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
    - Status Report Presentations
    - Formal Presentations
      - Project Plan
      - Alpha
      - Beta
    - 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 Water Bottle
- Plant Hanger
- Crystal Decor
- Pink Instant 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
    o People
    o Places
    o Things
  ▪ Search for Relevant Amazon Products
  ▪ Display Links to Amazon Product Pages
  ▪ Provide Front-End JavaScript Framework

• Technologies
  ▪ Amazon Web Services (AWS)
    o Rekognition / Komprehend
    o API Gateway
    o Lambda
    o Elastic Compute Cloud (EC2)
    o Command Line Interface (CLI)
    o Product Advertising API
  ▪ JavaScript / React or Angular or Vue
  ▪ Restful Web Services
Team Amazon
Linhswan Fang, Ben Nwachukwu, Patrick McCormick, Ian McGregor, Han Wang
Team Amazon
Project Plan Presentation

Screen Mockup

Trending Videos
Video Title 1  Video Title 2  Video Title 3  Video Title 4  Video Title 5

Continue Watching
Video Title 1  Video Title 2  Video Title 3  Video Title 4  Video Title 5

Highly Rated Products

The Capstone Experience
Team Amazon
Project Plan Presentation
Introducing Amazon Echo

298,241 views

BrandonYT
Published on January 10, 2017

Go buy from - http://amzn.to/2ix3Ulm
Team Amazon
Beta Presentation

Account Page
The Capstone Experience

Team Aptiv

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

Troy, Michigan
Team Aptiv
Alex Patton, Drew Glapa, Emilio Castillo, Klint Kaercher, Chad Krause
The Capstone Experience
Project Plan Presentation

Architecture Diagram

Team Aptiv

AMDAS

Fig. 5.1
OnBoard

Fig. 5.2
{json}

Fig. 5.3
OffBoard

Microsoft Azure

SQL

CLI

node
System Architecture

AMeDAS

OffBoard

OnBoard

node

Fig. 2.2

Fig. 2.3

Fig. 2.1

The Ongoing Evaluation

Team Aptiv
Project Plan Presentation
Team Aptiv
Project Plan Presentation

Screen Mockup
Reservation Creation

Team Aptiv
Alpha Presentation
Team Aptiv
Alpha Presentation

Vehicle Status Page
Team Aptiv
Beta Presentation
Vehicle Status Page

The Capstone Experience

Team Aptiv
Beta Presentation
Team Aptiv
Beta Presentation

Reservation Creation Page
Team Aptiv
Beta Presentation
My Reservations

November 1 10:30 AM
Blue BMW 5 Series
B12A1144,9027204
Location: Troy, MI
Driver: Ross Maguire

October 28 7:30 AM
Red Chevrolet Tahoe
G7A1028845027339
Location: Dublin, Ireland
Driver: Joe Lynn

October 25 6:00 PM
Red Audi S5
LCFA8B503J5027204
Location: Kokomo, IN
Driver: Klint Karcher

October 25 4:00 PM
White Lexus LF4
JL12422J50272204
Location: Kokomo, IN
Driver: Chad Knause

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
Auto-Owners Insurance

For Whatever Lies Ahead

Insurance built around your needs by a local independent agent

FIND AN AGENT FOR A QUOTE

Why choose an independent agent?

Pay Your Bill

Report a Claim

Policies to Meet Your Needs
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
    o Mobile Interface for Policyholders
    o 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

Auto-Owners
LIFE • HOME • CAR • BUSINESS
Lansing, Michigan
Team Auto-Owners
Alex Klingel, Connor Stabnick, Nabiha Biviji, Michael Dickmann
Team Auto-Owners
Project Plan Presentation

Screen Mockup
Screen Mockup: Web Portal Dashboard
Team Auto-Owners
Project Plan Presentation

Architecture Diagram

Natural Language Processing
- Dialogflow

Web Portal
MySQL Database

Google Assistant
Android

Smartphone Application

Capstone Server

Jeffrey Web Service API
Team Auto-Owners
Project Plan Presentation

Screen Mockup
Team Auto-Owners
Alpha Presentation

Welcome, Joseph!
- File a Claim
- Claim History

Jeffrey
- Hello! I'm Jeffrey, your Virtual Insurance Claim Advisor. I heard you wanted to file a claim?
- Yes
- I'm sorry to hear that - who am I speaking with?
- Joseph Gregors
- Ok, Joseph, can you tell me what happened?
- I got into a car accident while I was driving on I-46
- Looks like you were in a car accident - which car was involved?

Claim History
- 1. Claim #330-00000010-2018, Loss Date: 01/01/18
- 2. Claim #330-00000002-2018, Loss Date: 01/02/18
- 3. Claim #330-00000003-2018, Loss Date: 01/03/18
- 4. Claim #330-00000004-2018, Loss Date: 01/04/18
- 5. Claim #330-00000005-2018, Loss Date: 01/05/18
- 6. Claim #330-00000006-2018, Loss Date: 01/06/18
- 7. Claim #330-00000007-2018, Loss Date: 01/07/18
- 8. Claim #330-00000009-2018, Loss Date: 01/09/18
- 9. Claim #330-00000010-2018, Loss Date: 01/10/18

2013 Ford Focus
Team Auto-Owners
Alpha Presentation

Web Portal - Dashboard

![Web Portal Dashboard]

<table>
<thead>
<tr>
<th>Report Date</th>
<th>Insured</th>
<th>Type</th>
<th>Claim Number</th>
<th>DOL</th>
<th>Contact</th>
<th>Contact Phone</th>
</tr>
</thead>
</table>
### Team Auto-Owners
#### Alpha Presentation

<table>
<thead>
<tr>
<th>Report Date</th>
<th>Make/Model</th>
<th>License Plate</th>
<th>Color</th>
<th>Contact Name</th>
<th>Contact Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>08/08/1998</td>
<td>Ford Mustang</td>
<td>123456</td>
<td>Red</td>
<td>John Smith</td>
<td>555-555-5555</td>
</tr>
<tr>
<td>09/09/1999</td>
<td>Toyota Corolla</td>
<td>67890</td>
<td>Blue</td>
<td>Jane Doe</td>
<td>555-555-5555</td>
</tr>
<tr>
<td>10/10/2000</td>
<td>Chevrolet Camaro</td>
<td>12345</td>
<td>Green</td>
<td>Michael Brown</td>
<td>555-555-5555</td>
</tr>
<tr>
<td>11/11/2001</td>
<td>Honda Civic</td>
<td>6789012345</td>
<td>White</td>
<td>Susan Lee</td>
<td>555-555-5555</td>
</tr>
<tr>
<td>12/12/2002</td>
<td>Nissan Altima</td>
<td>12345678901</td>
<td>Orange</td>
<td>David Johnson</td>
<td>555-555-5555</td>
</tr>
</tbody>
</table>

**Joseph Gregors**

- Telephone: 308-000000-3018
- Email: jgregors@autoowners.com
- Address: 123 Main Street, Anytown, USA
- Assigned to: Team Alpha
- Date of Use: 2019-01-01

**Note:**
- Insurance policies are automatically updated as vehicles change status. Update the status of any vehicle on the policy. Updated vehicle coverage is posted on the policy.
Team Auto-Owners
Alpha Presentation
Web Portal - Search
Team Auto-Owners
Beta Presentation

Welcome, Joseph!

Claim History

Settings

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

Camera
Save Photos/Videos

Android App
Team Auto-Owners
Beta Presentation

Android App
Jessica

Detected Homeowners Policy Number 123-003001-05

Can you tell me what happened?

- my stove caught fire

Detected Loss Cause Fire

What is the address of the incident?

428 South Shaw Lane

Here are the buildings found at that address:

- home
- barn

Which building was involved?
# Team Auto-Owners

## Beta Presentation

### Web Portal

### Insurance Claim Details

**Joseph Greggors**

<table>
<thead>
<tr>
<th>Claim Number</th>
<th>Date of Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>300-0000058-2018</td>
<td>2018-11-09</td>
</tr>
</tbody>
</table>

**Loss Description**

I was driving my car on I-96 and another car pushed me into oncoming traffic.

**Risk Units**

2013 Ford Focus

**Main Contact**

Joseph Greggors

**Location**

220 Trowbridge Rd.
East Lansing, MI 48824

<table>
<thead>
<tr>
<th>Report Date</th>
<th>Insured</th>
<th>Type</th>
<th>Claim Number</th>
<th>DOL</th>
<th>Contact</th>
<th>Contact Phone</th>
</tr>
</thead>
</table>
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.

What can we help you find?
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

Midland, Michigan
Team Dow
Brandon Brooks, Keaton Coffman, Cassie Thompson, Charlie Benson
Team Dow
Project Plan Presentation

Dow's IT Assistant

Chat Now  Voice Now  Search Now  Chat Global  Call Global

Screen Mockup
Team Dow
Project Plan Presentation

Screen Mockup
Team Dow
Alpha Presentation
Team Dow

Alpha Presentation

Password Reset via Mobile Device
This is what we found for “Form”:

QSD HOT SHEET: Dow C.
Dow IT Assistant
with “DCC” in the SAP logon 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-
PPF_SA_EPINFile/Relative-
ticket/Packaging Request Form
v3.1.doc
No - Go to next step
All other application access issues
Follow normal

Just now
Help
Team Dow
Alpha Presentation

New Phone via Web
To enroll in the ServiceNow Self Service Password Reset go to “dow.service-now.com/go” and then click “Password Reset” under GET HELP.

After you have followed the steps and enrolled in the Self Service Password Reset Tool it will allow you to change your Dow network password from any Internet Connected Device at “www.dow.com/password”.

WebEx Meeting Center is a web conferencing tool. WebEx allows users to share documents, presentations, and applications anytime, anywhere, on any computer – or on an approved mobile device. WebEx enhances your ability to connect, communicate, and collaborate with colleagues, customers, and clients all over the world.
Team Dow
Beta Presentation
Password Reset via Web
Team Dow
Beta Presentation

Phone Search via Web
Team Dow
Beta Presentation
Team Dow
Beta Presentation

Email Virus via Phone
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
The Capstone Experience

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**

<table>
<thead>
<tr>
<th>% Positive Sentiment</th>
<th>% Negative Sentiment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept 1</td>
<td>Sept 2</td>
</tr>
</tbody>
</table>

---

The Capstone Experience
Team Ford
Project Plan Presentation
The Capstone Experience

Project Plan Presentation

Team Ford

Screen Mockup

---

**Testbot**
**7:57 PM**

**Sentiment Report:**
In the last week we've seen 12 new Reviews on the "Ford Remote Access" App!
Average sentiment rating of 0.9643 - positive (+0.013 from last week)

Of the 12 Reviews:
- 2 were very positive!
- 5 were positive!
- 3 were neutral
- 1 was negative
- 1 was very negative

Top 5 keywords in Positive reviews:
1. Ford
2. Fast
3. Start
4. System
5. Great

Top 5 keywords in Negative reviews:
1. Update
2. Installed
3. Bug
4. Errors
5. Timer

---

The Capstone Experience
Team Ford
Alpha Presentation
Team Ford
Alpha Presentation

Web Dashboard

**OVERALL SENTIMENT**

- Very Positive
- Positive
- Neutral
- Negative

**TOP KEYWORDS**

Positive Reviews:
1. Ford 40% of positive reviews
2. great 40% of positive reviews
3. car 30% of positive reviews
4. Unspecified 20% of positive reviews

Negative Reviews:
1. Ford 70% of negative reviews
2. error 60% of negative reviews
3. bug 50% of negative reviews
4. crash 50% of negative reviews

**SENTIMENT OVER TIME**

- Positive
- Negative
The Capstone Experience

Team Ford
Alpha Presentation

Slackbot Report

Capstone Team ...
- Ford Analyst

Channels
- general
- random

Direct Messages
- slackbot
- Ford Analyst (you)
- Invite People

Apps
- SentimentBot

# 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 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
neutral sent: 61
compound sent: 44
pos sent: 25
neg sent: 12
Team Ford
Beta Presentation

Web Dashboard

The Capstone Experience
Sentiment Bot 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
    o Inspect
    o Categorize
    o Tag
    o 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
Material Classification Engine

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

- Material ID: 283992, 60% match
- Material ID: 439472, 65% match
- Material ID: 264284, 48% match
- Material ID: 103748, 32% match
Team Herman Miller
Project Plan Presentation

Screen Mockup
Classification Result for 1 Fabric

Color: green
Pattern: solid texture

Team Herman Miller
Alpha Presentation
Team Herman Miller
Alpha Presentation

FIBRE Fabric Classification (Single)

Classification Result for 1 Fabric

Color: yellow, brown
Pattern: woven

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

Screen Mockup

NAME: Apple
EXPIRE: 05/21/2018
UPC: 648294638440
ZONE: AUTO
AISLE: 04
SECTION: 05
POSITION: 12
FIXTURE: A
ILC: AUTO040512A

Expiring in 48 Hours

<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

API

Service Bus

Transaction Creator

DLT Watcher

Hyperledger Fabric

Blockchain

Azure Active Directory
Screen Mockup

Meijer Shrink Prevention

2018 Loss
12/16-12/18

Loss per month

Apples | Potatoes | Lettuce | Oranges | Milk
35% | 12% | 12% | 31% | 6%
Team Meijer
Alpha Presentation

Blockchain Application

Shrink Reduction Using Blockchain Contract 27

Status

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

Actions

There's nothing for you to do right now.

Details

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

Activity

Today
- Wilmberg, Matthew Krzyztopf recorded action Ship Product 3:13 PM
- Wilmberg, Matthew Krzyztopf recorded action Receiving at 3:12 PM
- MSU Capstone recorded action Ship Product 3:32 PM
- MSU Capstone recorded action Create 3:11 PM
Team Meijer
Alpha Presentation

iOS QR Scanning and Product Info
Team Meijer
Alpha Presentation
Team Meijer
Alpha Presentation

Web Screenshot: Search Page
Team Meijer
Beta Presentation
Team Meijer
Beta Presentation

iOS QR Scanning and Product Info
Team Meijer

Beta Presentation

iOS Shipping Screen
Team Meijer
Beta Presentation

Web Application Loss Page

The Capstone Experience
The Capstone Experience

Team Michigan State University

Department of Computer Science and Engineering
Michigan State University
Fall 2018
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
The Capstone Experience

Team Michigan State University
Project Plan Presentation

Screen Mockup
Screen Mockup: Wayfinding AR
Team Michigan State University
Project Plan Presentation
Team Michigan State University
Project Plan Presentation
Screen Mockup
Team Michigan State University
Alpha Presentation
The Capstone Experience

Team Michigan State University
Alpha Presentation

iOS Searching
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
Impact your world

Your ideas can create an impact. And we’re here to help make yours possible. #EmpowerPossibility

SUBMIT YOUR IDEA NOW

SUBMIT AT A LOCAL STORE
Team Microsoft Project Overview

ITPro Company Portal

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

Microsoft
Redmond, Washington
Team Microsoft
Project Plan Presentation
Team Microsoft
Project Plan Presentation

Architecture Diagram
Team Microsoft
Project Plan Presentation

Screen Mockup
Team Microsoft
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Android: Groups

- CSE Faculty
- Capstone Course Staff
- Library Staff
- Human Resources Personnel
- Random Population
- Microsoft VIPs
- Group 0001
- Accounting Department
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Alpha Presentation

Android: All Devices
<table>
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<tr>
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<tr>
<td>Microsoft Capstone</td>
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<td>Kristin Garcia</td>
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Team Microsoft
Beta Presentation

New UWP Overview Page

The Capstone Experience
Team Microsoft
Beta Presentation

New UWP Device’s Information Page
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
    o Multiple Operating Systems
    o 98 Languages
    o 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

User Interface
- 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

MessageContext
- (Browser Engine)
- (Rendering Engine)

FluentDOM
- FluentDOM

Fluent
- Fluent

FluentReact
- FluentReact

FluentVue
- FluentVue

L10nRegistry
- L10nRegistry

LocaleService
- LocaleService

XUL
- XUL

React
- React

Vue
- Vue

Javascript
- Javascript
Team Mozilla
Project Plan Presentation

Screen Mockup
### Team Mozilla

**Alpha Presentation**

**about:config page in French**

---

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<th>Type</th>
<th>Valeur</th>
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<td>chaine</td>
<td>5000</td>
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عن اللاحات

تستخرج هذه الصفحة في إدارة لاحاتك. كل لاحاة هي عالم ذاته يحتوي تذكرة وعلامات وإضافات منفصلة.

أنشئ لاحاة جديدة

ملف شخصي: Collin

يجب أن يكون هذا الملف الشخصي مسموم ولا يمكن حذفه.

ملف الشخصي المسموم

لمحة المجلدين

المجلد المحلي

ملف الشخصي الم寄せ

أليك
পরিচিতি সম্পর্কে
এরূপ আপনার সুবিধাজনক জন্য “পরিচিতি” এর অর্থনিত।
এর মধ্যে কিছু কিছু চিন্তা জিবিতকার মত হতে পারে। কিছু কিছু কোন পোর্নের জন্য।
কিছু বাঁধা হয়ে যাবে কর্মের জন্যে যেদিকে যেদিকে চিন্তা আয়নায়।

- about:about
- about:addons
- about:buildconfig
- about:cache
- about:checkerboard
- about:config
- about:crashes
- about:credits
- about:debugging
- about:devtools
- about:downloads
- about:home
- about:library
- about:locale
- about:logo
- about:memory
- about:mozilla
- about:networking
- about:newtab
- about:performance
- about:plugins
- about:preferences
- about:privatebrowsing
- about:profiles
- about:restartrequired
- about:robots
- about:serviceworkers
- about:studies
- about:sync
- about:sync-log
- about:telemetry
- about:uri-classifier
- about:webRTC
- about:welcome
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:devtools
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
System Architecture
Team MSUFCU
Project Plan Presentation

[Image of a laptop screen showing a screen mockup of a financial transaction]

- $19.95
  ACH Debit
  Transaction Date: September 2, 2018
  Posted Date: September 4, 2018
  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
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Alpha Presentation

Android Member Account View

![Image of a mobile app interface showing a transaction history for a Platinum Visa card.]
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Alpha Presentation

iOS Member Transaction View
Autoencoder Architecture

Team MSUFCU
Alpha Presentation
### Account Summary

**Testing (Balance: $8,721.54)**

<table>
<thead>
<tr>
<th>Date</th>
<th>Acceptor</th>
<th>State</th>
<th>Post Amount</th>
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<tbody>
<tr>
<td>1</td>
<td>Walmart</td>
<td>1</td>
<td>1</td>
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</table>

**Checking (Balance: $843.29)**

<table>
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<th>Acceptor</th>
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<th>Post Amount</th>
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<tr>
<td>2018-04-06</td>
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<td>MI</td>
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Team MSUFCU
Beta Presentation
Android Member Account View
Team MSUFCU
Beta Presentation
iOS Member Transaction View
Isolation Forest Performance

<table>
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<tr>
<th>True:</th>
<th>Predicted: NO</th>
<th>Predicted: YES</th>
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<tr>
<td>NO</td>
<td>16214</td>
<td>1751</td>
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<tr>
<td>YES</td>
<td>1</td>
<td>38</td>
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</table>
Team MSUFCU
Beta Presentation
Member Facing Web Portal
The Capstone Experience

Team Proofpoint

Department of Computer Science and Engineering
Michigan State University
Fall 2018
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
Team Proofpoint
Jack Mansueti, Tae Park, Sean Joseph, Ryan Gallant, Ian Murray
Team Proofpoint
Project Plan Presentation

Sample Pipeline

- Processing
- Processed
- Awaiting Processing

Awaiting Processing
Processing
Processed
Team Proofpoint
Project Plan Presentation

Architecture Diagram
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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<tbody>
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<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>
<td>INTERESTING</td>
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<tr>
<td>4</td>
<td>sample4.exe</td>
<td>MODIFIED</td>
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</table>
The Capstone Experience

The Capstone Experience

Team Proofpoint

Alpha Presentation

Locating Relevant Instructions
Team Proofpoint
Alpha Presentation

Apply Byte Patching

RAMrules.txt
### Malware Sample Results

<table>
<thead>
<tr>
<th>ID</th>
<th>Name</th>
<th>Modified Resubmissions</th>
<th>State</th>
<th>Severity (Max:10)</th>
<th>Expand</th>
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<tbody>
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### Sample Resubmissions

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<td>reported</td>
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<td>0</td>
<td>reported</td>
<td>3</td>
</tr>
</tbody>
</table>
The Capstone Experience

Team Proofpoint

Beta Presentation

Modification in Progress
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
    - Receiving 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>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Security Number</td>
<td>123456789</td>
</tr>
<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>
Team Quicken Loans
Project Plan Presentation

Screen Mockup

W2 Form Submission

- **SSN**
- **Employer ID**
- **Employer’s name, address and ZIP code**
- **Control Number**
- **Employee’s first**
- **Employee’s address and ZIP code**

**RobertJohnsonW2.form**
<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Security Number</td>
<td>832345559</td>
</tr>
<tr>
<td>Employer Identification Number</td>
<td>38-6000584</td>
</tr>
<tr>
<td>Employer Name and Address</td>
<td>Michigan State University, 220 Trowbridge Rd, East Lansing, MI 48824</td>
</tr>
<tr>
<td>Control Number</td>
<td>478</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>9856</td>
</tr>
<tr>
<td>State Wages</td>
<td>50,000</td>
</tr>
<tr>
<td>State Income Tax</td>
<td>1,535</td>
</tr>
</tbody>
</table>
Team Quicken Loans
Alpha Presentation

Welcome, my name is Lindsey; princess of the mortgage world
Welcome, my name is Lindsey, princess of the mortgage world.
Team Quicken Loans
Alpha Presentation

Web-App Data Entry
Team Quicken Loans Beta Presentation
The PGA of America
100 Avenue of the Champions
Palm Beach Gardens, FL 33418

Justin Thomas
3093 Karen Lane
Louisville, KY 40202

W-2 Wage and Tax Statement
2018
Team Quicken Loans
Beta Presentation

Walter Input Screen

Social Security Number

Employer Id

Employee Address

Employee Name

Federal Income Tax Withheld

Select  Cancel
Team Quicken Loans
Beta Presentation

Lindsey Document View
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

Spectrum Health Virtual Reality Experience
Project Overview
Team Spectrum Health
Grand Rapids, Michigan
Team Spectrum Health
Jordan Hill, Jeremy Du, Stefani Taskas, Anthony Flatter
Team Spectrum Health Project Plan Presentation
Team Spectrum Health
Project Plan Presentation

Architecture Diagram

Hosting

360° Photo/Videos

Uploading

Configuration

Admins

SPECTRUM HEALTH

Microsoft Azure

ASP.NET

A-Frame

Website

PC

Mobile

VR Headset

User

The Capstone Experience
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
Team Spectrum Health
Alpha Presentation

Admin Page

- Hit Box
- Target
- Coordinates in 2D
- Labeling and Tagging information
Team Spectrum Health
Beta Presentation

GT-15 Patient Monitor

Used to check information on patient.
From Students…
…to Professionals

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.

Learn More
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
    - Receive Notification of New Slack Comments
    - Read Slack Comments on Video Review Site
    - Manage Reviews
      - See Existing Reviews
      - Create New Reviews
      - Assign New Slack Users to Reviews
  - Provide Interface for Video Reviewer
    - See Existing Reviews
    - Launch Video Review Site
    - Playback Video with Slack Interface
    - 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

Screen Mockup
Team TechSmith
Project Plan Presentation

Screen Mockup
Team TechSmith
Alpha Presentation
The Capstone Experience

Sync Review Command
Thread Creation in Slack

The Capstone Experience
Team TechSmith
Alpha Presentation
Comments Appear in Video Review
Creating Review Within Slack
Team TechSmith
Beta Presentation

Sync Existing Review To Slack
The Capstone Experience

Team TechSmith
Beta Presentation

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

Architecture Diagram

- User
- Camera Feed
- Train Part
- Vuforia Phone Application

Microsoft HoloLens
Augmented Reality

Camera Feed: View train
Train Part: Scan train
Vuforia Phone Application: Point cloud

Object recognition: Vuforia
Vuforia Database
Team Union Pacific
Project Plan Presentation
Workhead Part
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Proin dapius, tellus a laoreet ultricies, massa massa vulputate dolor, sed finibus enim nunc ac risus.
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
The main solenoid valve and several supporting valves.
Team Union Pacific Beta Presentation
Team Union Pacific
Beta Presentation

Build a Train: Instructions

Connect the passenger to the engine

Connect the caboose to the passenger
The Capstone Experience

Team United Airlines
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
Evan Childs, Scott Campbell, Bill Geshwender, Andy Ashton, Vladimir Otchere
Team United Airlines
Project Plan Presentation

Screen Mockup
Team United Airlines
Project Plan Presentation
Team United Airlines
Project Plan Presentation

Architecture Diagram

- PostgreSQL Tooling Database
- OpenCV
- Apache/Django Server
- Web Portal
- Technician Application (iOS)
- Python 3
- HTTP
Team United Airlines
Alpha Presentation

Check In / Check Out Toolkit
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

Result of Captured Image
Team United Airlines
Beta Presentation

Administrative Web Portal

Welcome, Evan

User info
childsev@msu.edu
Evan Childs
Full Name
Active Status
Admin Status
Change Password
Logout

Toolkit Content Verification System Administration

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 91 24314
Tool kit
Axle plug covers 9587754
Tool kit
Kit, test equip, eng fire ext sys, b787 9126651
Tool kit
unellevated@msu.edu
User
unellevated@msu.edu
User
The Capstone Experience

Team Urban Science

Department of Computer Science and Engineering
Michigan State University
Fall 2018
EVERYONE 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>1C4BJWFXDL851773</td>
<td>Belle Tire</td>
<td>9/15/18</td>
<td>Oxygen Sensor Replacements</td>
</tr>
<tr>
<td>1C4BJWFXDL851773</td>
<td>Outshiner</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

Front-End

FTP Service

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

Screen Mockup
Hello, world!

Welcome to the new single-page application, built with:

- ASP.NET Core and C# for cross-platform server-side code
- Angular for client-side code
- Bootstrap for layout styling

To help you get started, we've included:

- Client-side navigation: For example, click Counter then Back to return here.
- Angular CLI integration: In development mode, you don't need to run app-dev. If you want to run the background automatically, so your client-side responses are dynamically built on demand and the page refreshes when you modify any file.
- Efficient production builds: In production mode, development features are disabled, and your client-side application automatically minifies and bundles your files, making them easier to deploy.

The ".charts" subdirectory is an Angular CLI application. If you open a command prompt in that directory, you can run any command by using: ng serve, or use: npm install --save-dev @angular-devkit/build-devtools-ts.
Team Urban Science

Alpha Presentation

Registering a VIN

Register VIN

VIN: 1GDM7C1374F576478

Make: Nissan

Model: GTR

Year: 2007

For Sale: False

Submit
Submitting a Repair

Submit Repair

Date:
2018-10-09

Repair Description:
Tire Rotation

Part Description:
Front wheels

VIN:
3VWLX7AJ4CM100822

Type:
Maintenance

Repairer:
Pep-Boys

Submit
What's left to do?

- Role-based functionality
- Role-based UI
- Analytics Dashboard
- Flesh out Integration Engine
## Service History

### VIN Info

**Access to VIN Granted**

- VIN: WB1046901L6203200
  - Make: Ford
  - Model: Fiesta
  - Year: 2011

<table>
<thead>
<tr>
<th>Date</th>
<th>Repairer</th>
<th>Type</th>
<th>Part</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018-10-09T00:00:00</td>
<td>Valvoline</td>
<td>Maintenance</td>
<td>Engine</td>
<td>Changed oil</td>
</tr>
<tr>
<td>2018-10-09T00:00:00</td>
<td>Pep Boys</td>
<td>Maintenance</td>
<td>Brakes</td>
<td>Changed brake pads.</td>
</tr>
</tbody>
</table>
Incoming History Access Requests

Pending Requests

Active Requests

2040/50/07/01/9767:
Requester: John Doe
Action: Evaluate
Origin: XYZ
Action Date: 12/31/2023
Expiration Date: 01/31/2024

Team Urban Science
Beta Presentation
Team Urban Science
Beta Presentation

Vehicle Information

Make: FORD
Model: F-350
Year: 2005
VIN: 1FDWF37585EA89821

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>Belle Tire</td>
<td>Maintenance</td>
<td>Hub Cap</td>
</tr>
<tr>
<td>9/22/2018</td>
<td>Belle Tire</td>
<td>Maintenance</td>
<td>Tires</td>
</tr>
</tbody>
</table>
Team Urban Science
Beta Presentation
Outgoing History Access Request

Outgoing History Access Requests

Active Requests

1FDTF4HT8DEB50346
Active
10/26/2018 - 4/29/2019

View Info

1FV3GLBC0VL051219
Active
10/28/2018 - 4/29/2019

View Info

1FDWF37505EA80921
Active
11/8/2018 - 11/15/2018
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

Screen Mockup

1. **Boundary Alerts**
   - When your car enters or exits a pre-defined area.
   - **Create New Boundary Alert**

2. **Example 1**
   - Jessica’s Weekend
   - Recurring, Triggers On: Exit

3. **Example 2**
   - One-Time (August 30), Triggers On: Entry

4. **Example 2.5**
   - Recurring, Triggers On: Exit, Entry

5. **Example 3**
   - Always on, Triggers On: Exit

6. **Example 4**
   - Always on, Triggers On: Entry

7. **Example 5**
   - Always on, Triggers On: Exit

- **Click to create a boundary alert**

- **Click and type in a location**

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

Home Screen
Team Volkswagen
Alpha Presentation

Validation Game
Team Volkswagen
Alpha Presentation
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

![Vehicle Health Report](image-url)
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.
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
Jessica Clappison, Jack Turak, Shruti Avutapalli, Jackie Li, Savanna Pinkoski
Team Whirlpool
Project Plan Presentation

Screen Mockup

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

Architecture Diagram

TensorFlow Lite

Androi

iOS

User Creation/Sign-in

Data Storage

Image Storage

Authentication

Firebase

Storage
Team Whirlpool
Project Plan Presentation

Screen Mockup
Team Whirlpool
Alpha Presentation

Camera Functionality
Team Whirlpool
Alpha Presentation

Validation Game
Team Whirlpool
Beta Presentation

Image Capture Interface
Team Whirlpool
Beta Presentation
Annotation Interface
Team Whirlpool
Beta Presentation

Admin Dashboard
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
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
The Capstone Experience

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
TechSmith Screencast Award
Team Quicken Loans, Spring 2018

Fundamenta: Trust in New Home Construction
Riley Annis, Jaiwant Bhushan, Vishal Adusumilli, Turner Anderson, Erin O'Hara
Presented by Wendy Hamilton of TechSmith
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
Quicken Loans®
Engineered to Amaze™