android devices; the Meijer team member app runs on Windows. The Corporate Scoreboard web app is written using .NET framework and hosted on Azure Cloud Services.



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Michigan State University CATAlyst: Mapping CATA Buses in Real-Time

Michigan State University has one of the largest campuses in the nation, with more than 500 buildings on 5,000 acres. The Capital Area Transportation Authority (CATA) is the public transit service that services both Michigan State University and the greater Lansing area.

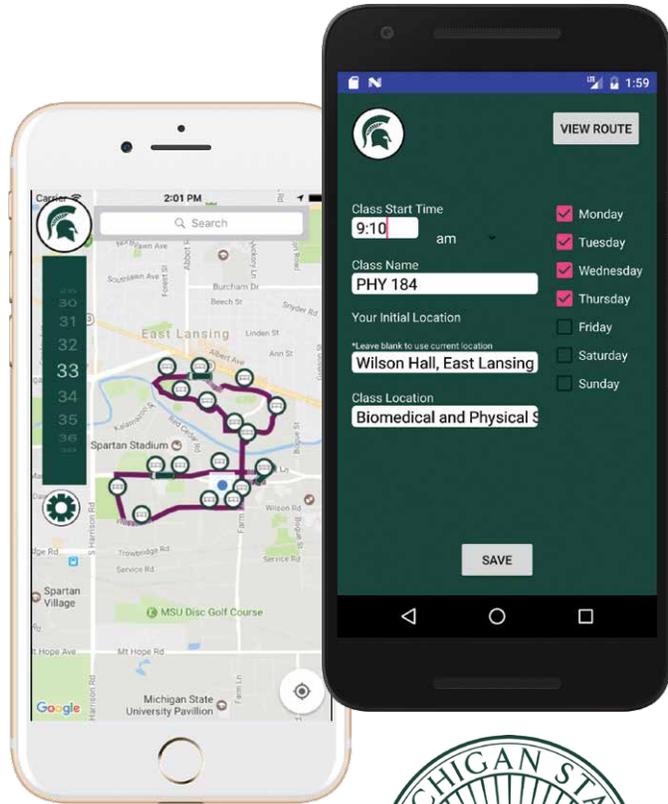
With over 30 routes, the CATA bus system is complex. Our mobile app CATAlyst enables riders using CATA to navigate the bus system easily and to arrive at their destination on time.

CATAlyst users select and view bus routes integrated within Google Maps. They can view all buses moving in real-time and all stops on a particular route. The arrival time of the next bus is displayed simply by selecting a specific stop.

Users can create and save weekly scheduled trips for classes and other events. CATAlyst maps out the best routes for a trip based on all available routes and the time of day.

CATAlyst sends a push notification to a user's mobile phone, notifying them when to leave for a scheduled trip. The push notification includes the time it takes to walk to a specific bus stop from their starting location and the total estimated trip time.

CATAlyst is a mobile app written in Swift for Apple iPhones (iOS) and Java for Google Android phones using CATA real-time data. The server side utilizes RESTful APIs written in Java, using Maven and Spring Boot on an Ubuntu 16.04 Server with a MySQL database.



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Microsoft Intune Company Portal Helper Bot

Headquartered in Redmond, Washington, Microsoft is one of the largest software and hardware companies in the country. They are leaders and innovators in all areas of technology.

Microsoft's Intune provides mobile device management, mobile application management and PC management capabilities from the cloud. Using Intune, organizations can provide their employees with access to corporate applications, data and resources from virtually anywhere on almost any device, while helping to keep corporate information secure.

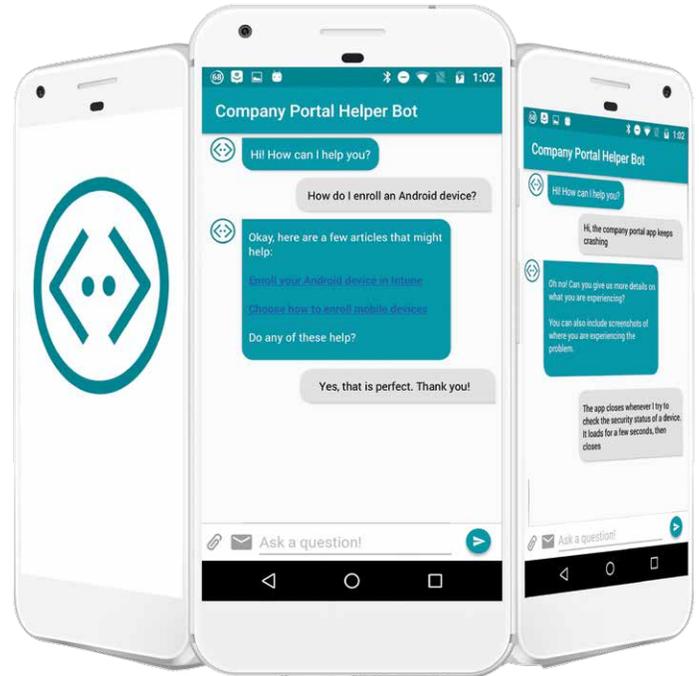
Our Intune Company Portal Helper Bot is an automatic chat bot that interacts with users when they experience problems inside the Microsoft Intune Company Portal app, which connects to Microsoft's internal Intune mobile management system.

As the Intune user base grows, the need to assist individual users experiencing issues grows as well. To help meet this increasing demand, our helper bot provides automated real-time help to Intune users to resolve their problems.

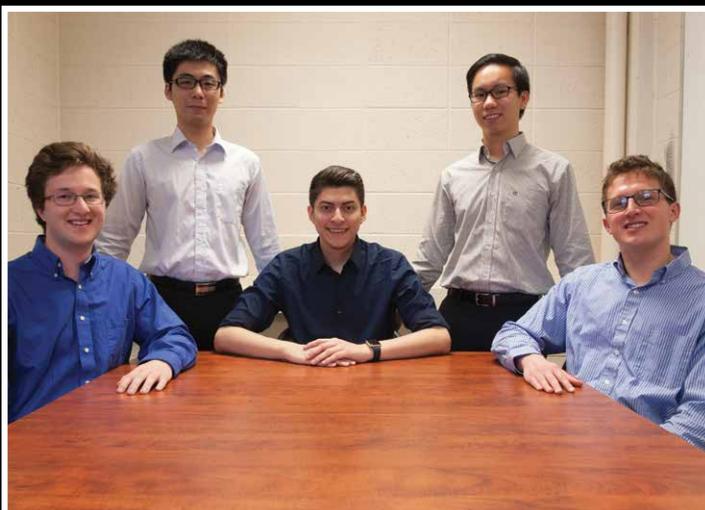
Users ask our bot questions related to their issue. Our bot searches through its curated database of documents to find articles related to the user's problem. The bot sends the articles it finds to the user for review.

If our helper bot is unable to find an article that resolves the user's issue, the user can submit a bug report for the Microsoft Intune Company Portal team to investigate further.

Our bot is written using .NET, Java and Microsoft's Bot Framework. The app runs on Android devices and is deployed using Microsoft Azure cloud services.



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Mozilla Corporation Improvements to Firefox's about:preferences

Web browsers are an integral part of everyone's internet experience. Mozilla's Firefox is a leader in the web browsing community. With an international community of developers, Firefox is one of the world's largest open source projects.

Firefox users can change Firefox's default look and feel using about:preferences, which enables users to change anything from the default font to the default search engine.

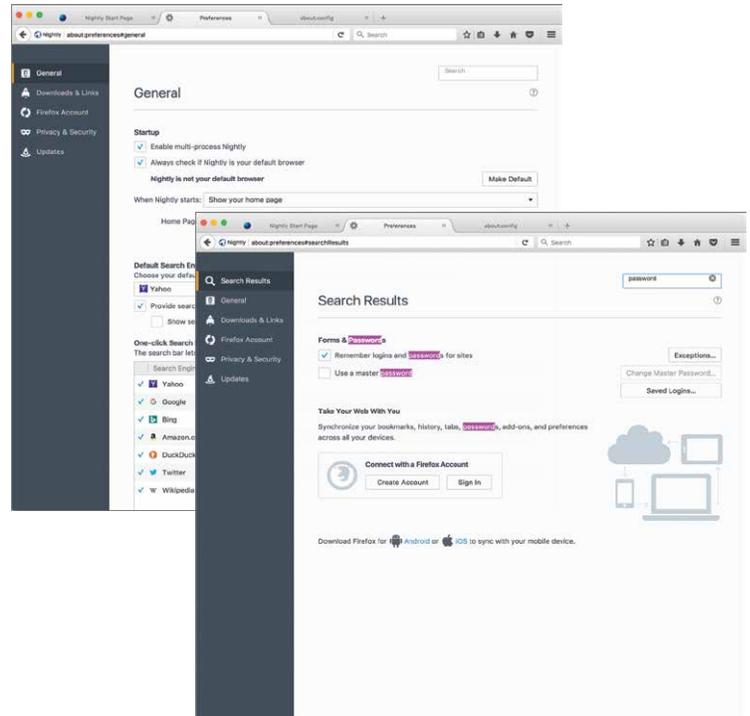
Our improvements to Firefox's about:preferences give Firefox's 450 million users an enhanced customization experience on macOS, Windows and Linux.

Firefox users must navigate a series of tabs and pages in about:preferences to find a particular preference they wish to change. With design specifications from the User Experience team at Mozilla, these tabs and pages are now organized to make it easier for a user to find particular preferences.

Even with the improved organization, finding a particular preference among so many can still be a challenge. To this end, our improvements include a new search functionality with which users can find preferences easily and quickly.

We use Mozilla telemetry probes within Firefox to measure the impact of each of our improvements to about:preferences to determine their effectiveness.

Our code is written in JavaScript, CSS and XUL. XUL is the user interface markup language that Mozilla uses to develop Firefox.



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MSU Federal Credit Union Banking with Amazon's Alexa and Apple's Siri

Founded in 1937, Michigan State University Federal Credit Union offers financial services to Michigan State University and Oakland University faculty, staff, students, alumni association members and their families. With 230,000 members and over \$3.3 billion in assets, MSUFCU is the largest university-based credit union in the world.

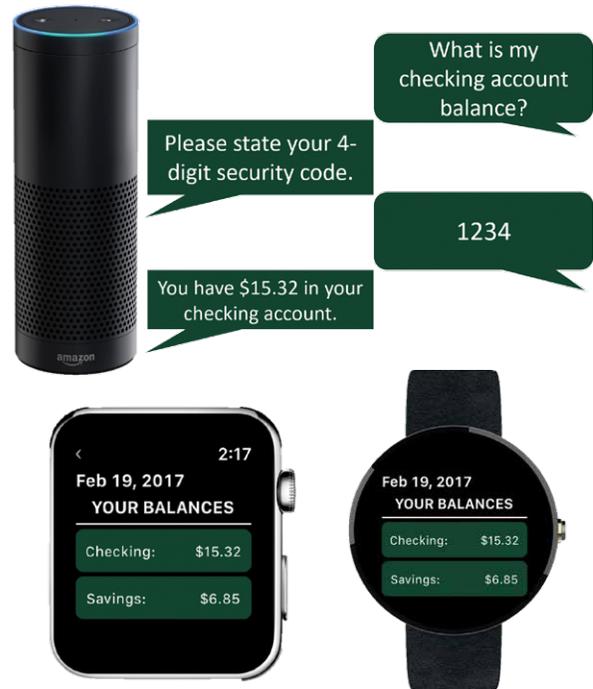
MSUFCU currently offers mobile banking apps on both Apple (iOS) and Google Android devices for members to access their funds and perform banking transactions at any time.

Our Banking with Amazon's Alexa and Apple's Siri systems maintain MSUFCU's technological edge by expanding their banking offerings to voice-controlled smart devices such as Amazon Alexa-enabled devices, Apple Watch and Android Wear.

Voice-controlled technologies give MSUFCU members new ways to interact with their accounts, including accessing their account balance, transferring money and obtaining information about recent transactions. Members can request other information about MSUFCU such as branch hours, current loan rates and the location of the nearest ATM or Branch.

Our companion administrative web portal enables MSUFCU staff to manage the available information and services offered by these voice technologies. Frequently asked questions can be added to the apps in minutes to improve the user experience.

The Alexa skill is written in Python, Apple Watch in Swift and Android Wear in Java. All three contact a MySQL database through JSON. The administrative web portal is written in PHP.



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Rook Security

Force Platform Ingestion Tool (PIT)

Rook Security, based in Indianapolis, Indiana, is a managed threat response force that is dedicated to providing global IT security solutions that anticipate, manage and eliminate threats.

As the number and types of devices connected to the Internet increase, the need to protect those devices from attackers is increasing as well.

To this end, Rook Security provides their Force platform, which is a tool that streamlines the process of handling incoming security alerts, thereby increasing the efficiency of Rook's in-house security analysts and lowering response times to threats.

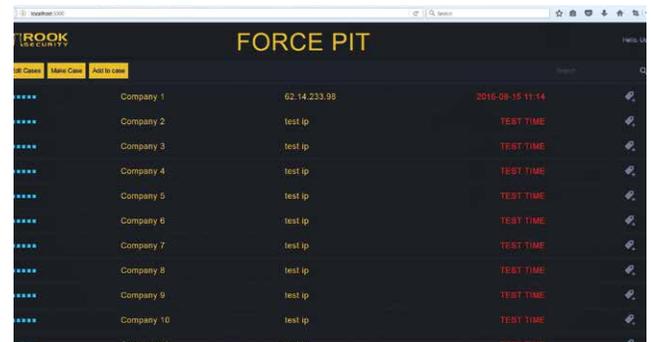
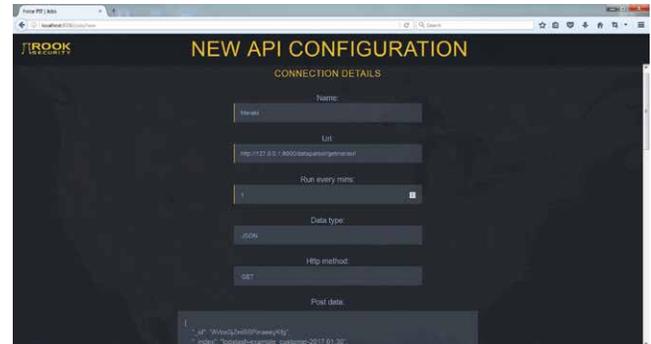
Our Force Platform Ingestion Tool with Alert Correlation system is a tool that processes security alerts from Rook clients for ingestion into the Force platform.

When a security alert is received by the Force platform, our system processes the alert by extracting key information and by analyzing the alert to determine whether it relates to other recent alerts, potentially grouping it into a larger case automatically.

Rook security analysts view these security alerts and respond accordingly depending on the type of attack, the source of the threat, the threat level and other relevant information.

Our system also enables Rook analysts to create connections with new clients to route their alerts into Force to be monitored.

Our Force Platform Ingestion Tool with Alert Correlation system runs on a Python Django web platform, using React/Redux JavaScript libraries, and is accessible by any modern web browser.



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Spectrum Health Resident Physician Tracking

Spectrum Health provides high quality healthcare in Western Michigan through 10 hospitals, 7 urgent care centers and 33 laboratories. Together, Spectrum Health employs nearly 3,100 physicians, residents and advanced practitioners.

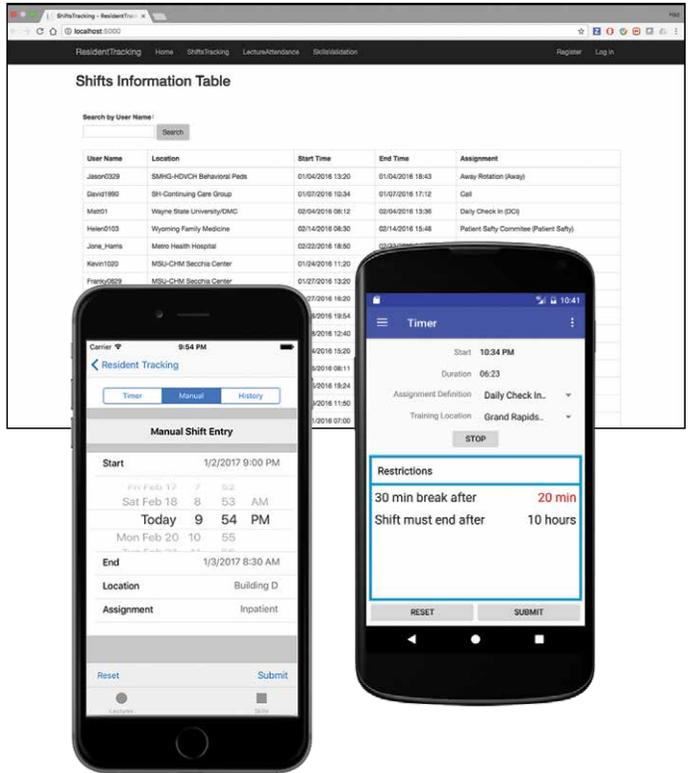
After graduating from medical school, physicians train for a number of years as resident physicians at hospitals before becoming certified in their field of specialty.

Hospital resident physicians are limited by federal regulations in the number of hours they may work in a single shift, so they must keep track of their shift times accurately.

Resident physicians click the Start button on our mobile app to begin their shift. Push notifications alert the resident if they are approaching a shift time limit per federal regulations. Clocking out is as simple as pressing the Stop button. Our app provides for manual time entry if the resident forgets to start or end their shift.

Administrators called Resident Coordinators use our companion web app to manage groups of residents. Resident Coordinators can view clock-in and out times, see shift data by resident, and select a date range for the shift display. An Export button exports data for importing into Excel.

Our Resident Physician Tracking system utilizes Swift for Apple (iOS) devices and Java for Google Android devices. It uses ASP.NET Core MVC with .NET Core and Entity Framework for its API.



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TechSmith Teacher's Virtual Toolbelt

TechSmith provides simple and intuitive visual communication software for both academic and business environments.

Teaching some subjects, such as physics, is often a challenge. It is difficult to depict physical forces and objects visually.

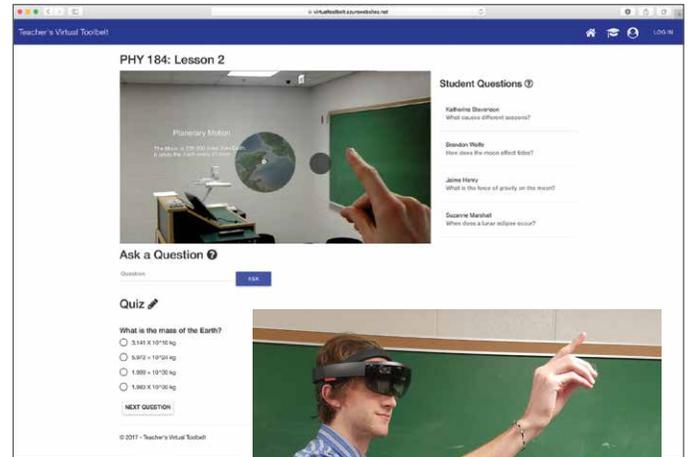
Our Teacher's Virtual Toolbelt uses the Microsoft HoloLens augmented reality device as a teaching tool to better illustrate challenging subjects and concepts using holograms. By combining a HoloLens app and a web app, this tool allows for collaboration between students and teachers.

Our HoloLens app is used by the teacher. It provides a set of basic holograms such as cubes, spheres and arrows. The HoloLens enables the teacher to interact with these holograms in a 3D space using hand gestures and voice commands.

The teacher uses our web app to plan lessons that include quizzes and textual reference material. Students use the web app to view live lessons and take quizzes. Students submit questions that are visible to the teacher in the HoloLens. The teacher starts the lessons and quizzes using voice commands.

The teacher's augmented view of the holograms is streamed from the HoloLens to the web application, allowing students to see the holograms as the teacher conducts the lesson. This mixed reality stream lets an entire group of students benefit from the capabilities of one HoloLens device.

Our HoloLens app is written in Unity. Our web app uses the .NET Web API framework, and is written in C# and JavaScript. The web app and SQL database are hosted on the Microsoft Azure Cloud.



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TWO MEN AND A TRUCK® Mobile Mini “Movers Who Care”

TWO MEN AND A TRUCK®, founded in 1985, is the largest franchised moving company in the United States. Headquartered in Lansing, Michigan, it has franchises located throughout four different countries.

TWO MEN AND A TRUCK® has grown its operations considerably over the years and prides itself on providing friendly and efficient services to their customers.

Our Mobile Mini “Movers Who Care” is a mobile 2D driving game that enhances the company’s friendly image by focusing on children during a move. Moving can be a difficult and often times boring process for a child, so this mobile application serves as the perfect distraction.

Game users drive a moving truck, playing through five levels, each with different terrain, and three difficulties, each with different box types. The objective of the game is to deliver as many boxes to the house as possible. Points are earned based on the time taken to complete the level, the selected difficulty and the number of boxes kept intact.

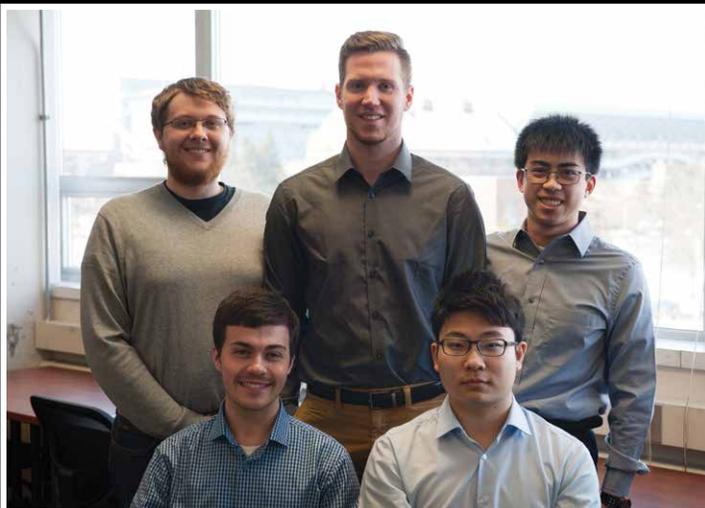
Players collect coins in each level. Collecting and saving coins enables players to purchase one-time use items and permanent truck upgrades from the store. These upgrades help them complete more challenging levels and difficulties.

Mobile Mini “Movers Who Care” works on both Apple iPhones and iPads (iOS) and Google Android devices. Players have the option to compete by posting scores to a leaderboard via Facebook. The game is written in Unity’s version of Microsoft Visual Studio using C#.



**TWO MEN
AND A
TRUCK®**

“Movers Who Care.”



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Union Pacific Learning New Train Routes

Union Pacific is a leading transportation company headquartered in Omaha, Nebraska. Union Pacific has over 8,500 locomotives running on 32,100 miles of track across 23 states with over 44,500 employees.

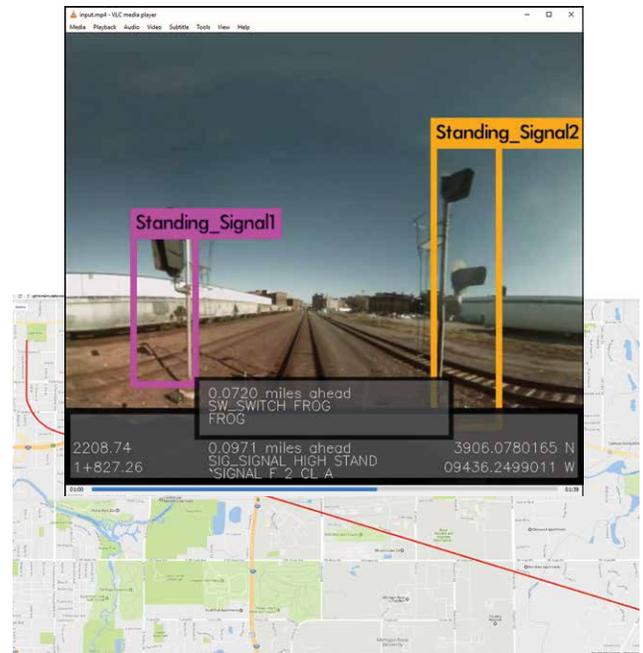
When Union Pacific assigns an engineer or conductor to a new train route, they must learn the new route by riding along on a train with another engineer or conductor who already knows the route. This process can take days for each new train route to be learned, resulting in millions of dollars spent annually as multiple engineers and conductors learn multiple routes.

Our Learning New Train Routes system is an augmented reality software that uses actual video of the train route taken by cameras mounted on engines. Our software overlays this video with important information including mile markers, train speed and important landmarks such as signals and switches.

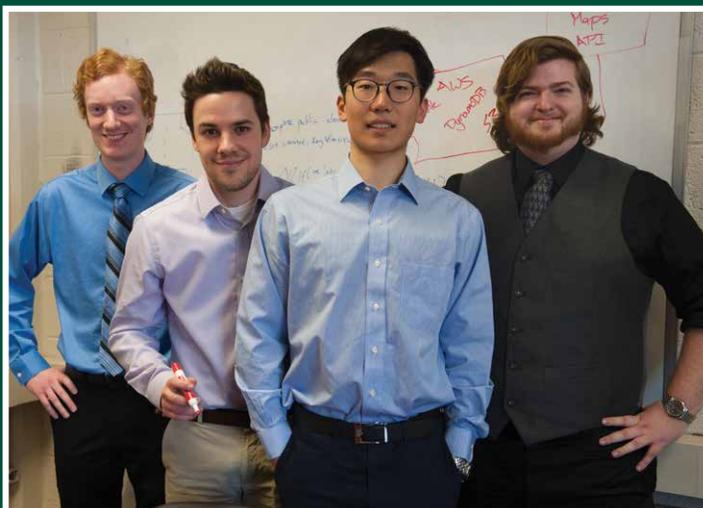
Engineers and conductors use our companion web app to view an augmented reality video of a new train route. They can view videos from anywhere, at any time, and on any web-browsing device.

A Google Maps display shows the train's progress along the route. Engineers and conductors can move around in the video by clicking on the map. In particular, they can replay sections of track to ensure that they learn the new train route well.

Our Learning New Train Routes system is written in Python and utilizes OpenCV and Darknet for image recognition. HTML, CSS and JavaScript are used for the web app.



BUILDING AMERICA®



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Urban Science Real-Time Ad Campaign Management

Urban Science is a global consulting firm headquartered in Detroit, which specializes in industries that include automotive, health and retail. Urban Science uses the combination of science and technology to identify and improve market share, sales, profitability and customer loyalty.

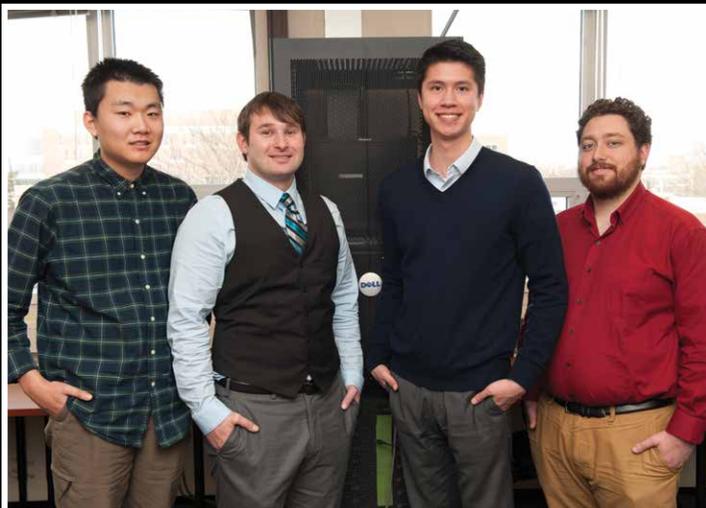
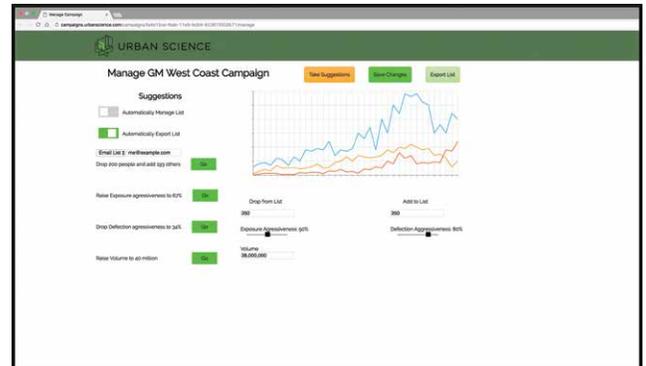
Within the automotive industry, Urban Science aims to improve marketing campaign efficiency for which a common challenge is to target potential likely buyers while avoiding advertising to customers who are not interested in buying a new vehicle.

Our Real-Time Ad Campaign Management recommendation system helps automobile ad campaign managers optimize their marketing campaign budgets by targeting optimal potential buyers.

Our system uses various real-time online and offline marketing data to improve marketing campaigns by making various recommendations such as removing customers from mailing lists and accurately predicting which customers would be most likely to purchase a vehicle.

Using our intuitive interface, ad campaign managers have the option to implement the recommended improvements to their campaign allowing them to make tactical decisions and impact campaign execution and results in real-time.

Our Real-Time Ad Campaign Management recommendation system is written in C# using .NET Core 1.0 as a platform. The control panel interface is built with HTML, CSS and JavaScript with the Vue.js framework. Data is stored in a Neo4j graph database.



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Whirlpool Corporation Commercial Laundry Dashboard

The Whirlpool Corporation is the number one manufacturer of major appliances in the world, with approximately \$20 billion in annual sales in some 170 countries around the world.

Whirlpool sells commercial laundry equipment to a number of trade partners including apartment complexes, laundromats, hotels, hospitals and more, which creates a large global fleet of appliances.

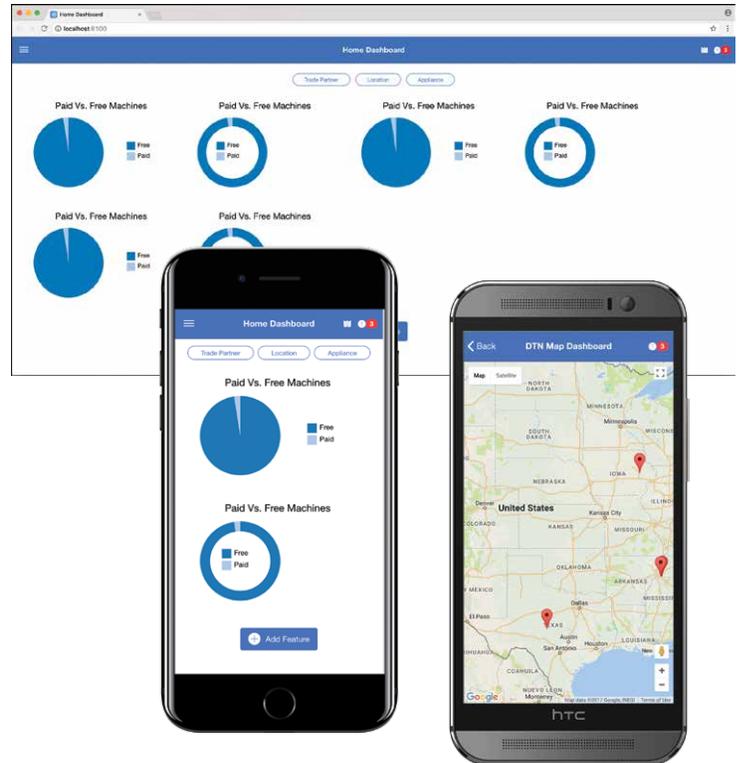
Whirlpool's commercial laundromat equipment is connected to the Internet via a black box called the MC360, which enables Whirlpool to gather data from all of this equipment from all over the world in real time.

Our Commercial Laundry Dashboard provides Whirlpool administrators with the ability to view the collective data from all of their machines. Our intuitive visual interface enables them to monitor the equipment of their trade partners and alert them to potential problems through the use of push notifications.

Users can customize their dashboard by adding and removing visual features, filtering among various options, and switching between the dashboard and an interactive map of their trade partner locations.

In addition, users can organize important data by creating custom dashboards where static filters are set.

Our Commercial Laundry Dashboard runs on Apple (iOS) devices, on Google Android devices and in modern web browsers. It is developed using Google App Engine, Cordova Ionic, Flask, D3.js and PostgreSQL.



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The Capstone Experience

Yello

YelloVision: Career Fair Augmented Reality App

Yello, headquartered in Chicago, Illinois, provides software solutions to enable companies to hire new employees as quickly and efficiently as possible.

While there exist numerous software systems for companies to manage information about applicants at career fairs, there is a lack of software for applicants to manage information about companies.

While attending a career fair, applicants have limited time to explore dozens or even hundreds of companies, forcing them to make important life decisions quickly, based on limited information.

Our YelloVision Career Fair Augmented Reality app is designed to help applicants to make informed decisions about potential employers while attending a career fair.

Using YelloVision, a career fair applicant looks up information about a company simply by using their phone camera to scan a company's logo at their booth. After identifying a company by its logo, our app displays the company's name, locations and the majors it is looking to hire. A "More Details" button provides access to more comprehensive information.

In addition to its augmented reality feature, YelloVision supports searching by company name in cases when an applicant does not want to use the logo search feature or the applicant cannot find a logo at a company's booth.

Our YelloVision Career Fair Augmented Reality app is built using Objective C in Xcode for Apple (iOS) devices and using Java in Android Studio for Google Android devices.



yello



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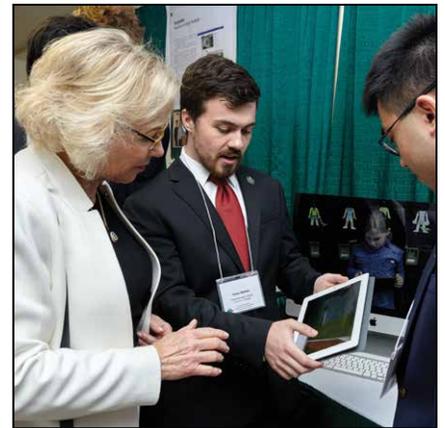
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Design Day



Design Day Award Winners

Fall 2016

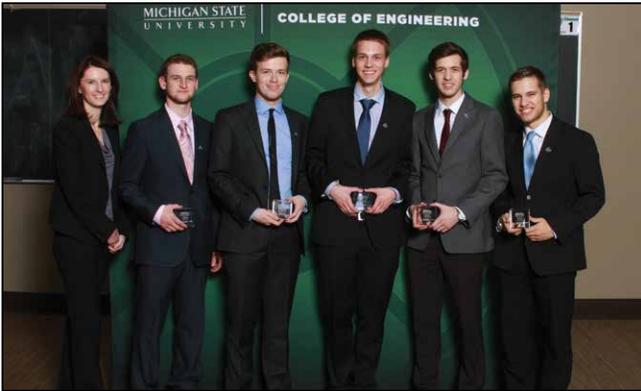
Spring 2017



Auto-Owners Exposition Award
Team Whirlpool



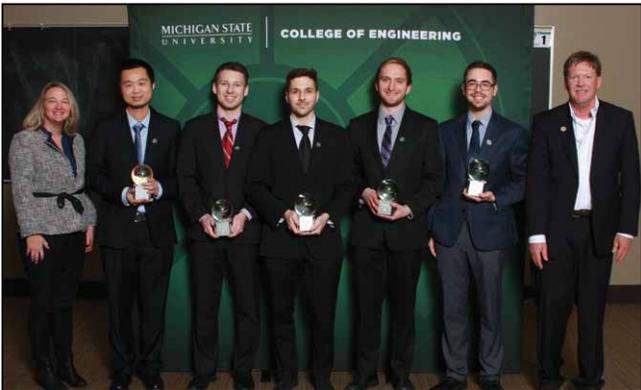
Auto-Owners Exposition Award
Team TechSmith



MSU Federal Credit Union Praxis Award
Team Rook



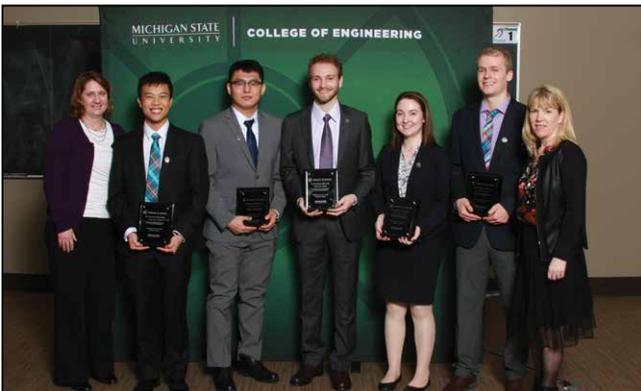
MSU Federal Credit Union Praxis Award
Team Union Pacific



TechSmith Screencast Award
Team Ford



TechSmith Screencast Award
Team Amazon



Urban Science Sigma Award
Team Amazon



Urban Science Sigma Award
Team Michigan State University

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