08/29: Capstone Overview

The Capstone Experience

Dr. Wayne Dyksen
Department of Computer Science and Engineering
Michigan State University
Fall 2018
CSE 498, Collaborative Design

• “The Capstone Experience”
• Instructors
  ▪ Dr. Wayne Dyksen (“Dr. D.”)
  ▪ James Mariani
  ▪ Ryan Johnson
• Class Meetings
  MW, 3:00-4:20pm, 1279 Anthony
• Syllabus
• Web Site
  ▪ capstone.cse.msu.edu
  ▪ Check it often.
• Email
  ▪ Check your email often.
  ▪ Read my email thoroughly and carefully!
Professional Meeting Expectations

• Seated, Ready to Go by 3:00 p.m.

• No...
  ▪ Electronic Devices
  ▪ Hats or Hoods
  ▪ Coats
  ▪ Eating
  ▪ Sleeping
  ▪ “Breaks”
Capstone Overview

Course Logistics

• Client Projects

• Course Logistics (Continued Next Meeting)
Course Goals

• Give You Experience In
  ▪ Real World
  ▪ Corporate Setting

• Start Your Transition
  ▪ From Student...
  ▪ ...To Professional
Course Goals

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

• Build a Significant Software System
• Work in a Team Environment
• Learn New Tools and Environments
• Build and Administer Systems
• Develop Your Communication Skills
• Develop Interview Talking Points
• Learn to Do Stuff on Your Own
• Etc...
Project Deliverables

• Project Plan Document & Presentation
• Alpha Presentation
• Beta Presentation
• Project Software
• Project Video
• Design Day

See Major Milestones.
All-Hands Meetings

Presentations By

- Dr. D.
- TAs
- Teams
  - Status Reports
  - Formal Presentations
    - Project Plan
    - Alpha
    - Beta
  - Project Videos
- Guest Speaker(s)
# All-Hands Meetings Agendas

<table>
<thead>
<tr>
<th>Date</th>
<th>Agenda Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>08/29</td>
<td>Capstone Overview</td>
</tr>
<tr>
<td>09/03</td>
<td>(Labor Day, No Meeting)</td>
</tr>
<tr>
<td>09/05</td>
<td>Project Plan</td>
</tr>
<tr>
<td>09/10</td>
<td>Team Status Report Presentations</td>
</tr>
<tr>
<td>09/12</td>
<td>Risks and Prototypes</td>
</tr>
<tr>
<td>09/17</td>
<td>Schedule and Teamwork</td>
</tr>
<tr>
<td>09/19</td>
<td>Resume Writing and Interviewing</td>
</tr>
<tr>
<td>09/24</td>
<td>Team Project Plan Presentations</td>
</tr>
<tr>
<td>09/26</td>
<td>Team Project Plan Presentations</td>
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<tr>
<td>10/01</td>
<td>Team Project Plan Presentations</td>
</tr>
<tr>
<td>10/03</td>
<td>Team Project Plan Presentations</td>
</tr>
<tr>
<td>10/08</td>
<td>Creating and Giving Presentations</td>
</tr>
<tr>
<td>10/10</td>
<td>Team Status Report Presentations</td>
</tr>
<tr>
<td>10/15</td>
<td>Team Alpha Presentations</td>
</tr>
<tr>
<td>10/17</td>
<td>Team Alpha Presentations</td>
</tr>
<tr>
<td>10/22</td>
<td>Team Alpha Presentations</td>
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<tr>
<td>10/24</td>
<td>Team Alpha Presentations</td>
</tr>
<tr>
<td>10/29</td>
<td>Design Day and the Project Videos</td>
</tr>
<tr>
<td>10/31</td>
<td>Camtasia Demo</td>
</tr>
<tr>
<td>11/05</td>
<td>Intellectual Property</td>
</tr>
<tr>
<td>11/07</td>
<td>Ethics and Professionalism</td>
</tr>
<tr>
<td>11/12</td>
<td>Team Beta Presentations</td>
</tr>
<tr>
<td>11/14</td>
<td>Team Beta Presentations</td>
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<tr>
<td>11/19</td>
<td>Team Beta Presentations</td>
</tr>
<tr>
<td>11/21</td>
<td>Team Status Reports</td>
</tr>
<tr>
<td>11/26</td>
<td>Team Beta Presentations</td>
</tr>
<tr>
<td>11/28</td>
<td>Team Status Reports</td>
</tr>
<tr>
<td>12/03</td>
<td>Project Videos</td>
</tr>
<tr>
<td>12/05</td>
<td>Project Videos and All Deliverables</td>
</tr>
<tr>
<td>12/06</td>
<td>Design Day Setup</td>
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<tr>
<td>12/07</td>
<td>Design Day</td>
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<tr>
<td>12/11</td>
<td>Project Videos</td>
</tr>
</tbody>
</table>
Urban Science Capstone Lab

- **3358EB, 3352EB, 3340EB**
- **Door Lock**
  - Electronic Keypad
  - Code = #######
  - Do Not Give Out to Other Students
- **Systems**
  - Up to Four per Team
    - Two 27” iMacs
    - One Dell Rack-Mounted Server (Optional)
    - One Mac Book Pro (Optional)
  - Team 100% Responsible
    - Building
    - Maintaining
    - Securing
    - Backing Up
- **Books**
- **WiFi**
  - SSID: CSE498, CSE498 5MHz
  - Key: ???????
- **Conference Area**
  - Team Meetings
  - Client Conference Calls
  - Google Conference Calendar
- ** Appliances**
  - Water Cooler/Heater
    - Nota Bene: The water cooler is not connected to a drain. Do not pour things into it, like rinsing out your water container.
  - Whirlpool Refrigerator
    - Cold Water From Bottled Water
    - Ice From Bottled Water
  - Microwave
  - Keurig Coffee Maker
- **Lockable Storage**
  - One Drawer Per Team
  - As Needed
  - Assigned by Dr. D. and TAs
  - Obtain Keys from CSE Office
Scheduled Lab Times

• No Formal Lab Sessions
• “Credit” for Scheduled Weekly Meetings
  ▪ Team Meetings
  ▪ Client Conference Calls
  ▪ Triage Meetings with TAs
• Meeting Times TBA With
  ▪ Team
  ▪ Client
  ▪ TAs
• Students must be available to meet in person.
  ▪ Team Meetings
  ▪ Triage Meetings
  ▪ Client Conference Calls
CSE498 Prerequisites

Must Have Successfully Completed

• Tier I Writing Requirement
• CSE335
• CSE410
• Another 400-Level CSE Course Other Than CSE491
Capstone Overview

✓ Course Logistics

Client Projects

• Course Logistics (Continued)
Team / Project Generalities

• Clients
  ▪ Vary in Size and Type
  ▪ Client contacts/mentors are “volunteers.”

• Team Contact Person
  ▪ Picked By Team
  ▪ Main Point of Contact for Client
Team / Project Generalities

• Project Types
  ▪ All Significant Software Development
  ▪ Vary in Specifics

• Project Level of Difficulty
  ▪ Hard Enough
  ▪ But Not too Hard

• Deliverable
  ▪ To the Client
  ▪ By the Due Date
Team / Project Generalities

• Challenges
  ▪ Very Short, Unforgiving Time Line
  ▪ Client Contact
  ▪ Team Dynamics
  ▪ Project Plan (in ~3 Weeks)
  ▪ Entirely New...
    ▪ Languages
    ▪ Environments
    ▪ API’s
    ▪ SDK’s
    ▪ Processes
    ▪ Protocols
    ▪ Etc.
  ▪ Project Management
  ▪ Etc...
Project Specifics

• Vary
  ▪ Type
  ▪ Current State of Specificity

• Challenge
  ▪ Connect with Client
  ▪ “Nail Down” the Project
    o Hard Enough
    o Not too Hard
    o Avoid Feature Creep
  ▪ Course Feature, Not Bug
Intellectual Property and Non-Disclosure Agreements

• Intellectual Property Agreement
  ▪ You agree to assign ownership of intellectual property that may be created as a result of your project to your client.
    o Copyrightable Program Code
    o Patentable “Ideas”
  ▪ Most clients will require an IP agreement.

• Non-Disclosure Agreement
  ▪ You agree not to disclose client confidential information.
  ▪ Most clients will require an NDA.

• To date...
  ▪ Most code has not gone directly into production.
  ▪ No patents have resulted.

• Use agreements provided by MSU.
• Always Contact Dr. D. Before Signing Anything
# Project Teams

- Team Amazon
- Team Aptiv
- Team Auto-Owners
- Team Dow
- Team Ford
- Team Herman Miller
- Team Meijer
- Team Michigan State University
- Team Microsoft
- Team Mozilla
- Team MSUFCU
- Team ProofPoint
- Team Quicken Loans
- Team Spectrum Health
- Team TechSmith
- Team Union Pacific
- Team United Airlines
- Team Urban Science
- Team Volkswagen
- Team Whirlpool
Team Amazon

Project Overview

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 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 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 Dow

Project Overview

Assist IT: Mobile IT Help 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 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 Herman Miller

Project Overview

Material Normalization Using Computer Vision

• Functionalties
  ▪ 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 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
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
    o Building Name (Engineering, Wilson Hall)
    o 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 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 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

**Nota Bene:**
- Team members are required to meet with the project sponsors for all day meetings on September 15 & 16.
- Team Members must agree to Open Source licensing.
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
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 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 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

Grand Rapids, Michigan
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

The Capstone Experience

Capstone Overview

Okemos, Michigan
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 United Airlines

Project Overview

Tooling Kit Content Verification System

• Functionalities
  - Verify Aircraft Tooling Kit Contents
  - Use Mobile Device Camera

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

• Technologies
  - Computer Vision
  - CSS / HTML / PHP / JavaScript
  - Apple iOS / Swift
  - Google Android / Java
  - SQL Database

The Capstone Experience

Capstone Overview
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

Detroit, Michigan
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

Auburn Hills, Michigan
Team Whirlpool

Project Overview

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
    - Via Mobile Apps
    - Validate Annotations as Actual Ingredients
    - Identify Bounding Boxes
    - Detect and Report Poor Lighting
  - Create Image Validation Game
    - Via Mobile Apps
    - Validate Annotations via Crowdsourcing
    - Track User Participation and Accuracy
    - Create Variety of User Experiences
    - 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

The Capstone Experience

Benton Harbor, Michigan
Google Form

- [www.capstone.cse.msu.edu](http://www.capstone.cse.msu.edu)
- + Other Links
- > Downloads
- > Team Member Survey: Google Form
First Assignments

• Read the Syllabus.

• Check out the Lab (3358EB, 3352EB, 3340EB).
  ▪ See if you can find it.
  ▪ See if you can get in.

• Check out the Web Site.

• Research your Project.
  ▪ Sponsor
  ▪ Technologies
What’s Next?

• Teams
  ▪ Assignments by Email Tonight
  ▪ Meet Initially by Tomorrow Afternoon
  ▪ Lab Machine Assignments in Lab
  ▪ Start Researching Technologies
  ▪ Start Configuring Lab Machines
  ▪ Team Photos
    o After All-Hands Meeting
      🔄 W 09/05: Teams Amazon – Mozilla
      🔄 M 09/10: Teams MSUFCU– Whirlpool
    o Dress Casual (But Appropriate)
    o Schedule for it.

• Client
  ▪ Contact by Email by Tomorrow COB (Close of Business)
  ▪ Conference Call or On-Site Meeting by Friday
  ▪ Review Project Proposal
Capstone Overview

- ✔ Course Logistics

- ✔ Client Projects

- ➤ Course Logistics (Continued)
Urban Science Capstone Lab Machines

• Up to Four per Team
  ▪ Two 27” iMacs
  ▪ Dell Rack-Mounted Server (Optional)
    o Connected to Outside World
    o Keep Secure
  ▪ Mac Book Pro (Optional)

• Operating Systems on iMacs and MBPs
  ▪ Run macOS High Sierra
  ▪ Install VMware Fusion (from [here](#))
  ▪ Create Virtual Machines
    o Windows 10 VM from TAs
    o Allocate Sufficient Cores and Memory
    o Others as Needed
  ▪ Don’t use Apple Boot Camp
Capstone Lab Miscellany

• Security
  ▪ Keep lab doors closed.
  ▪ Do not open doors for strangers
  ▪ Do not give out door key code to others.
  ▪ Do not invite non-capstone students to work in the lab with you.
  ▪ Email Dr. D. if door becomes unlocked.

• Wireless
  ▪ SSID: CSE498
  ▪ Key: ??????
  ▪ Only for Mobile Devices Requiring Lab Subnet

• Coffee
  ▪ Some Provided by Dr. D.
  ▪ Bed, Bath & Beyond (Get 20% Off Coupon)

• Game Playing / Video Watching
  ▪ Not On Monitors Facing Hallway
  ▪ Not If Other Team Members Need Machine
Capstone Lab Miscellany

• Do **not** “maniac” the wires and cables.
• Keep the lab neat and clean.
  ▪ Lived In, Okay.
  ▪ Messy, Not Okay.
• Respect...
  ▪ ...other teams’ spaces.
  ▪ ...shared spaces.
• Garbage Containers
  ▪ Empty the small one by the coffee maker into a larger one.
  ▪ Put larger ones out in the hall at night if near full.
  ▪ Put back in the lab in the morning if empty.
• Turn the lights out if you’re the last one out.
• Close the windows if you open them.
• Be careful with cabinet drawers; don’t “maniac” them.
Mobile Devices Available

• For Capstone Project Use
• By Team for the Semester
• iOS
  ▪ iPads
  ▪ iPhones
  ▪ iTouch
• Android
  ▪ Tablet
  ▪ Phone
• Surface Pro 3
Expectations & Workload

• Extremely High For Both
• Your MSU Career Capstone
• Addition to Your Personal Portfolio
• Experience Viewed Like an Internship
• Interview Talking Points
• Leverage Into a Job Offer
Schedules

- **Schedules > All-Hands Meeting**
- **Schedules > Major Milestones**
  - 09/17: Status Report Presentations
  - 09/24: Project Plan Presentations
  - 10/15: Alpha Presentations
  - 11/12: Beta Presentations
  - 12/03: Project Videos
  - 12/05: All Deliverables
  - 12/06: Design Day Setup
  - 12/07: Design Day
  - 12/11: Project Videos

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**The Capstone Experience**

Capstone Overview

- Attendance is required.
- No excuses are accepted.
- Do not schedule anything including during these times interviews, travel home, etc.
- Will coordinate with your interviews.
Meeting Attendance

• Required
  ▪ All-Hands (Class) Meetings
  ▪ Team Triage Meetings
  ▪ Team Meetings
  ▪ Team Conference Call Meetings

• 5% of Final Grade

• Late == Absent
  ▪ 1% of Final Grade for Each Unexcused Absence
  ▪ Attendance Grade Can Be Negative (See Syllabus)
  ▪ If > 5 Absences Team Contribution Grade Will Be Affected

• Almost No Excuses Accepted
  ▪ One or Two Excused Possible for Interviews
  ▪ Must Provide Information
    ○ Date, Company, Recruiter Name & Contact Info
    ○ In Advance
    ○ To Both Dr. D. and TAs

• Must Attend (No Excuses Accepted)
  ▪ Your Team Presentations
  ▪ All Project Video Viewing
  ▪ Design Day

Do NOT schedule interviews.
Do NOT schedule ANYTHING.
Do NOT buy plane tickets.
Team Organization

• Up to Each Team
• Organize into Roles
  ▪ Client Contact
  ▪ Program Manager
  ▪ Developer
  ▪ Tester
  ▪ Systems Administrator
  ▪ Etc...
• Everyone must make technical contributions.
Team Dynamics

• Key to Success
• Significant Component of Course Grade
• Address Problems Immediately
  ▪ Within Team
  ▪ With Dr. D. and/or TAs
• Be Ready to Discuss During Interviews
# Grading

- **Team (70%)**
  - Project Plan Document & Presentation: 10
  - Alpha Presentation: 10
  - Beta Presentation: 10
  - Project Video: 10
  - Project Software & Documentation: 25
  - Design Day: 05
  - Total: 70

- **Individual (30%)**
  - Technical Contribution: 10
  - Team Contribution: 10
  - Team Evaluation: 05
  - Meeting Attendance: 05
  - Total: 30

---

**The Capstone Experience**

Capstone Overview
Grading

• Final Grade Sum Of...
  ▪ Individual Total
  ▪ % of Team Total Based on Team Contribution

• Grand Total =
  (Individual Total)
  +
  (Team Total) * (Team Contribution) / 10.0

• Nota Bene: Your Team Contribution will have a very significant effect on your final grade.
# Grading

## The Capstone Experience

### Capstone Overview

<table>
<thead>
<tr>
<th>Technical Contribution</th>
<th>Team Contribution</th>
<th>Team Evaluation</th>
<th>Meeting Attendance</th>
<th>Team Total</th>
<th>Grand Total</th>
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</table>

*Nota Bene: Assumes Perfect Score In Every Other Category*
Unacceptable Excuses for Not Contributing

• They never asked me to do anything.
• They never let me do anything.
• I wrote 1000’s of lines of code but they weren’t included in the project.
• My features were not included in the project.
• I work 40 hours per week at my job.
• I live 60 minutes from MSU.
• I didn’t want to work on this project team.
• I ranked this project 20 out of 20.
• I did a lot of research about stuff we never used.
• I was busy interviewing.
• Etc...
Grading

• We reserve the right to make changes with sufficient notice.
• No special consideration will be given for final grades including but not limited to
  ▪ status in any academic program including CSE,
  ▪ financial aid,
  ▪ rank in the armed forces,
  ▪ job while a student at MSU,
  ▪ job after anticipated graduation from MSU,
  ▪ commute to MSU,
  ▪ graduation,
  ▪ mortgage,
  ▪ wedding,
  ▪ visa status,
  ▪ ability to enroll in CSE498 next semester,
  ▪ or anything else.
Integrity of Scholarship

• MSU’s policies will be enforced.

• Individual and team work must be original.

• Violators...
  ▪ ...will be referred to the appropriate deans.
  ▪ ...may receive a grade of F in the course.
Using Resources

• Ok For “Help”
  ▪ People
    □ Past Capstone Teams
    □ Other Capstone Teams
    □ Faculty Members
  ▪ Articles
  ▪ Sample Code
  ▪ Etc...

• Not Ok For “Entire” Project
• If Unsure, Ask Dr. D. and/or TAs
Using Existing Code

- Ok
  - Examples
  - Prototypes
  - Open Source Code
    - Fragments
    - Libraries
    - Utilities

- Not Ok
  - Vast Amounts of Your Project
  - Not Open Source

- Ask Client in Advance
- Document and Report All Existing Code Used
- Be Careful!
- If Unsure, Ask Dr. D. and/or TAs and/or Your Client
Design Day

• College of Engineering Event
  ▪ Engineering Building
  ▪ Friday, December 7, 2018

• Displays (Booths) of Design Projects
  ▪ CSE Capstone
  ▪ ECE Capstone
  ▪ ME Capstone
  ▪ Etc...

• Presentations and Awards
  ▪ Panel of Judges
  ▪ CSE Team Project Videos
Travel to Client

• Reimburse for Mileage for Personal Car
• Travel Within Michigan (Outside of Lansing)
  ▪ Grand Rapids
  ▪ Midland
  ▪ St. Joseph
  ▪ Metro Detroit
• From East Lansing to Client and Back
• One Car Per Team Per Trip
• See Brenda in the CSE office in advance.
VISA

• Verified Individualized Services and Accommodations

• Let us know immediately.

• We will work with you.
Office Hours

• Any Time…
  ▪ Visit: 3149 EB
  ▪ Call: 353-5573
  ▪ Email: (dyksen@msu.edu)

• Make Appointment
Capstone Overview

- Course Logistics
- Client Projects
- Course Logistics (Continued)

Questions?
What’s ahead?

• Team Photos
  ▪ Informal
    o After Meeting Today: Teams Amazon through Mozilla
    o After Meeting Monday: Teams MSUFCU through Whirlpool
  ▪ Formal
    o After Each Project Plan Presentation
    o Dress code for presenting teams is business casual.

• Setup
  ▪ Team Machines
    o Dell Server If Needed (Ask TAs)
    o Apple iMacs (with Windows 10 VM)
  ▪ Team Software
    o Microsoft Office
      ❖ Word and PowerPoint
      ❖ Microsoft Windows Version
    o Web Server
    o Code Repository
    o SDK’s
    o Etc.

Required.
Use Windows 10 VM.
What’s ahead?

All-Hands Meetings
• 08/29: Capstone Overview
• 09/05: Capstone Overview
  Project Plan
  Team Photos: Teams Amazon – Mozilla
• 09/10: Risks and Prototypes
  Team Photos: Teams MSUFCU- Whirlpool
• 09/12: Team Status Report Presentations
• 09/17: Resume Writing and Interviewing
• 09/19: Schedule and Teamwork
• 09/24: Team Project Plan Presentations
• 09/26: Team Project Plan Presentations
• 10/01: Team Project Plan Presentations
• 10/03: Team Project Plan Presentations
What’s ahead?

• Team Status Report Presentations
  ▪ PowerPoint Template
  ▪ Due 12:01 a.m., Wednesday, September 12
    (Think Tuesday night.)
  ▪ < One Week
  ▪ Email to Dr. D.
    ○ Subject: Team <Company Name>: Status Report Presentation
    ○ Subject: Team Auto-Owners: Status Report Presentation
    ○ Attachment: team-<company-name>-status-report-presentation.ppt
    ○ Attachment: team-urban-science-status-report-presentation.ppt

• Dr. D. Will Combine Into Single PowerPoint
  ▪ To Speed Things Up During Meeting
  ▪ Do NOT Modify Master Slide
  ▪ Must Use Windows Version of Microsoft Office

• Each Team Presents
  ▪ Using Dr. D.’s Laptop
  ▪ At Most 3.5 Minutes (Rehearse Timing)
  ▪ Single or Multiple Presenters (Your Choice)

← Get on it now!