The Capstone Experience

Dr. Wayne Dyksen
Department of Computer Science and Engineering
Michigan State University
Fall 2018
Course Goals

• Build a Significant Software System
• Work in a Team Environment
• Learn New Tools and Environments
• Build and Administer Systems
• Develop Communication Skills
• Develop Interview Talking Points
• Consider Issues of Ethics and Professionalism
Course Goals

• Teams of Students
• Build Significant Software System
  ▪ Design
  ▪ Develop
  ▪ Debug
  ▪ Document
  ▪ Deliver
• For Corporate Clients
• In 15 (Short) Weeks
Project Deliverables

- Project Plan Document & Presentation
- Alpha Presentation
- Beta Presentation
- Project Software & Documentation
- Project Video
- Design Day

See Major Milestones.
All-Hands Meetings

• MW, 3:00-4:20 p.m., 1279 Anthony Hall
• Presentations By
  ▪ Professor
  ▪ Teams
    o Status Report Presentations
    o Formal Presentations
      ➢ Project Plan
      ➢ Alpha
      ➢ Beta
    o Project Videos
  ▪ Guest Speakers
All-Hands Meetings

- 08/29: Capstone Overview
- 09/03: (Labor Day, No Meeting)
- 09/05: Project Plan
- 09/10: Team Status Report Presentations
- 09/12: Risks and Prototypes
- 09/17: Schedule and Teamwork
- 09/19: Resume Writing and Interviewing
- 09/24: Team Project Plan Presentations
- 09/26: Team Project Plan Presentations
- 10/01: Team Project Plan Presentations
- 10/03: Team Project Plan Presentations
- 10/08: Creating and Giving Presentations
- 10/10: Team Status Report Presentations
- 10/15: Team Alpha Presentations
- 10/17: Team Alpha Presentations
- 10/22: Team Alpha Presentations
- 10/24: Team Alpha Presentations
- 10/29: Design Day and the Project Videos
- 10/31: Camtasia Demo
- 11/05: Intellectual Property
- 11/07: Ethics and Professionalism
- 11/12: Team Beta Presentations
- 11/14: Team Beta Presentations
- 11/19: Team Beta Presentations
- 11/21: Team Status Reports
- 11/26: Team Beta Presentations
- 11/28: Team Status Reports
- 12/03: Project Videos
- 12/05: Project Videos and All Deliverables
- 12/06: Design Day Setup
- 12/07: Design Day
- 12/11: Project Videos
The Capstone Experience

Team Amazon

Department of Computer Science and Engineering
Michigan State University
Fall 2018
INTERESTING FINDS UPDATED DAILY

YOUR MIX    EXPLORE    YOUR ❤️

FUN

- Glass Bottle
- Hanging Planter
- Crystal Cluster
- Pink Camera
AVAST: Amazon Video And Shopping Technology

- Functionalities
  - Leverage Growing Internet Video Watching
  - Market Amazon Products in Contextual and Personalized Ways
- Features
  - Identify Items of Interest in Videos Automatically
    - People
    - Places
    - Things
  - Search for Relevant Amazon Products
  - Display Links to Amazon Product Pages
  - Provide Front-End JavaScript Framework
- Technologies
  - Amazon Web Services (AWS)
    - Rekognition / Komprehend
    - API Gateway
    - Lambda
    - Elastic Compute Cloud (EC2)
    - Command Line Interface (CLI)
    - Product Advertising API
  - JavaScript / React or Angular or Vue
  - Restful Web Services
Team Amazon
Linhshawn Fang, Ben Nwachukwu, Patrick McCormick, Ian McGregor, Han Wang
Team Amazon
Project Plan Presentation
Team Amazon
Project Plan Presentation

Architecture Diagram

AWS

MSU Team Amazon AVAST

Product recommendations

User

Video served to user

Video sent to backend

Handle login to various services &
Get video feed from services

Third Party

Amazon Shopping API

Identifiable Items

Amazon RDS

Products

Log in with

Token

Angular

AVAST

User authentication

Rekognition

AWS
Team Amazon
Project Plan Presentation

Screen Mockup
Team Amazon
Alpha Presentation
Introducing Amazon Echo

BrandonYT
Published on January 10, 2017

Go buy from - http://amzn.to/2ie3UHM
The Capstone Experience

Team Aptiv

Department of Computer Science and Engineering
Michigan State University
Fall 2018
YOU ARE BORN TO MOVE.

JOIN OUR TEAM
Team Aptiv
Project Overview

Autonomous Vehicle Fleet Connectivity Apps

• Functionalities
  ▪ Provide Connectivity to Autonomous Vehicle Test Fleet
  ▪ Via Mobile and Web Apps

• Features
  ▪ Enable Scheduling Vehicles for Use
  ▪ Provide Real-Time Access to Vehicle Data
    (Location, Speed, Current User, Etc.)
  ▪ Handle Various Roles
    (Drive, Engineer and Manager)
  ▪ Support Web, Android and Apple iOS
  ▪ Integrate Apps Into Existing Aptiv Tool
  ▪ Create Complete Documentation

• Technologies
  ▪ Autonomous Vehicle Technologies
  ▪ Aptiv AMDAS
  ▪ CSS / HTML / PHP / JavaScript
  ▪ Apple iOS / Swift
  ▪ Google Android / Java
Team Aptiv
Alex Patton, Drew Glapa, Emilio Castillo, Klint Kaercher, Chad Krause
Team Aptiv
Project Plan Presentation

Screen Mockup
Team Aptiv
Project Plan Presentation

Architecture Diagram

Fig. 5.1

Fig. 5.2

Fig. 5.3

AMDAS

OnBoard

OffBoard

Microsoft Azure

SQL

.NET

CLI

node

The Capstone Experience
Team Aptiv
Project Plan Presentation
Team Aptiv
Project Plan Presentation

Screen Mockup
Team Aptiv
Alpha Presentation

Search Interface

Type a date MM/DD/YY or choose a...

Select a vehicle

Recent Cars

White Lincoln MKC
1FGDB4JU0MM195186

Red Audi S5
KLFA8523JK9J57204

Grey BMW X5
LBW86XZ5MB396552

The Capstone Experience
Team Aptiv
Alpha Presentation

Reservation Creation
Team Aptiv
Alpha Presentation
Team Aptiv
Alpha Presentation

Vehicle Status Page
Team Aptiv
Beta Presentation
Vehicle Status Page
Team Aptiv
Beta Presentation

Reservation Creation Page

[Image of a mobile application interface for a reservation creation page. The interface includes fields for vehicle selection, date selection, driver name, start and end times, and options to book overnight.]

The Capstone Experience
My Reservations Page

My Reservations

- November 1 10:30 AM
  - Blue BMW 5 Series
  - Location: Troy, MI
  - Driver: Ross Maguire

- October 28 7:30 AM
  - Red Chevrolet Tahoe
  - Location: Dublin, Ireland
  - Driver: Joe Lyon

- October 25 6:00 PM
  - Red Audi S5
  - Location: Kokomo, IN
  - Driver: Klint Knechta

- October 25 4:00 PM
  - White Lexus LFA

- October 21 11:00 AM
The Capstone Experience

Team Auto-Owners

Department of Computer Science and Engineering
Michigan State University
Fall 2018
Auto-Owners Insurance
Life • Home • Car • Business
Team Auto-Owners
Project Overview

Jeffrey: Virtual Insurance Claim Advisor

- Functionalities
  - Simplify Insurance Claim Submission
  - Use Voice Recognition and Natural Language Processing
- Features
  - Provide Easy-To-Use Voice Interaction
  - Handle Various Roles
    (Policyholder, Agent, Auto-Owners Associate)
  - Handle Various Claims
    (Home and Auto)
  - Build
    - Mobile Interface for Policyholders
    - Web Interface for Agents and Auto-Owners Associates
  - Utilize GPS for Detecting Location
  - Enable Uploading of Images and Video
  - Format and Submit to Claim System
  - Send Confirmation Messages
- Technologies
  - Natural Language Processing (NLP)
  - Image and Video Processing
  - Global Positioning System (GPS)
  - CSS / HTML / PHP / JavaScript
  - Apple iOS / Swift
  - Google Android / Java
Team Auto-Owners
Alex Klingel, Connor Stabnick, Nabiha Biviji, Michael Dickmann
Team Auto-Owners
Project Plan Presentation

Screen Mockup
Team Auto-Owners
Project Plan Presentation
Team Auto-Owners
Project Plan Presentation

Architecture Diagram

- Natural Language Processing
  - Dialogflow

- Web Portal
- MySQL Database
- Jeffrey Web Service API
- Capstone Server

- Smartphone Application
  - Google Assistant
  - Android
# Team Auto-Owners

## Project Plan Presentation

Screen Mockup

![Dashboard](Image)

### Bert Renoylds - 330-876543-2018

- **Date of Loss:** 10/10/2018
- **Phone:**
  - **Home:** 45-454545-2018
  - **Cell:** 222-222222-2018

### Claim Information

<table>
<thead>
<tr>
<th>Claim Status</th>
<th>Claim Number</th>
<th>Date of Loss</th>
<th>Claimant Name</th>
<th>Claimant Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active</td>
<td>330-876543-2018</td>
<td>10/10/2018</td>
<td>Joseph Gregory</td>
<td>222-222222-2018</td>
</tr>
</tbody>
</table>

### Policy Information

- **Policy Number:** 330-876543-2018
- **Effective Date:** 01/01/2018
- **Expiration Date:** 12/31/2018

### Claim Details

- **Claimant:** Joseph Gregory
- **Address:** 123 Main St, Anytown, USA

### Contact Information

- **Insurer:** Auto-Owners Insurance
- **Agent:** Jeff Jefferson
- **Phone:** 248-555-0123

---

*The Capstone Experience*
Team Auto-Owners
Alpha Presentation
Team Auto-Owners
Alpha Presentation

Welcome, Joseph!
- File a Claim
- Claim History

Jeffrey
Hello! I'm Jeffrey, your Virtual Insurance Claim Adviser. I heard you wanted to file a claim?

I'm sorry to hear that - who am I speaking with?
Joseph Gregons

Ok, Joseph, can you tell me what happened?
I got into a car accident while I was driving on I-69.

Looks like you were in a car accident - which car was involved?
2013 Ford Focus

Claim History
1. Claim #330-0000001-2018, Loss Date: 01/01/18
2. Claim #330-0000002-2018, Loss Date: 01/02/18
3. Claim #330-0000003-2018, Loss Date: 01/03/18
4. Claim #330-0000004-2018, Loss Date: 01/04/18
5. Claim #330-0000005-2018, Loss Date: 01/05/18
6. Claim #330-0000006-2018, Loss Date: 01/06/18
7. Claim #330-0000007-2018, Loss Date: 01/07/18
8. Claim #330-0000008-2018, Loss Date: 01/08/18
9. Claim #330-0000009-2018, Loss Date: 01/09/18
10. Claim #330-0000010-2018, Loss Date: 01/10/18

Jeffrey Android Application
Team Auto-Owners
Alpha Presentation

Web Portal - Dashboard

![Dashboard Image]

Joseph Gregors 330-876543-2018  Date of Loss: 12/22/2017

Loss Description
Claimant was driving down I-75 and was struck from behind by a semi-truck. Deer jumped on car and broke windshield, postcollision.

Loss Location
Lansing, MI 48917
6101 Anacapri Blvd

Risk Units
2017 Chevy Equinox

Assigned Claim Branch
Albany, MI

Notes
Insured brother was driving vehicle. Brother is not listed on policy. Uninsured motorist coverage present on policy.

<table>
<thead>
<tr>
<th>Report Date</th>
<th>Insured</th>
<th>Type</th>
<th>ClaimNumber</th>
<th>DOL</th>
<th>Contact</th>
<th>Contact Phone</th>
</tr>
</thead>
</table>

Return to Search
Team Auto-Owners
Alpha Presentation

Web Portal - Search
Team Auto-Owners
Beta Presentation

Welcome, Joseph!

Claim History
1 300-0000001-2018 2018-10-30

Settings
Voice
Voice: Default
Speech Rate: x1.25
Pitch: 0
Volume Gain: +0 dB

Camera
Save Photos/Videos: On
Team Auto-Owners
Beta Presentation

Android App
Team Auto-Owners

Beta Presentation

Web Portal
The Capstone Experience

Team Dow

Department of Computer Science and Engineering
Michigan State University
Fall 2018
Dow Innovation Leads the Way

We’re making vehicles safer, lighter, more efficient and more durable.

PLAY VIDEO

What can we help you find?

Search Here
Team Dow
Project Overview

IT Assistant

• Functionalities
  ▪ Provide IT Assistance to Dow Employees
  ▪ Adjust Dynamically Around Conversation
  ▪ Via Mobile and Web Apps

• Features
  ▪ Provide Natural Language Interface
  ▪ Adjust Content to Maximize Accuracy
    o Apply Machine Learning (ML)
    o Leverage Crowdsourcing
  ▪ Leverage Dow’s Existing Knowledge Base
  ▪ Scale to 80,000 Employees Worldwide
  ▪ Support Web, Google Android and Apple iOS

• Technologies
  ▪ Microsoft Azure
    o Language Understanding Intelligence Service (LUIS)
    o Machine Learning Services (ML)
    o Voice Assistants
  ▪ CSS / HTML / PHP / JavaScript
  ▪ Apple iOS / Swift
  ▪ Google Android / Java
Team Dow
Brandon Brooks, Keaton Coffman, Cassie Thompson, Charlie Benson
Team Dow
Project Plan Presentation

Screen Mockup

Dow's IT Assistant

Chat Now  Voice Now  Search Now  Chat Global  Call Global
Team Dow
Project Plan Presentation

Screen Mockup

The Capstone Experience
Team Dow
Alpha Presentation
Team Dow
Alpha Presentation
Password Reset via Mobile Device
Team Dow
Alpha Presentation

Form via Mobile Device

This is what we found for "Form":

QSD HOTSHEET Dow C..
Dow IT Assistant
with "DCC" in the SAP login pac
Yes – Redirect the client to submit the ERF Shared Access Request form. The form is
at http://manage-
info.intranet.dow.com/Forms/SA-
PPY_SA_UPNvap/Relative-
ticket/Packaging Request Form
v0.1.doc  No - Go to next step 8
All other application access issues
Follow normal
The Capstone Experience

Team Dow
Alpha Presentation

New Phone via Web
From Students…
…to Professionals

The Capstone Experience

Team Ford

Department of Computer Science and Engineering
Michigan State University
Fall 2018
Make Your Ride, Your Ride.

2019 MUSTANG

VIEW ALL CARS
Team Ford
Project Overview

Ford Customer App Review Dashboard

• Functionalities
  ▪ Summarize Customer Reviews of Ford Apps
  ▪ Generate Sentiment Analysis Dashboard

• Features
  ▪ Fetch Reviews from Google Play Store and iTunes
  ▪ Categorize Reviews Using Sentiment Analysis
  ▪ (From Very Negative to Very Positive)
  ▪ Visualize Sentiment Analysis via Dashboard
  ▪ Cascade Review Summaries to Slack Channel
  ▪ Provide Administrative Portal
  ▪ Create Full Stack of Microservices

• Technologies
  ▪ Java / Spring Framework
  ▪ Python Natural Language Toolkit
  ▪ Slack
  ▪ HTML5
  ▪ RESTful Web Services

Dearborn, Michigan
Team Ford
Mingkai Yang, Noah Keppers, Paul Friesen, Drew Morgan, Jordan Schroeder
Team Ford
Project Plan Presentation

Screen Mockup

Sentiment Analysis Dashboard

App Name: Ford Pass (Google Play)
Version: Latest
Dates: 9/1/2018 to 9/10/2018

OVERALL SENTIMENT:
- Very Positive (xx%)
- Positive (xx%)
- Neutral (xx%)
- Negative (xx%)
- Very Negative (xx%)

TOP KEYWORDS:

Positive Reviews:
1. xx% of positive reviews
2. xx% of positive reviews
3. xx% of positive reviews
4. xx% of positive reviews

Negative Reviews:
1. xx% of negative reviews
2. xx% of negative reviews
3. xx% of negative reviews
4. xx% of negative reviews

SENTIMENT OVER TIME:

% Positive Sentiment
% Negative Sentiment
Team Ford
Project Plan Presentation

Architecture Diagram

- Config DB
- Reviews DB
- Amazon DynamoDB

Databases

- Main API Module
- NLP API Module
- Reviews API Module

Backend

- Admin Portal
- Sentiment Dashboard

Frontend

- Angular
- Slack
- AWS Lambda
- Amazon S3
Team Ford
Project Plan Presentation

Screen Mockup

The Capstone Experience
Team Ford
Alpha Presentation

Web Dashboard (Comparing Apps)
Team Ford
Alpha Presentation

Slackbot Report

#general
5 new messages since 4:16 PM on October 14th

**Ford Analyst** 4:19 PM
@SentimentBot reviews 10-01-2018 10-31-2018

**SentimentBot** APP 4:19 PM
Review
appldStore: com.ford.fordpass*App Store
version: 2.4.1
date: 2018-10-09T21:23:23.000Z
neutral sent: 61
compound sent: 44
pos sent: 25
neg sent: 12

Review
appldStore: com.ford.fordpass*App Store
version: 2.4.1
date: 2018-10-09T21:23:23.000Z
Team Ford
Beta Presentation

Web Dashboard
Team Ford
Beta Presentation

Web Dashboard (Comparing Apps)
The Capstone Experience

Team Ford
Beta Presentation

Slackbot Report

---

#general

Sentiment Bot 8:45 AM
Report for:
App: FordPass (Google Play)
Version: 2.4.1

Between October 29 and November 05, sentiment has been mostly Negative for 67 reviews

## Overall Sentiment
- Positive: 37%
- Negative: 39%
- Neutral: 7%
- Mixed: 16%

## Keywords in Positive Reviews
- the app: 2.6%
- Love: 2.6%
- miles: 2.6%
- example screens: 1.3%

## Keywords in Negative Reviews
- the app: 4.55%
- my car: 3.64%
- this app: 2.73%
- the car: 2.73%

Report for:
App: FordPass (App Store)
Version: 2.4.1

Between October 29 and November 05, sentiment has been mostly Negative for 18 reviews

## Overall Sentiment
The Capstone Experience

Team Herman Miller

Department of Computer Science and Engineering
Michigan State University
Fall 2018
The Evolution of Comfort
A new seating experience from Studio 7.5
Meet Cosm
Team Herman Miller
Project Overview

FIBRE: Fabric Identification Based Recommendation Engine

• Functionalities
  ▪ Simplify Office Furniture Ordering
  ▪ Standardize (Normalize) Order Material Data
  ▪ Reduce Customer Requests
  ▪ Offer Alternative Recommendations

• Features
  ▪ Ingest New Materials Requests From Customer Orders
  ▪ Apply Computer Vision
    ▪ Inspect
    ▪ Categorize
    ▪ Tag
    ▪ Approve Or Decline
  ▪ Recommend Nearest Approved Alternative When Declined
  ▪ Support Various Herman Miller Systems via Open Framework
  ▪ Be Trainable, Scalable and Flexible

• Technologies
  ▪ Machine Learning / Deep Learning
  ▪ Python
  ▪ TensorFlow (Image Recognition)
Team Herman Miller
Ted Stacy, Ritwik Biswas, Joe Smith, David Xuan, Josh Bhattarai
Team Herman Miller
Project Plan Presentation

Material Classification Engine

Your submitted image

We didn’t find your material. Here are some alternatives.

- Material ID: 283992, 66% match
- Material ID: 439472, 65% match
- Material ID: 264284, 48% match
- Material ID: 103748, 32% match
Team Herman Miller
Project Plan Presentation

Architecture Diagram

AWS

Flask Web Client
AWS API Gateway
AWS Lambda Functions

AWS SageMaker
- Color Analysis Model Endpoint
- Pattern Analysis Model Endpoint
- Recommendation Engine

TensorFlow

GraphQL
Fabric Database

S3
- S3 Model Storage Bucket
- S3 Data Storage Bucket
Classification Result for 1 Fabric

Color: green
Pattern: solid texture

Recommendations
Classification Result for 1 Fabric

Color: yellow, brown
Pattern: woven
Classification Results for 6 Fabrics

- **Color:** beige  
  **Pattern:** solid texture
- **Color:** brown, gray, red, beige  
  **Pattern:** botanical
- **Color:** pink, white, beige, red, gray, violet  
  **Pattern:** abstract
- **Color:** orange, red  
  **Pattern:** solid texture
Customer's Requested Fabric

- Color: brown, gray, red, beige
- Pattern: botanical

Fabric Recommendations

- Hand Tinted Rose
- Whirl Breeze
- Kicksilver
- Scape Nighthawk
Team Herman Miller
Beta Presentation
Web-App Multiple Classifications
Team Herman Miller
Beta Presentation
Web-App Recommendation
Team Herman Miller
Beta Presentation
Team Herman Miller
Beta Presentation

FIBRE Mobile App
The Capstone Experience

Team Meijer

Department of Computer Science and Engineering
Michigan State University
Fall 2018
our biggest back to school sale. ever.

25% off backpacks

Shop Now
Team Meijer

Project Overview

Meijer Shrink Reduction Using Blockchain

- Functionalities
  - Reduce Product Waste and Loss
  - Track and Control High Waste and Loss Items

- Features
  - Capture Essential Product Data
  - Select and Implement Tracking Mechanism
  - Establish Trigger/Alert Mechanisms
  - Ensure Proper Movement of Products
  - Get Close-Dated Products For Sale Quickly
  - Identify Recalled Products
  - Store Data in Blockchain

- Technologies
  - Microsoft
    - .NET Framework (C#, ASP.NET)
    - Azure
      - Notification Services
      - Mobile Services (Both iOS and Windows)
    - Application Insights
    - Visual Studio Team Server
  - Microsoft Azure or IBM Blockchain Tools
  - Meijer Web Services
  - Bluebird Android Devices
  - SQL Server / MongoDB

Meijer Shrink Reduction Using Blockchain

Project Overview

Team Meijer

Grand Rapids, Michigan
Team Meijer
Lucas Banks, Moritz Greiss, Mohammad Yousafzai, Phillip Litchfield, Matt Wilimberg
Team Meijer
Project Plan Presentation

Screen Mockup

<table>
<thead>
<tr>
<th>Name</th>
<th>Expire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples</td>
<td>05/21/2018</td>
</tr>
<tr>
<td>Bananas</td>
<td>05/21/2018</td>
</tr>
<tr>
<td>Bread</td>
<td>05/21/2018</td>
</tr>
<tr>
<td>Milk</td>
<td>05/22/2018</td>
</tr>
<tr>
<td>Meat</td>
<td>05/22/2018</td>
</tr>
<tr>
<td>Chicken</td>
<td>05/22/2018</td>
</tr>
</tbody>
</table>
Team Meijer
Project Plan Presentation

Architecture Diagram

Interfaces
- Azure Active Directory
- Apple
- DLT Watcher

API
- Service Bus
- Transaction Creator
- Hyperledger Fabric
- Blockchain
- DLT Watcher
- SQL Azure
System Architecture

Interfaces

Transactions Creator

Service Bus

API

SQL Azure

Azure Active Directory

React

Ethereum

Transaction Creator

OLT Watcher
### Shrink Reduction Using Blockchain Contract 27

**Status**

- 1. In Distribution Center: 10/14/18, 3:12 PM
- 2. In Transit to Distribution Center: 10/14/18, 3:12 PM
- 3. At Distribution: 10/14/18, 3:12 PM
- 4. In Transit to Meijer Store: 10/14/18, 3:13 PM

**Actions**

There's nothing for you to do right now.

**Details**

- **Distribution Center**: Wilmberg, Matthew Krzysztof
- **Meijer Store**: -
- **Product**: Apples
- **Current Location**: In Transit
- **Expire Month**: 11
- **Expire Day**: 25
- **Expire Year**: 2018
- **Check**: True

**Activity**

- Wilmberg, Matthew Krzysztof recorded action Ship Product: 3:13 PM
- Wilmberg, Matthew Krzysztof recorded action Receiving at: 3:12 PM
- MSU Capstone recorded action Ship Product: 3:12 PM
- MSU Capstone recorded action Create: 3:11 PM
Team Meijer
Alpha Presentation

iOS QR Scanning and Product Info
Team Meijer
Alpha Presentation

Web Screenshot: Search Page
Shrink Reduction Using Blockchain Final Contract 423

Team Meijer
Beta Presentation
Team Meijer
Beta Presentation

iOS QR Scanning and Product Info
Team Meijer
Beta Presentation

iOS Shipping Screen

The Capstone Experience
Team Meijer
Beta Presentation

Web Application Loss Page

Loss Statistics

Loss By Product

Loss By Date

List of products lost due to shrink

<table>
<thead>
<tr>
<th>Product Lost</th>
<th>Date Trashed</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bananas</td>
<td>2015-1-5</td>
<td>Farm</td>
</tr>
<tr>
<td>Bananas</td>
<td>2015-1-5</td>
<td>Farm</td>
</tr>
<tr>
<td>Bananas</td>
<td>2015-1-5</td>
<td>Farm</td>
</tr>
<tr>
<td>Bananas</td>
<td>2015-1-5</td>
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<tr>
<td>Bananas</td>
<td>2015-1-5</td>
<td>Farm</td>
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<td>2015-1-5</td>
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<tr>
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<td>2015-1-5</td>
<td>Farm</td>
</tr>
</tbody>
</table>

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The Capstone Experience

Team Michigan State University

Department of Computer Science and Engineering
Michigan State University
Fall 2018
DISCOVERING THE GOLD STANDARD OF CANCER DRUGS

MORE

SPARTAN HIGHLIGHTS

MSUTODAY

EVENTS

AUGUST 3
Navigating MSU’s Campus Using Augmented Reality

• Functionalities
  ▪ Provide Assistance Navigating MSU’s Campus
  ▪ Leverage Augmented Reality (AR) on Mobile Devices

• Features
  ▪ Use Mobile Device Camera
  ▪ Overlay Information About Surroundings
    ○ Building Name (Engineering, Wilson Hall)
    ○ Points-of-Interest (Sparty, The Rock)
  ▪ Provide 3D Wayfinding Instructions
  ▪ Give Self-Guided Tours
  ▪ Utilize MSU’s Campus ArcGIS Instance
  ▪ Support Google Android and Apple iOS

• Technologies
  ▪ Apple iOS / Swift / ARKit
  ▪ Google Android / Kotlin / ARCore
  ▪ ArcGIS
Team Michigan State University
Shaye Beadling, Yongqi Han, Paul Rosemurgy, Minseo Baik, Austin Pfeil
Spartan Stadium first opened in 1923 and seats about 75,000, which makes it the Big Ten’s 6th largest stadium.
Team Michigan State University
Project Plan Presentation

Architecture Diagram

ArcGIS

Request Information

Building & Wayfinding Info

JSON

iOS

Request Information

Swift

ARKit

Xcode

iOS

Android

Android Studio

Kotlin

ARCore

The Capstone Experience
System Architecture

iOS

Android

ArcGIS

Android

System Architecture

iOS

Android

ArcGIS

Android

ArcGIS

Android

Team Michigan State University
Project Plan Presentation
Team Michigan State University
Project Plan Presentation

Screen Mockup
Team Michigan State University
Alpha Presentation

iOS Touring
iOS Searching
Team Michigan State University
Alpha Presentation
Team Michigan State University
Alpha Presentation

Android Wayfinding
Team Michigan State University
Beta Presentation
iOS Touring
Team Michigan State University
Beta Presentation
iOS Searching and Wayfinding
Team Michigan State University
Beta Presentation
Android Touring and Wayfinding
The Capstone Experience

Team Microsoft

Department of Computer Science and Engineering
Michigan State University
Fall 2018
Team Microsoft
Project Overview

ITPro Company Portal

• Functionalities
  ▪ Expand Functionality of Microsoft’s Intune Portal
  ▪ Enable IT Professionals (ITPros) to Use Intune
    ◦ Directly
    ◦ From Mobile Devices

• Features
  ▪ Extend Fall 2017 Capstone Project
  ▪ Get/Set InTune Settings by ITPros
  ▪ Leverage Microsoft Graph
  ▪ Apply Google Jetpack Standards
  ▪ Scale to Support Millions of Users Worldwide

• Technologies
  ▪ Microsoft Graph
  ▪ Google Android
  ▪ Java
  ▪ RESTful Web Services
Team Microsoft
Zhanming Bai, Zoe Fu, Jason Brownell, Ayaka Okamoto
Team Microsoft Project Plan Presentation
Team Microsoft
Project Plan Presentation

Architecture Diagram
Team Microsoft
Project Plan Presentation

Screen Mockup
Team Microsoft
Alpha Presentation

Android: Groups

- CSE Faculty
- Capstone Course Staff
- Library Staff
- Human Resources Personnel
- Random Population
- Microsoft VIPs
- Group 0001
- Accounting Department
<table>
<thead>
<tr>
<th>UserName</th>
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<td>Microsoft Capstone</td>
<td>0b2803af-a2b7-4540-b142-e0cd8b4c9ffe</td>
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<tr>
<td>Ayaka Okamoto</td>
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<td>George Wilkerson</td>
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<td>Jackie</td>
<td>7a599da4-429d-4a25-b572-8046817042c4</td>
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<td>Jason Brownell</td>
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<td>Kristin Garcia</td>
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<td>Zoe Fu</td>
<td>aad6eb56-867c-46fc-a38b-e7949ebb5a1c</td>
</tr>
</tbody>
</table>
The Capstone Experience

Team Mozilla

Department of Computer Science and Engineering
Michigan State University
Fall 2018
Fast for good.

2x the speed. Built-in privacy protection. Powered by Mozilla.
There's a better way to browse.
Team Mozilla
Project Overview

Asynchronize All the (Localization) Things!

• Functionalities
  ▪ Present Messages to Firefox Users
    (e.g. “You are about to close 10 tabs.”)
  ▪ “Localize” Messages to Support
    ○ Multiple Operating Systems
    ○ 98 Languages
    ○ Hundreds of Millions of Users Worldwide

• Features
  ▪ Integrate into Single Firefox Download
  ▪ Eliminate Need for Special Builds of Firefox
  ▪ Support Restartless “Localization”
    (Restartless Language Switching)
  ▪ Convert Synchronous Code to Asynchronous Code
  ▪ Leverage Mozilla’s New Fluent System
  ▪ Deliver Code Ready to Ship with Firefox

• Technologies
  ▪ Firefox Code Base (~ 51M Lines)
  ▪ CSS
  ▪ C++ / JavaScript
  ▪ XUL / XBL / HTML
  ▪ Fluent
  ▪ Document Type Definition (DTD)
  ▪ Mercurial
  ▪ IRCCloud
  ▪ Bugzilla
  ▪ Phabricator
  ▪ Microsoft Windows, Apple macOS and Linux

Mountain View, California
Team Mozilla
Jim Lennon, Jack Song, Raza Haider, Jack Smith, Collin Wing
openDir = Open Directory
# LOCALIZATION NOTE (macOpenDir): This is the Mac-specific variant of openDir.
# This allows us to use the preferred "Finder" terminology on Mac.
macOpenDir = Show in Finder
# LOCALIZATION NOTE (winOpenDir2): This is the Windows-specific variant of
# openDir.
winOpenDir2 = Open Folder

profiles-opendir =
    { PLATFORM() ->
        [macos] Show in Finder
        [windows] Open Folder
        *[other] Open Directory
Team Mozilla
Project Plan Presentation

Architecture Diagram

MessageContext

User Interface
UI Toolkit (XPFE)

Data Persistence
User, Secure, And Engine Persistence

Networking
Necko
Security (NSS/PSM)

JavaScript Interpreter
Spider - Monkey

XML Parser
Expat

Display Backend
GTK+ Adapter
GTK+ / X11 Libraries

L10nRegistry
LocaleService

FluentDOM
Fluent
FluentReact
FluentVue

React
Vue

XUL
Javascript

(Browser Engine)
(Rendering Engine)
About Profiles

This page helps you to manage your profiles. Each profile is a separate world which contains separate history, bookmarks, settings and add-ons.

Create a New Profile

Profile: Collin

Ábóóūūt Přóó filéēs

This page helps you to manage your profiles. Each profile is a separate world which contains separate history, bookmarks, settings and add-ons.

Create a New Profile

Profile: Collin

Restart

Restart with Add-ons Disabled... Restart normally...

Rééyúūt

Rééyúūt with Agíí-áíłí Oqësëbëłí... Rééyúūt náqëñzñal Iy...
Team Mozilla
Alpha Presentation
Team Mozilla
Alpha Presentation

about:config page in French

<table>
<thead>
<tr>
<th>Nom de l'option</th>
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<th>Type</th>
<th>Valeur</th>
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<td>booléen</td>
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<td>booléen</td>
<td>false</td>
</tr>
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<td>accessibility.blockonoffwithon</td>
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<td>booléen</td>
<td>false</td>
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<td>booléen</td>
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<td>nombre entier</td>
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<td>accessibility.force_disabled</td>
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<td>accessibility.handler.enabled</td>
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<td>accessibility.modalmode.enable</td>
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<td>booléen</td>
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<td>booléen</td>
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</tr>
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<td>accessibility.support.url</td>
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<td>chaine</td>
<td><a href="https://support.mozilla.org/FR/FR/accessibility-services">https://support.mozilla.org/FR/FR/accessibility-services</a></td>
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<td>booléen</td>
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<td>accessibility.typeahead.find.soundURL</td>
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<td>chaine</td>
<td>berp</td>
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<td>accessibility.typeahead.find.obtralinkonly</td>
<td>par défaut</td>
<td>booléen</td>
<td>false</td>
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<td>booléen</td>
<td>true</td>
</tr>
<tr>
<td>accessibility.typeahead.find.timesout</td>
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<td>nombre entier</td>
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<tr>
<td>accessibility.usetexttospeech</td>
<td>par défaut</td>
<td>chaine</td>
<td>true</td>
</tr>
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</table>
عن اللاحات

تأثبي هذه الصفحة في إدارة اللاحات. كل لاحة هي عالم بذاته يحتوي تأريخًا وعلامات وإضافات منفصلة.

أنيق لاحات جديدة

ملف شخصي: Collin

هذا الملف الشخصي مستخدم ولا يمكن حذفه.

ملف شخصي: Jack

الملف الشخصي المستخدم

<table>
<thead>
<tr>
<th>الملف الشخصي المستخدم</th>
<th>الملف الشخصي المحذوف</th>
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<td>اغتي المحذوف</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The Capstone Experience

Team Mozilla
Alpha Presentation

about:about page in Bengali
¡Bienvenido a las herramientas de desarrollador de Firefox!

¿Has activado exitosamente las herramientas de desarrollador? Para empezar, explora el menú de desarrollador web o abre las herramientas con Ctrl+Shift+I.

Boletín de Mozilla Developer
Obtén noticias de desarrollo, trucos y recursos enviados directamente a tu bandeja de entrada.

Correo electrónico

Suscribir

Inspector
Inspecciona y refina el código para

Consola
Rastrea problemas de CSS, JavaScript

Depurador
Puedes depurar JavaScript con
Team Mozilla
Beta Presentation

About Dialog of about:preferences
The Capstone Experience

Team Mozilla
Beta Presentation

about:restartrequired
The Capstone Experience

Team MSUFCU

Department of Computer Science and Engineering
Michigan State University
Fall 2018
Team MSUFCU
Project Overview

Transaction Anomaly Detection

• Functionalities
  ▪ Visualize MSUFCU Members’ Spending Habits
  ▪ Send Alerts About Unusual Account Activity

• Features
  ▪ Identify Member Account Anomalies
  ▪ Apply User-Created and MSUFCU-Created Rules
  ▪ Leverage Machine Learning and Data Science
  ▪ Send Alerts Via SMS, Push Notifications or Email
  ▪ Build Card-Based Member-Facing Module
  ▪ Support Web, Google Android and Apple iOS
  ▪ Integrate with MSUFCU’s Existing Systems
  ▪ Apply Anti Money Laundering (AML) Rules
  ▪ Provide Companion Administrative Web Portal

• Technologies
  ▪ CSS / HTML / PHP / JavaScript
  ▪ JSON
  ▪ Apple iOS / Swift
  ▪ Google Android / Java
  ▪ SQL Database
Team MSUFCU
Caleb Sherman, Andrew Schmidt, Jim Xu, Austin Roberts, Paul Soma
Team MSUFCU
Project Plan Presentation

Screen Mockup
Team MSUFCU
Project Plan Presentation
System Architecture

MySQL

django

REST API

Python

TensorFlow

Keras

Android

iOS

Team MSUFCU
Project Plan Presentation
Team MSUFCU
Project Plan Presentation

Screen Mockup

Account #: ...1234
Transaction Details

- $19.95
ACH Debit

September 2, 2018
Transaction Date

September 4, 2018
Posted Date

Planet Fitness
Okemos, MI 48864

Description: PLANET FITNESS 1982 G R A OKEMOS MI 09/15
Also known as: PLANET FITNESS
Method: Recurring
Category: Gym

Warnings:

Your monthly recurring payment to PLANET FITNESS recently increased from $14.95 to $19.95
Team MSUFCU
Alpha Presentation

Android Member Account View
Team MSUFCU
Alpha Presentation

iOS Member Transaction View
Team MSUFCU
Alpha Presentation
Team MSUFCU
Beta Presentation

Android Member Account View

<table>
<thead>
<tr>
<th>Transaction</th>
<th>Amount</th>
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<tbody>
<tr>
<td>SPEEDWAY 07190 776</td>
<td>$13.24</td>
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<tr>
<td>CHIPOTLE 0931</td>
<td>$4.72</td>
</tr>
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<td>TAVERN AND TAP</td>
<td>$74.47</td>
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<tr>
<td>SPEEDWAY 07515 687</td>
<td>$42.87</td>
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<tr>
<td>TARGET 00066165</td>
<td>$30.95</td>
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<td>HORROCKS FARM MARKET LA</td>
<td>$18.93</td>
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<td>SUBWAY 00072181</td>
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<td>WESTSIDE COMMUNITY YMCA</td>
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<td>MEIJER INC #194 Q01</td>
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<td>FRANKS PRESS BOX</td>
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<tr>
<td>CANCUN MEXICAN GRILL</td>
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<tr>
<td>CHIPOTLE 0931</td>
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Team MSUFCU
Beta Presentation

iOS Member Transaction View
### Isolation Forest Performance

<table>
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<tr>
<th></th>
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<th>Predicted: YES</th>
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<tr>
<td>True:</td>
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<tr>
<td>NO</td>
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<td>1751</td>
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<td>YES</td>
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<td>38</td>
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</table>

Team MSUFCU
Beta Presentation
Team MSUFCU
Beta Presentation

Member Facing Web Portal
The Capstone Experience

Team Proofpoint

Department of Computer Science and Engineering
Michigan State University
Fall 2018
Team Proofpoint
Project Overview

Improved Detonation of Evasive Malware

• Functionalities
  ▪ Protect Users from Malware Threats
  ▪ Counter Evasive Malware Techniques

• Features
  ▪ Enhance Existing Malware Technologies
  ▪ Identify and Block Malware Evasive Behavior
  ▪ Modify Malware Execution
  ▪ Extract Valuable Attributes

• Technologies
  ▪ Cuckoo (Malware Sandboxing)
  ▪ Suricata (Intrusion Detection System)
  ▪ Operating Systems and Compilers
  ▪ Reverse Engineering
  ▪ Python / JavaScript
  ▪ MySQL

Proofpoint
Sunnyvale, California
Team Proofpoint
Project Plan Presentation

Sample Pipeline

Awaiting Processing
Processing
Processed
Screen Mockup: Results

<table>
<thead>
<tr>
<th>ID</th>
<th>Name</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>sample1</td>
<td>CLEAN</td>
</tr>
<tr>
<td>2</td>
<td>sample2</td>
<td>SUCCESSFUL EXECUTION</td>
</tr>
<tr>
<td>3</td>
<td>sample3</td>
<td>INTERESTING</td>
</tr>
<tr>
<td>4</td>
<td>sample4</td>
<td>MODIFIED</td>
</tr>
</tbody>
</table>

Team Proofpoint
Project Plan Presentation
Team Proofpoint
Project Plan Presentation

Architecture Diagram

Web Front End

Web Server

Database

Analysis

Bootstrap
jQuery

vmware

PostgreSQL
Team Proofpoint
Project Plan Presentation
### Team Proofpoint Project Plan Presentation

#### Screen Mockup

<table>
<thead>
<tr>
<th>ID</th>
<th>Name</th>
<th>State</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>sample1.exe</td>
<td>CLEAN</td>
</tr>
<tr>
<td>2</td>
<td>sample2.exe</td>
<td>SUCCESSFUL EXECUTION</td>
</tr>
<tr>
<td>3</td>
<td>sample3.exe</td>
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</tr>
<tr>
<td>4</td>
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<td>MODIFIED</td>
</tr>
</tbody>
</table>
Team Proofpoint
Alpha Presentation
### Team Proofpoint

**Alpha Presentation**

Applying Byte Patching

---

| 45  | D8 | 48 | 89 | 45  | A8 | 48 | 8B | 45  | A8 | 48 | 89 | C2 | 48 | 8B | 4D | D0 | E8 | EA | D1 | 00 | 00 |
|-----|----|----|----|-----|----|----|----|-----|----|----|----|----|----|----|----|----|----|----|----|----|
| C3  | 89 | D8 | 48 | 83 | C4 | 38 | 5B | 5D | C3 | 55 | 48 | 89 | E5 | 48 | 83 | EC | 70 | E8 | B2 | 9B | 00 |
| C7  | 45 | B0 | 40 | 00 | 00 | 00 | 48 | 8D | 45 | B0 | 48 | 89 | C1 | 48 | 8B | 05 | C1 | 0E | 0D | 00 | FF |
| 48  | 8B | 45 | B8 | 48 | C1 | E8 | 14 | 89 | 45 | FC | 8B | 45 | FC | 89 | C2 | 48 | 8B | 0D | 84 | 98 | 0A |
| E8  | DF | 52 | 06 | 00 | 48 | 8D | 15 | 19 | 4A | 0A | 00 | 48 | 89 | C1 | E8 | 20 | D0 | 09 | 00 | 48 | 8B |
| 79  | 98 | 0A | 00 | 48 | 89 | C1 | E8 | 91 | 50 | 06 | 00 | 87 | 7D | FC | FF | E7 | 03 | 00 | 7E | 27 | 48 |
| 15  | 09 | 4A | 0A | 00 | 48 | 8B | 0D | 4A | 98 | 0A | 00 | E8 | F5 | CF | 09 | 00 | 11 | 15 | 4E | 98 | 0A |
| 00  | 48 | 89 | C1 | E8 | 66 | 50 | 06 | 00 | E9 | 8A | 00 | 00 | 00 | 48 | 8D | 0A | 4A | 0A | 00 | 48 | 8B |
| 0D  | 23 | 98 | 0A | 00 | E8 | CE | CF | 09 | 00 | 48 | 8B | 15 | 27 | 90 | 00 | 48 | 89 | C1 | E8 | 3F | 50 |
| 06  | 00 | 48 | 8D | 0D | 20 | 4A | 0A | 00 | E8 | 03 | FF | FF | FF | FF | FF | FF | FF | FF | FF | FF | FF |
| 00  | 85 | C0 | 0F | 95 | C0 | 84 | C0 | 74 | 3F | 48 | 8D | 1B | E8 | 4A | 0A | 00 | E8 | 54 | 60 | 01 | 00 |
| 8D  | 15 | 1F | 4A | 0A | 00 | 48 | 8B | 0D | D6 | 91 | 00 | E8 | 81 | CF | 09 | 00 | 48 | 8B | 15 | DA |
| 0A  | 00 | 48 | 89 | C1 | E8 | F2 | 4F | 06 | 18 | 8D | 0D | 1B | 4A | 0A | 00 | E8 | AE | 5F | 01 | 00 |
| 45  | F8 | EB | 0A | B9 | 01 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |

---

GlobalMemoryStatus.txt

- jl, jle, jge, jge
- 7D, 7F, 7E, 7C

---

**RAMrules.txt**
Team Proofpoint
Alpha Presentation
## Malware Sample Results

<table>
<thead>
<tr>
<th>ID</th>
<th>Name</th>
<th>Modified Resubmissions</th>
<th>State</th>
<th>Severity (Max:10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ramcheck.exe</td>
<td>1</td>
<td>reported</td>
<td>0.2</td>
</tr>
<tr>
<td>3</td>
<td>hello_world.zip</td>
<td>0</td>
<td>reported</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>ramcheck.exe</td>
<td>1</td>
<td>reported</td>
<td>0.2</td>
</tr>
<tr>
<td>6</td>
<td>processorNameCheck.exe</td>
<td>1</td>
<td>reported</td>
<td>0.6</td>
</tr>
<tr>
<td>8</td>
<td>hello_world.zip</td>
<td>0</td>
<td>reported</td>
<td>0</td>
</tr>
<tr>
<td>9</td>
<td>ramcheck.exe</td>
<td>1</td>
<td>reported</td>
<td>0.2</td>
</tr>
<tr>
<td>10</td>
<td>processorNameCheck.exe</td>
<td>1</td>
<td>reported</td>
<td>0.6</td>
</tr>
<tr>
<td>13</td>
<td>binary</td>
<td>0</td>
<td>reported</td>
<td>N/A</td>
</tr>
<tr>
<td>14</td>
<td>binary-edit1</td>
<td>0</td>
<td>reported</td>
<td>3.6</td>
</tr>
<tr>
<td>15</td>
<td>binary-edit2</td>
<td>0</td>
<td>reported</td>
<td>3.6</td>
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<tr>
<td>16</td>
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<td>binary-edit5</td>
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<td>N/A</td>
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</tbody>
</table>

## Sample Resubmissions

<table>
<thead>
<tr>
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<th>Name</th>
<th>Modified Resubmissions</th>
<th>State</th>
<th>Severity (Max:10)</th>
</tr>
</thead>
<tbody>
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<td>0</td>
<td>reported</td>
<td>3</td>
</tr>
<tr>
<td>23</td>
<td>sample1-mod-23.exe</td>
<td>0</td>
<td>reported</td>
<td>3</td>
</tr>
<tr>
<td>24</td>
<td>sample1-mod-24.exe</td>
<td>0</td>
<td>reported</td>
<td>3</td>
</tr>
<tr>
<td>25</td>
<td>sample1-mod-25.exe</td>
<td>0</td>
<td>reported</td>
<td>3</td>
</tr>
<tr>
<td>26</td>
<td>sample1-mod-26.exe</td>
<td>0</td>
<td>reported</td>
<td>3</td>
</tr>
<tr>
<td>27</td>
<td>sample1-mod-27.exe</td>
<td>0</td>
<td>reported</td>
<td>3</td>
</tr>
<tr>
<td>28</td>
<td>sample1-mod-28.exe</td>
<td>0</td>
<td>reported</td>
<td>3</td>
</tr>
<tr>
<td>29</td>
<td>sample1-mod-29.exe</td>
<td>0</td>
<td>reported</td>
<td>3</td>
</tr>
<tr>
<td>30</td>
<td>sample1-mod-30.exe</td>
<td>0</td>
<td>reported</td>
<td>3</td>
</tr>
<tr>
<td>31</td>
<td>sample1-mod-31.exe</td>
<td>0</td>
<td>reported</td>
<td>3</td>
</tr>
<tr>
<td>32</td>
<td>sample1-mod-32.exe</td>
<td>0</td>
<td>reported</td>
<td>3</td>
</tr>
<tr>
<td>33</td>
<td>sample1-mod-33.exe</td>
<td>0</td>
<td>reported</td>
<td>3</td>
</tr>
</tbody>
</table>
Team Proofpoint
Beta Presentation

Modification in Progress

teamproofpoint@CuckooNode:~/evasive-malware-analysis/executable_modifier$ python detonator.py 205
['detonator.py', '205']

***************Working on Sample 205***************
--Creating Assembly File--
--Compiling Behaviors--
*****Working on Behavior GetDiskFreeSpaceEx: 1 of 11*****
--Locating Memory Addresses to Change--
--Evasive Behavior not Found--
*****Working on Behavior GetComputerNameExW: 2 of 11*****
--Locating Memory Addresses to Change--
--Evasive Behavior not Found--
*****Working on Behavior EnumServicesStatus: 3 of 11*****
--Locating Memory Addresses to Change--
--Evasive Behavior not Found--
*****Working on Behavior ProcessSleepNTime: 4 of 11*****
--Locating Memory Addresses to Change--
--Evasive Behavior not Found--
*****Working on Behavior GetiphysicallyInstalledSystemMemory: 5 of 11*****
--Locating Memory Addresses to Change--
--Evasive Behavior not Found--
*****Working on Behavior QueryValue: 6 of 11*****
--Locating Memory Addresses to Change--
--Evasive Behavior not Found--
*****Working on Behavior NtAllocateVirtualMemory: 7 of 11*****
--Locating Memory Addresses to Change--
--Evasive Behavior not Found--
*****Working on Behavior GetAdaptersAddress: 8 of 11*****
--Locating Memory Addresses to Change--
***Modifying Code***
*****Working on Behavior NtQuerySystemInformation: 9 of 11*****
--Locating Memory Addresses to Change--
--Evasive Behavior not Found--
*****Working on Behavior GetSystemFirmwareTable: 10 of 11*****
--Locating Memory Addresses to Change--
***Modifying Code***
*****Working on Behavior GlobalMemoryStatusEx: 11 of 11*****
--Locating Memory Addresses to Change--
--Evasive Behavior not Found--

****************************************************************
/home/teamproofpoint/cuckoo/storage/modifledExes/205.exe
The Capstone Experience

Team Quicken Loans

Department of Computer Science and Engineering
Michigan State University
Fall 2018
Quicken Loans
Engineered to Amaze
Introducing


RateShield Approval™ Either Way, You Win!

Buy Your Home Using the New Power Buying Process™
Team Quicken Loans
Project Overview

Walter, You Gotta Go

• Functionalities
  ▪ Integrate Legacy Apps With Modern Versions
  ▪ Automate Legacy Apps Processes With Virtual Worker

• Features
  ▪ Leverage Robotic Process Automation
    ▪ Screen Scraping
    ▪ Machine Learning / Artificial Intelligence
  ▪ Create “Legacy” App (Walter)
    ▪ Used for Loan Application Process
    ▪ Receives Information and Documents
  ▪ Write Modern Replacement App (Lindsey)
  ▪ Implement Centralized Database (Leroy)
  ▪ Provide Web Service (Roger)
  ▪ Create Virtual RPA Worker (Debra)

• Technologies
  ▪ Robotic Process Automation (RPA)
  ▪ Microsoft
    ▪ Azure / Azure SQL
    ▪ C# / Visual Studio
    ▪ .NET WinForms
    ▪ ASP .NET Core
  ▪ GraphQL
  ▪ CSS / HTML / PHP / JavaScript
Team Quicken Loans
Gabe Martino, James Nguyen, Austin Robbins, David Flores, Dustin Eastway
Team Quicken Loans
Project Plan Presentation

Screen Mockup

<table>
<thead>
<tr>
<th>Social Security Number</th>
<th>123456789</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employer Identification Number</td>
<td>123</td>
</tr>
<tr>
<td>Employer Name and Address</td>
<td>Test Company and Test Address</td>
</tr>
<tr>
<td>Control Number</td>
<td>123</td>
</tr>
<tr>
<td>Employee Name and Address</td>
<td>Test Employee and Test Address</td>
</tr>
<tr>
<td>Wages, tips, other compensation</td>
<td>50,000</td>
</tr>
<tr>
<td>Federal income tax withheld</td>
<td>1,000</td>
</tr>
<tr>
<td>Social Security Wages</td>
<td>10,000</td>
</tr>
<tr>
<td>Social security tax withheld</td>
<td>1,000</td>
</tr>
<tr>
<td>Medicare wages and tips</td>
<td>15,000</td>
</tr>
<tr>
<td>Medicare tax withheld</td>
<td>5,000</td>
</tr>
<tr>
<td>Social security tips</td>
<td>0</td>
</tr>
<tr>
<td>Allocated Tips</td>
<td>1,000</td>
</tr>
<tr>
<td>State</td>
<td>MI</td>
</tr>
<tr>
<td>Employers State ID</td>
<td>1234</td>
</tr>
<tr>
<td>State Wages</td>
<td>50,000</td>
</tr>
<tr>
<td>State Income Tax</td>
<td>1,535</td>
</tr>
<tr>
<td>Local Wages</td>
<td>50,000</td>
</tr>
</tbody>
</table>

The Capstone Experience
Team Quicken Loans
Project Plan Presentation

Virtual Worker (Debra)

UiPath

Desktop Application (Walter)

APIEndpoints (Roger)

.NET Core

Database (Leroy)

SQL

Web Application (Lindsey)
Team Quicken Loans
Project Plan Presentation

Screen Mockup

W2 Form Submission

- a. SSN
- b. Employer ID
- c. Employer’s name, address and ZIP code
- d. Control Number
- e. Employee’s first
- f. Employee’s address and ZIP code

Pay Stubs >
Bank Statements >

RobertJohnsonW2.form
### Social Security Number
- 832345559

### Employer Identification Number
- 38-6000584

### Employer Name and Address
- Michigan State University, 220 Trowbridge Rd, East Lansing, MI 48824

### Control Number
- 478

### Employee Name and Address
- Michael Davis, 62635 Mt. Vernon Rd, Washington, MI 46094

### Wages, tips, other compensation
- 50,000

### Federal income tax withheld
- 1,000

### Social Security Wages
- 10,000

### Social security tax withheld
- 1,000

### Medicare wages and tips
- 15,000

### Medicare tax withheld
- 5,000

### Social security tips
- 0

### Allocated Tips
- 1,000

### State
- MI

### Employers State ID
- 9856

### State Wages
- 50,000

### State Income Tax
- 1,535
Welcome, my name is Lindsey, princess of the mortgage world.
### Web-App Data Entry

#### Lindsey

<table>
<thead>
<tr>
<th>Bank Statement Forms</th>
<th>Social Security Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>000-00-0000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pay Stub Forms</th>
<th>Employer Identification Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>483</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>W2 Forms</th>
<th>Employer Name &amp; Address</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SOM 100 N Capitol Ave, Lansing, MI 4891</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unknown Forms</th>
<th>Control Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2034</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unknown Forms</th>
<th>Employee Name &amp; Address</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Alvin Grumblie</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unknown Forms</th>
<th>Wages, Tips &amp; Other Compensation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$50,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unknown Forms</th>
<th>Federal Income Tax Withheld</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$1,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unknown Forms</th>
<th>Social Security Wages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$10,000</td>
</tr>
</tbody>
</table>
The Capstone Experience

Team Spectrum Health

Department of Computer Science and Engineering
Michigan State University
Fall 2018
Team Spectrum Health
Project Overview

Spectrum Health Virtual Reality Experience

• Functionalities
  ▪ Visualize and Annotate Spectrum Health Facilities
  ▪ Answer Questions for Patients and Family Members
  ▪ Use Virtual Reality (VR)

• Features
  ▪ Build Web-Based Virtual Reality App
  ▪ View 360-Degree Media Using VR Googles
  ▪ Provide Explanations via Annotations
    o Cafeterias
    o Visitor Elevators
    o Aspects of a Hospital Room
    o Tools in a Procedure Room
  ▪ Configure Media Based on User Interaction
  ▪ Provide Companion Administrative Web Portal

• Technologies
  ▪ CSS / HTML / PHP / JavaScript
  ▪ A-Frame
  ▪ ASP.NET Core (C#)
  ▪ Entity Framework Core
  ▪ Microsoft Azure
  ▪ Microsoft SQL Server
Team Spectrum Health
Jordan Hill, Jeremy Du, Stefani Taskas, Anthony Flatter
Team Spectrum Health
Project Plan Presentation

Screen Mockup
Team Spectrum Health
Project Plan Presentation
Team Spectrum Health
Project Plan Presentation

Screen Mockup

VR Room Tour

Select a Building: Big Rapids Hospital

Room 120
Room 123
Room 135
VR Room Tours

Select a Building:
Helen DeVos Children's Hospital

- Patient Room
- Treatment Room
Team Spectrum Health
Alpha Presentation

VR Room Tours

Select a Building:
- Helen DeVos Children's Hospital

Helen DeVos Children's Hospital

- Patient Room
Team Spectrum Health Alpha Presentation
Team Spectrum Health
Alpha Presentation

Hit Box
Target

Coordinate
s in 2D

Labeling and
Tagging
information

The Capstone Experience
The Capstone Experience

Team TechSmith

Department of Computer Science and Engineering
Michigan State University
Fall 2018
Introducing Camtasia 2018

The fastest way to create professional-looking videos.
Team TechSmith
Project Overview

TechSmith Video Review and Slack Integration

• Functionalities
  ▪ Connect Video Authors with Video Reviewers
  ▪ Use Team Messaging Systems

• Features
  ▪ Integrate TechSmith’s Video Review with Slack
  ▪ Provide Interface for Video Author
    o Receive Notification of New Slack Comments
    o Read Slack Comments on Video Review Site
    o Manage Reviews
      ➢ See Existing Reviews
      ➢ Create New Reviews
      ➢ Assign New Slack Users to Reviews
  ▪ Provide Interface for Video Reviewer
    o See Existing Reviews
    o Launch Video Review Site
    o Playback Video with Slack Interface
    o Provide Annotation within Slack
  ▪ Support Other Team Messaging Systems

• Technologies
  ▪ CSS / HTML / PHP / JavaScript
  ▪ TechSmith Video Review API Proxy
  ▪ Microsoft C#/Net Core
  ▪ Slack App / Slack SDK
  ▪ RESTful Web Services Using Swagger
Team TechSmith
Noah Hirvela, Nick Gilreath, Conner Bean, Tommie Henderson, Neil Xu
Team TechSmith
Project Plan Presentation
Team TechSmith
Project Plan Presentation

Screen Mockup
# department-chat

You created this channel today. This is the very beginning of the #department-chat channel. Purpose: Professional discussion (edit)

Add an app Invite others to this channel

Today

Tommie 9:29 PM
Can someone sync the review we were talking about?

Noah Hirvela 9:30 PM
Sure, I'll get right on it!

Tommie

[link to Sync Review Command]
Thread Creation in Slack
Comments Appear in Video Review
The Capstone Experience

Team TechSmith
Beta Presentation

Creating Review Within Slack
Team TechSmith

Beta Presentation

Sync Existing Review To Slack
Team TechSmith
Beta Presentation
Team TechSmith
Beta Presentation

The Capstone Experience
The Capstone Experience

Team Union Pacific

Department of Computer Science and Engineering
Michigan State University
Fall 2018
Building America for more than 155 years by serving customers, communities and shareholders with a passion for performance, high ethical standards and teamwork.
Team Union Pacific
Project Overview

Augmented Reality Mechanic Training

• Functionalities
  ▪ Train Union Pacific Mechanics Safely
  ▪ Use Augmented Reality (AR)

• Features
  ▪ Show Holographic Images of Railroad Equipment
  ▪ Demonstrate Standard Repair Operations
  ▪ “Match” Holograms with Physical Objects
  ▪ Use Microsoft Hololens
  ▪ Generate Accurate Holograms from CAD Data

• Technologies
  ▪ Microsoft Hololens
  ▪ Unity Game Engine
  ▪ PiXYZ Plugin
  ▪ Vuforia Plugin
Team Union Pacific
Luke Sperling, Nick MacDonald, Justin Barber, Colleen Little, Jake Cousineau
Team Union Pacific
Project Plan Presentation

Connect the Caboose To The Coal Car
Team Union Pacific
Project Plan Presentation

Architecture Diagram

User

Camera Feed

Train Part

Vuforia Phone Application

Vuforia Database

Microsoft HoloLens

Augmented Reality

Object recognition

Point cloud

Point cloud

View train

Scan train
Team Union Pacific

Project Plan Presentation

Screen Mockup

Workhead Part
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Proin dapibus, tellus a laoreet ultricies, massa massa vulputate dolor, sed finibus enim nunc ac risus
Team Union Pacific
Alpha Presentation
Learn About Machinery – Bounding Box
Solenoid Valve

This valve uses the magnetic field from an electric current to control the flow of fluids through the system.
Connect the engine to the passenger
Team Union Pacific
Alpha Presentation

Completion of Build a Train

Successfully built!
Team Union Pacific
Beta Presentation
Learn About Machinery: Model Manipulation
Team Union Pacific

Beta Presentation

Learn About Machinery Portal

The main solenoid valve and several supporting valves.
Team Union Pacific
Beta Presentation

Build a Train: Instructions

Connect the passenger to the engine

Engine
Passenger

Connect the caboose to the passenger

Passenger
Caboose
The Capstone Experience

Team United Airlines

Department of Computer Science and Engineering
Michigan State University
Fall 2018
Team United Airlines
Project Overview

Toolkit Content Verification System

• Functionalities
  ▪ Verify Aircraft Toolkit Contents
  ▪ Use Mobile Device Camera

• Features
  ▪ Build Database of Complete Kits
    o List of Contents
    o Images of Contents
    o Barcodes and RFID Tags
  ▪ Support Mobile Device Cameras
  ▪ Apply Computer Vision
    o Compare Image Taken to Image Stored
    o Determine Kit Completeness
  ▪ Send Notifications
    o Incomplete Kits
    o Missing Tools
  ▪ Provide Companion Administrative Web Portal

• Technologies
  ▪ Computer Vision
  ▪ CSS / HTML / PHP / JavaScript
  ▪ Apple iOS / Swift
  ▪ Google Android / Java
  ▪ SQL Database
Team United Airlines
Project Plan Presentation

Screen Mockup

The Capstone Experience
Team United Airlines
Project Plan Presentation

Architecture Diagram

- PostgreSQL Tooling Database
- OpenCV
- Python 3
- Apache/Django Server
- HTTP
- Web Portal
- Technician Application (iOS)
### Project Plan Presentation

#### Team United Airlines

**Screen Mockup**

![United Airlines Portal](image)

**Inventory**

<table>
<thead>
<tr>
<th>Tracking_number</th>
<th>mnc_number</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9101317</td>
<td>96-2004-C-G031</td>
<td>null</td>
</tr>
<tr>
<td>9101317</td>
<td>null</td>
<td>TESTER, CABLE ASSY, DIRECT CONNECT</td>
</tr>
</tbody>
</table>
Team United Airlines
Alpha Presentation
Team United Airlines
Alpha Presentation

Check In / Check Out Toolkit
Team United Airlines
Alpha Presentation

Toolkit Found With Captured Image
Team United Airlines
Alpha Presentation

All Tools Detected / Tools Missing
Team United Airlines
Beta Presentation

Check In / Check Out Toolkit
Team United Airlines
Beta Presentation
Team United Airlines
Beta Presentation

Administrative Web Portal

Welcome, Evan

User info
- chiljev@msu.edu
- Email Address
- Evan Childs
- Full Name
- Active Status
- Admin Status
- Change Password
- Logout

Toolkit Content Verification System

AUTHENTICATION AND AUTHORIZATION

Groups

TOOL IMAGE VERIFIER

Process results

Tool kits

Tool regions

Users

Recent actions

My actions
- Kit, light meter, white & black, see info 9124314
- Tool kit
- Axle plug covers 5557754
- Tool kit
- Kit, test equip, eng fire ext sys, b787 9126651
- Tool kit
- unelevated@msu.edu
- User
- unelevated@msu.edu
- User
The Capstone Experience

Team Urban Science

Department of Computer Science and Engineering
Michigan State University
Fall 2018
EVEYONE HAS AN OPINION.
WE HAVE SCIENCE.

Since the day we started, we’ve been a force for change. We started with a problem to solve. We scrutinized it, developed a theory, tested it and applied the solution. And we have the same approach today, we listen to our clients’ needs and find a solution. We’re curious, objective, empirical and determined. Through this spirit, we invented The Power of 4™ formula to bring scientific discipline to the business world. It’s how we are Guiding Business Through Science.
Team Urban Science
Project Overview

VIN-Verse

- Functionalities
  - Display Information About Specific Vehicle Identification Number (VIN)
  - Aggregate Data About a Class of VINs

- Features
  - Provide Web and Mobile Apps
  - Enter VIN Using Keyboard or Mobile Device Camera
  - Give Detailed History of VIN’s Life
  - Build Real-Time Authorization Mechanisms
    - Dealers
    - Independent Repair Facilities (IRFs)
    - Owners
  - Protect Vehicle Owner’s Privacy
  - Crawl Google Reviews or Yelp

- Technologies
  - CSS / HTML / PHP / JavaScript
  - Angular JS
  - Microsoft
    - C# / ASP.NET Core
    - SQL Server
  - Apple iOS / Swift
  - Google Android / Java
  - Firebase
Team Urban Science
Project Plan Presentation

Screen Mockup

Vin History

<table>
<thead>
<tr>
<th>VIN</th>
<th>Accessed By</th>
<th>Date</th>
<th>Repair Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1C4BJWGFXDL531773</td>
<td>Belle Tire</td>
<td>9/13/18</td>
<td>Oxygen Sensor Replacements</td>
</tr>
<tr>
<td>1C4BJWGFXDL531773</td>
<td>Outzhiner</td>
<td>9/13/18</td>
<td>Ignition Coil and Spark Plug Replace...</td>
</tr>
</tbody>
</table>
Team Urban Science
Project Plan Presentation

Architecture Diagram

Data Feeds
- Manufacturer
- Service Repair Facility
- Consumers
- Potential Buyers

Service Records
- Repair orders and service history
- Self-reported repairs and service history
- View vehicle history

FTP Service

Back-End
- Microsoft SQL Server
- ASP.net
- C#
Team Urban Science
Project Plan Presentation
Team Urban Science
Alpha Presentation
Registering a VIN

Register VIN

VIN:
1GDM7C1374F576478

Make:
Nissan

Model:
GTR

Year:
2007

For Sale: [ ]

Submit
Submitting a Repair

Submit Repair

Date: 2018-10-09

Repair Description:
Tire Rotation

Part Description:
Front wheels

VIN:
3VWLX7AJ4C008226

Type:
Maintenance

Repairer:
Pep-Boys

Submit
Team Urban Science
Alpha Presentation

Service History
Team Urban Science
Beta Presentation

Vehicle Information

**Vehicle Information**

- **Make**: FORD
- **Model**: F-350
- **Year**: 2005
- **VIN**: 1FDWF37585E89821

**All Repairs**

<table>
<thead>
<tr>
<th>Date</th>
<th>Repairer</th>
<th>Type</th>
<th>Part</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/20/2018</td>
<td>Bella Tires</td>
<td>Maintenance</td>
<td>Hub Cap</td>
</tr>
<tr>
<td>9/22/2018</td>
<td>Bella Tires</td>
<td>Maintenance</td>
<td>Tires</td>
</tr>
</tbody>
</table>
Team Urban Science
Beta Presentation

Outgoing History Access Request
Team Urban Science
Beta Presentation
The Capstone Experience

Team Urban Science

Beta Presentation

Analytics Report
The Capstone Experience

Team Volkswagen

Department of Computer Science and Engineering
Michigan State University
Fall 2018
The all-new Arteon.
Modern art you can really feel.

MEET ARTEON
Team Volkswagen
Project Overview

VW Car-Net Demo App

• Functionalities
  ▪ Change the Habits of Car Dealers
  ▪ Communicate the Value of Car-Net

• Features
  ▪ Target VW Dealers and Customers
  ▪ Create Car-Net Demo / Guided Tour
  ▪ Be Easy and Fun to Use
  ▪ Demonstrate End-to-End User Experience
  ▪ Support Google Android and Apple iOS
  ▪ Support Integration of Video and Product Content

• Technologies
  ▪ Car-Net
  ▪ Apple iOS / Swift
    o AVAudioSession and AVPlayer
    o URLSession and Codable
    o NSNotifications
  ▪ Google Android / Java or Kotlin
    o MediaPlayer and MediaController
    o OKHttp and Retrofit
    o Event Bus
Team Volkswagen
Zebin Liang, Tim Guertin, Emily Brent, Cyprian Blunt, Kira Chan
Team Volkswagen
Project Plan Presentation

Screen Mockup
Team Volkswagen
Project Plan Presentation
Team Volkswagen
Project Plan Presentation

Architecture Diagram

Firebase Analytics

OAuth

Registration Server

Swift

Kotlin
Team Volkswagen Project Plan Presentation
Team Volkswagen
Project Plan Presentation

Screen Mockup

**Boundary Alerts**
- When your car enters or exits a pre-defined area.
- **Create New Boundary Alert**
  - **Example 1:** Recurring, Triggers On: Exit
  - **Example 2:** Recurring, Triggers On: Exit
  - **Example 2.5:** Recurring, Triggers On: Entry, Exit
  - **Example 3:** Recurring, Triggers On: Exit
  - **Example 4:** Always on, Triggers On: Entry
  - **Example 5:** Always on, Triggers On: Exit

**Example**
- **12345 Monroe, Detroit, MI**
  - **Click to create a boundary alert**
  - **Click and type in a location**

**Set Location**
- **Click to set the location**
Team Volkswagen
Alpha Presentation

Home Screen
Team Volkswagen
Alpha Presentation

Validation Game
Team Volkswagen
Alpha Presentation
Home Screen (Progress Updated)
Team Volkswagen
Beta Presentation

Registration Module
Team Volkswagen
Beta Presentation

Navigation Module
Team Volkswagen

Beta Presentation

Vehicle Health Reports Module

The Capstone Experience
The Capstone Experience

Team Whirlpool

Department of Computer Science and Engineering
Michigan State University
Fall 2018
When dinner can’t wait — and he can’t either

Control the brand new Smart Range from anywhere, so life doesn’t revolve around your range.

See What’s New
Team Whirlpool
Project Overview

IRAV: Image Recognition Annotation and Validation

• Functionalities
  ▪ Annotate and Validate Images of Recipe Ingredients
  ▪ Apply Crowdsourcing and Gamification
  ▪ Target Whirlpool’s Yummly App

• Features
  ▪ Ingest and Annotate Images
    o Via Mobile Apps
    o Validate Annotations as Actual Ingredients
    o Identify Bounding Boxes
    o Detect and Report Poor Lighting
  ▪ Create Image Validation Game
    o Via Mobile Apps
    o Validate Annotations via Crowdsourcing
    o Track User Participation and Accuracy
    o Create Variety of User Experiences
    o Show Leaderboard
  ▪ Support Google Android and Apple iOS
  ▪ Provide Companion Administrative Dashboard

• Technologies
  ▪ CSS / HTML / PHP / JavaScript
  ▪ Apple iOS / Swift
  ▪ Google Android / Java
  ▪ TensorFlow (Image Recognition)
  ▪ Amazon S3 or Google Cloud Datastore
Team Whirlpool
Project Plan Presentation

Screen Mockup

Image Recognition Annotation & Validation

Please select:
white eggs
brown eggs
x-large eggs

Image Recognition Annotation & Validation

Image Recognition Annotation & Validation

Image Recognition Annotation & Validation

The Capstone Experience
Team Whirlpool
Project Plan Presentation
Team Whirlpool
Project Plan Presentation

Architecture Diagram

- TensorFlow Lite
- Android
- iOS

User Creation/Sign-in

Data Storage

Authentication

Image Storage

Firebase

The Capstone Experience
System Architecture

Team Whirlpool
Project Plan Presentation
Team Whirlpool
Alpha Presentation
Team Whirlpool
Alpha Presentation

Camera Functionality
Team Whirlpool
Alpha Presentation

Annotation Capabilities
Team Whirlpool
Alpha Presentation
Team Whirlpool
Alpha Presentation

Validation Game
Team Whirlpool
Beta Presentation

Annotation Interface
Team Whirlpool
Beta Presentation
Team Whirlpool
Beta Presentation

Admin Dashboard

Dashboard

Weekly Challenge

Food Item
Enter food item

Whitelist Users
- lzh19991221@gmail.com
- avutapai1@msu.edu
- clipps12@msu.edu
- pinkoski@msu.edu
- turakjac@msu.edu
- iravvq@gmail.com

Whitelist Domains
- whirlpool.com
The Capstone Experience

Dr. Wayne Dyksen
Department of Computer Science and Engineering
Michigan State University
Fall 2018
The Capstone Experience Lab
The Capstone Experience Lab
The Capstone Experience Lab
The Capstone Experience Lab
The Capstone Experience Lab
View of Spartan Stadium
The Capstone Experience

Design Day Award Winners

December 8, 2017
Auto-Owners Exhibition Award
Team TechSmith, Spring 2017
Teacher’s Virtual Toolbelt
Alex Crimin, Zeke Zandbergen, Yang He, Ryan Cornillie
Presented by Scott Lake of Auto-Owners Insurance
MSU Federal Credit Union Praxis Award
Team Union Pacific, Spring 2017
Learning New Train Routes
Matthew Schleusener, Kangjie Mi, Nick Summers, Jon Wild
Presented by Liam Petraska of MSU-Federal Credit Union
TechSmith Screencast Award
Team Amazon, Spring 2017
ACRA: Amazon Customer Review Analyzer
Jie Wan, Jason Liu, Ian Whalen, Ankit Luthra, Tess Huelskamp
Presented by Wendy Hamilton of TechSmith
Urban Science Sigma Award
Team Michigan State University, Spring 2017

**CATAlyst:** Mapping CATA Buses in Real-Time

Charlie Ward, Cathy Dinsmoor, Tom Beaver, Jimmy Mkude, James Dodge

Presented by Linda Koepppe and Luke Mercier of Urban Science
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Design Day Award Winners

April 27, 2018
Auto-Owners Exhibition Award
Team Phoenix Group, Spring 2018
Customer Service System with Chatbot
Aman Goshu, James Finch, Sarah Fillwock, Dan Shumaker, Fatema Alsaleh
Presented by Ross Hacker and Scott Lake of Auto-Owners Insurance
MSU Federal Credit Union Praxis Award
Team Amazon, Spring 2018
AMPED: Amazon Marketplace Podcast Earnings Detection
Zach Whitener, Cam Korzecke, Chess Luo, Dillon Stock, Hansheng Zhao, Hanzhong
Presented by Ben Maxim of MSU Federal Credit Union
Urban Science Sigma Award
Team Herman Miller, Spring 2018
Adjust: Augmented Reality Chair Adjustment Assistant
Kyle Kinsey, Han Huang, Jacob Weber, Kevin Gaban, Mike Bremiller
Presented by Elizabeth Klee, Nik Steel and Andrea Michaud of Urban Science
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