01/09,01/11: Capstone Overview

The Capstone Experience

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Michigan State University
Spring 2024
CSE498, Collaborative Design

• “The Capstone Experience”
• Professors
  - Dr. Wayne Dyksen (“Dr. D.”)
  - Prof. James Mariani
• Team Managers (TMs)
  - Samantha (Sam) Kissel
  - Griffin Klevering
  - Luke Sperling
• Class Meetings
  - Tu, Thu 3:00 – 4:20 p.m. Eastern Time
  - All-Hands:
    - 158 Natural Resources
    - Microsoft Teams General Channel
  - Split-Hands:
    - Luke: 152 Natural Resources
    - Griffin: 2250 Engineering Building
    - Sam: 158 Natural Resources

• Website
  - capstone.cse.msu.edu
  - Check it often.
• Syllabus
  - www.capstone.cse.msu.edu/other-links/syllabus
  - Read it thoroughly and carefully.
• Email
  - Check your email often.
  - Read your email immediately, thoroughly and carefully.
Meeting Goals for 01/09 and 01/11

• 01/09
  ▪ Introduction to Capstone Logistics
  ▪ Overview of Projects
  ▪ Team Member Survey

• 01/11
  ▪ Capstone Logistics
  ▪ What’s ahead?
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

• Start Your Transition
  ▪ From... “Make one of these.” —CSE Professor
  ▪ ...To “Solve my problem.” —Customer/Client
Course Goals

• Teams of 5-6 Students
• Build Significant Software System
  ▪ Design
  ▪ Develop
  ▪ Debug
  ▪ Document
  ▪ Deliver
• For Project Sponsor / Client
  (Note: We’ll use “project sponsor” and “client” interchangeably.)
• In 14 (Short) Weeks
Course Goals

- Build a significant software system for a customer.
- Gather requirements.
- Work in a team environment.
- Learn new tools and environments.
- Build and administer systems.
- Develop communication skills.
- Develop interview talking points.
- Learn to do stuff on your own.
- Etc...
Professional Meeting Expectations

• Starts at 3:00 p.m. ET (Eastern Time) Promptly
• Meeting Ready
  ▪ In Person: Seated
  ▪ Microsoft Teams: Joined
  ▪ Ready to Go
  ▪ Looking Professional
• Not Meeting Ready Include But Not Limited To...
  ▪ Entering a Room
  ▪ Walking to a Seat
  ▪ Being in the Process of Sitting Down
  ▪ Joining a Meeting
• No...
  ▪ Other Electronic Devices
    ○ Phones
    ○ Laptops
    ○ Etc.
  ▪ Hats or Hoods
  ▪ Coats
  ▪ Eating
  ▪ Sleeping
  ▪ “Breaks”
Project Deliverables

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

See Major Milestones.
All-Hands/Split-Hands Meetings

• All-hands
  ▪ Dr. D.
  ▪ James Mariani
  ▪ Luke Sperling
  ▪ Guest Speaker(s)

• Split-Hands
  ▪ Team Status Reports
  ▪ Team Formal Presentations (30% of Final Grade)
  ▪ Team Project Videos
Weekly Schedule

- 01/09: Capstone Overview
- 01/11: Capstone Overview
- 01/16: Risks and Prototypes
- 01/18: Project Plan
- 01/23: Team Status Report Presentations
- 01/25: Schedule and Teamwork
- 01/26: Team Photos (9:00 a.m. – 5:00 p.m.)
- 01/30: Team Project Plan Presentations
- 02/01: Team Project Plan Presentations
- 02/06: Design Day Booklet Process
- 02/08: Team Status Report Presentations
- 02/13: No Meeting
- 02/15: Creating and Giving Presentations
- 02/20: Team Alpha Presentations
- 02/22: Team Alpha Presentations
- 02/27: (Spring Break, No Meeting)
- 02/29: (Spring Break, No Meeting)
- 03/05: Team Status Report Presentations
- 03/07: Resume Writing and Interviewing
- 03/12: Design Day and the Project Videos
- 03/14: Intellectual Property
- 03/19: Ethics and Professionalism
- 03/21: Team Status Report Presentations
- 03/26: Team Status Report Presentations
- 03/28: Team Beta Presentations
- 04/02: Team Beta Presentations
- 04/04: Team Beta Presentations
- 04/09: Team Status Report Presentations
- 04/11: Team Status Report Presentations
- 04/14: Project Videos Due
- 04/16: Project Videos
- 04/17: All Deliverables Due
- 04/18: Project Videos
- 04/18: Design Day Setup
- 04/19: Design Day
- 04/25: Capstone Wrap Up (5:45 p.m. – 7:45 p.m.)
The Capstone Labs

- **3340EB, 3352EB, 3358EB**
- **Door Lock**
  - Electronic Keypad
  - Code = ########
  - Do Not Give Out to Other Students
- **Systems**
  - Up to Three per Team
    - Two 27” iMacs
    - One Dell Rack-Mounted Server (Optional)
  - Team 100% Responsible
    - Building
    - Maintaining
    - Securing
    - Backing Up
- **WiFi**
  - SSID: CSE498, CSE498 5MHz
  - Key: ????????

- **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**
  - At Most One Drawer Per Team
  - Only As Needed
  - Assigned by Instructors
  - Obtain Keys from CSE Office
The Capstone Labs

- 3340EB, 3352EB, 3358EB

- In-Person Access
  - Sanitizing Wipes
    - Keyboard and Mouse
    - Desktop
    - Before and After Use
  - Hand Sanitizer

- Remote Access

Instructions will be emailed.
Scheduled Lab Times

- No Formal Lab Sessions
- “Credit” for Scheduled Weekly Meetings
  - Team Meetings
  - Client Conference Calls
  - Triage Meetings with TMs
- Meeting Times TBA With
  - Team
  - Client
  - TMs
- Students must be available to meet in person.
  - Team Meetings
  - Triage Meetings
  - Client Conference Calls
- Schedule Accommodations
  - Made For Reasonable Requests
  - Not Made For
    - Working Unreasonable Number of Hours
    - Commuting Distance to Campus
CSE498 Prerequisites

• Must Have Successfully Completed In Advance
  ▪ CSE300
  ▪ CSE325
  ▪ CSE335
  ▪ At Least Two CSE Technical 400-Level Courses Chosen From CSE402, CSE404, CSE410, CSE415, CSE420, CSE422, CSE425, CSE431, CSE434, CSE435, CSE440, CSE450, CSE460, CSE471, CSE472, CSE476, CSE477, CSE480, and CSE482
  ▪ Tier I Writing Requirement (WRA 101 or WRA 195H)

• Ability to Read Email
  ▪ Immediately
  ▪ Carefully
  ▪ Completely
Capstone Overview

✓ Course Logistics

➢ Client Projects

• Course Logistics (Continued)
Team / Project Generalities

• Clients
  ▪ Vary in Size and Type
  ▪ Sponsor/client contacts 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 Timeline
  - Client Contact
  - Team Dynamics
  - Project Plan (in ~3 Weeks)
  - Entirely New...
    - Languages
    - Environments
    - API’s
    - SDK’s
    - Processes
    - Protocols
    - Hardware
    - 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
  ▪ Course Feature, Not Bug

• Must Be Approved by Instructors
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 to clients. See Downloads.
• Contact Dr. D. or James For Questions.
• Not Willing to Sign Affects Project Choice
# Project Teams

1. Ally
2. Amazon
3. Anthropocene Institute
4. Auto-Owners
5. DRIVEN-4
6. Elektrobit
7. Evolutio
8. Ford
9. GM
10. Google
11. HAP
12. Lockheed Martin Space
13. Ludus
14. Magna
15. Meijer
16. Michigan State University CSE
17. Michigan State University Enviroweather
18. MillerKnoll
19. MSUFCU
20. Roosevelt Innovations Knowledge Science
21. RPM
22. Stryker
23. TechSmith
24. Union Pacific
25. United Airlines Training
26. Urban Science
27. UWM
28. Vectra AI
29. Whirlpool
30. WK Kellogg Co
Team Ally

Project Overview

Shareholder Engagement Chatbot

• Functionalities
  ▪ Improve Investor Engagement and Satisfaction
  ▪ By Answer Shareholder Questions
  ▪ With an Interactive Chatbot

• Features
  ▪ Train an LLM on Ally’s Public Filings
  ▪ Automatically Detect Context of Question
    ○ Provide Appropriate Responses
    ○ Refuse to Disclose Private Information
  ▪ Deploy Chatbot to be Public Facing

• Technologies
  ▪ React
  ▪ Amazon Web Service
  ▪ ChatGPT / Azure Bot Service
Team Amazon

Project Overview

Employee Badge Image Validation Tool

- Functionalities
  - Make Employee Onboarding Easy
  - By Validating ID Photos
  - Using Machine Learning Models

- Features
  - Design an Intuitive Web App
  - Train and Develop a Machine Learning Model
  - Analyze ID Photos for Quality and Errors
  - Provide Users with In-Depth Feedback on Photos

- Technologies
  - AWS Machine Learning and Image Recognition Services
  - AWS Deployments
  - AWS Compute
  - AWS Storage
  - Web Development – Angular, Vue, or React
Team Anthropocene Institute

Project Overview

Optimizing Electric Motors Using Machine Learning

• Functionalities
  ▪ Increase Electric Motor Efficiency
  ▪ Using Machine Learning Models
  ▪ And Real-World Datasets

• Features
  ▪ Analyze Data From Multiple Unique Sources
  ▪ Identify Optimal Electric Motors
  ▪ Find Patterns in Alternative Motor Designs
  ▪ Train a Unique AI Model That Will:
    ▪ Maximize Motor Efficiency
    ▪ Minimize Rare Material Usage

• Technologies
  ▪ Modern Web Framework
  ▪ Database Technologies
  ▪ Machine Learning (ML)
Team Auto-Owners

Project Overview

PIG: Policyholder’s Interactive Guide

• Functionalities
  ▪ Enhance Consumer Understanding of Insurance
  ▪ By Offering a Way to View Information about Insured Items
  ▪ Through Augmented Reality

• Features
  ▪ AR Goggles Simulate Real-Life Scenes
  ▪ Enable Users to Make Object Appear in Space
  ▪ Display Information About Insurance Info in AR
  ▪ View Insurance Information of Real-Life Vehicles

• Technologies
  ▪ Unity
  ▪ C++ or Equivalent
  ▪ Visual Studio
  ▪ Windows SDK
  ▪ HoloLens with Developer Mode
Team DRIVEN-4

Project Overview

DRIVEN-4 Connect Application, Server and Backend

• Functionalities
  ▪ Make Data Management Easy
  ▪ By Creating an All-In-One Data Service
  ▪ And an Intuitive Web App

• Features
  ▪ Develop a Configurable API System
  ▪ Design a Custom Dashboard Creator
  ▪ Update Existing Web App with New Capabilities
    ▪ Integrate and Display New Data
    ▪ Query and Modify Data
  ▪ Integrate a User-Friendly Tutorial Page

• Technologies
  ▪ Python
  ▪ Pandas
  ▪ Flask API
  ▪ SQL

The Capstone Experience

Capstone Overview
Team Elektrobit

Project Overview

Automotive Software Integration In Virtual 3D

• Functionalities
  ▪ Make Vehicle Testing Easier
  ▪ By Simulating Vehicle Incidents
  ▪ Utilizing a High-Performance Computing Module

• Features
  ▪ Remotely Create Vehicle Simulations
    ▪ Create Secure Connections Between Simulator and Machine
    ▪ Start and Stop Unique Simulations
    ▪ Simulate LiDAR and Other Vehicle Functions
    ▪ Collect In-Depth Simulator Data for Visualizations
  ▪ Design a Simulator Dashboard

• Technologies
  ▪ Carla Simulator
  ▪ EB Corbo HPC
  ▪ Docker

The Capstone Experience

Capstone Overview
Team Evolutio

Project Overview

Evo Project Reporting Tool

- Functionalities
  - Improve Meeting Efficiency
  - By Automating Report Generation
  - Within an Intuitive Web App

- Features
  - Dynamically Generate Project Reports
    - Analyze Data From a Project Database
    - Reformat Data to Appear Attractively In A PDF Report
  - Design an Easy-To-Use Web App
  - Ensure Report Customizability for Company Styling
  - Produce Reports on a Routine Schedule

- Technologies
  - React / NextJS
  - Docker
  - Asana
Team Ford

Project Overview

Dealer Experience Dashboard

• Functionalities
  ▪ Improve the Ford Dealership Experience
  ▪ By Leveraging Large Amounts of Cloud Data
  ▪ In an Intuitive Dashboard

• Features
  ▪ Build a One-stop-shop for Dealer Interaction
  ▪ Replace Existing COTS Dashboard
    ▪ Develop and Maintain Completely In-house
    ▪ Implement a New Tech Stack
  ▪ Show Areas of Improvement for Dealers
  ▪ Enable Easy Analysis of Customer Satisfaction

• Technologies
  ▪ React JS
  ▪ GCP BigQuery
Team GM

Project Overview

Recovery of Lost and Stolen IT Assets

• Functionalities
  ▪ Improve Security and Privacy of GM
  ▪ By Assisting in the Recovery of Lost IT Assets
  ▪ And Rendering Stolen Technology Unusable

• Features
  ▪ Send Email Notifications After Loss
    ▪ Notify Employees and Supervisors
    ▪ Update Employees when Status Changes
  ▪ Detect Lost Devices Connecting to Internet
    ▪ Show Notification on Lost Device, Explaining its Status
    ▪ Provide Timeline for Safe Return of Device
  ▪ Automatically Lock Stolen Technology that is not Returned

• Technologies
  ▪ Database Technologies
  ▪ Microsoft Azure
Team Google

Project Overview

Android Vulnerability Database

• Functionalities
  ▪ Increase Android Safety
  ▪ By Creating a Vulnerability Database
  ▪ Accessed Through a Web App

• Features
  ▪ Analyze Android Vulnerability Information
  ▪ Collect and Store Data Within a Database
  ▪ Design an Intuitive User Interface
  ▪ Display Data Based on User Input
  ▪ Provide Insights on Vulnerability Patterns

• Technologies
  ▪ Google Cloud
  ▪ Databasing Technologies
Team HAP

Project Overview

Artificial Intelligence (AI) Training Course

• Functionalities
  ▪ Educate Employees on AI Capabilities
  ▪ Through an Intensive Online Course
  ▪ Utilizing an AI Professor

• Features
  ▪ Design a Unique AI Training Course
  ▪ Create an AI Professor
    ▪ Facilitate Lessons
    ▪ Provide Users with Q&A
  ▪ Quiz Users on Content
  ▪ Develop an Attractive Web App

• Technologies
  ▪ Machine Learning Strategies – LLMs and Virtual Avatars
  ▪ ChatGPT
  ▪ Modern Web Framework
Team Lockheed Martin Space

Project Overview

SmartSat™ AI Acceleration in Space

• Functionalities
  ▪ Enhance Satellite Capabilities
  ▪ By Enhancing Real Satellite Software Kits
  ▪ With Modern ML Systems

• Features
  ▪ Analyze Modern Satellite Software
  ▪ Develop Tools to Run on Real Satellite Hardware
  ▪ Integrate ML Frameworks into Satellite Software
  ▪ Design Rigorous Testing Software

• Technologies
  ▪ C++ & Python
  ▪ Embedded Development Exposure
  ▪ ONNX
  ▪ Vitis AI
  ▪ Amd ROCm
  ▪ Xillinx
Team Ludus

Project Overview

Digital Playbill Builder

• Functionalities
  ▪ Offer a Unique Experience for Those Attending a Play
  ▪ By Creating Digital Playbills
  ▪ With an Innovative Web Application

• Features
  ▪ Design Entire Custom Playbills or Utilize a Template
  ▪ Add Shapes, Text, Images, Videos, Links, Buttons, and More
  ▪ Include Interactive Features for the Audience
  ▪ Create User Accounts to Save Projects
  ▪ Receive Recommended Design Elements with AI

• Technologies
  ▪ PHP with Laravel Framework
  ▪ OpenAI API
  ▪ HTML5 Canvas and Helper Libraries
  ▪ Nginx + Linux

Holland, Michigan
Team Magna

Project Overview

3D Model for Factory Digital Twin Using WebGPU

• Functionalities
  ▪ Visualize a Manufacturing Plant
  ▪ By Modeling Assets on a Factory Floor
  ▪ With a Web-Based Application

• Features
  ▪ Modify Magna’s Existing Solution
  ▪ Represent Fixed and Moveable Objects in a Factory
  ▪ Provide Metrics About Factory Assets
  ▪ Accurately Reflect Factory Changes in Real-Time
  ▪ Improve Model Aesthetics and Adopt Physically-Based Rendering

• Technologies
  ▪ RESTful APIs
  ▪ JSON Data and Models
  ▪ Cesium Ion Platform
  ▪ Three.js / Babylon.js / TroisJS / TresJS
  ▪ Orillusion / WebGPU

Sam
Team Meijer

Project Overview

Supply Chain Induction Visibility Using Witron

• Functionalities
  ▪ Create a Supply Chain Graphical View
  ▪ Showing Incoming Inventory and Witron Induction
  ▪ Visualized on a Real-Time Web Dashboard

• Features
  ▪ Web Dashboards Display Several Induction Stations
  ▪ Display Information About Velocity and Staffing
  ▪ Facilitate Accuracy Improvements for Hundreds of Pallets

• Technologies
  ▪ API Coding in Azure
  ▪ Azure Web Services
  ▪ Oracle / SQL Databases
  ▪ Visual Web UI Platform
Team Michigan State University CSE
Project Overview

clUML: A Browser-based UML editor

• Functionalities
  ▪ Improve CSE Course Materials
  ▪ By Continuing Development of UML Class Diagram Editor
  ▪ That Will be Embedded in Any CourseLib Website

• Features
  ▪ Creation and Editing of UML Class and Object Diagrams
  ▪ Add Support for Tabs, Allowing Multiple Diagrams
  ▪ Backend Support and Improvements
  ▪ Demonstrate clUML in Several Ways Throughout CourseLib
  ▪ Add Redundancy Checker and Other Testing

• Technologies
  ▪ JavaScript / PHP
  ▪ Webpack
  ▪ Composer
  ▪ Yarn
  ▪ SASS
  ▪ Karma and Jasmine
Enviroweather Mobile

- Functionalities
  - Provide Detailed Information on Weather Conditions
  - And Insect, Disease, and Crop Development
  - In a User-friendly Mobile Website

- Features
  - Offer Graphical Display of Weather Data
  - Show Regional Rainfall Summary
  - Track Pest Risk in Real-time

- Technologies
  - Swift
  - Android Studio
  - Next.js
Team MillerKnoll

Project Overview

Product Lifecycle Tracing System

• Functionalities
  ▪ Increase Organizational Efficiency for MillerKnoll
  ▪ With a Web Dashboard
  ▪ That Identifies Component Sources and Products

• Features
  ▪ Consolidate Vast Amounts of Information into a Dashboard
  ▪ Integrate Data from Multiple Sources
  ▪ Track Product Parts for Easy Identification
    ▪ Via Manufacturing Location
    ▪ Via Part Number

• Technologies
  ▪ CSS / HTML / JavaScript / PHP
  ▪ Data Fabric Technologies
Team MSUFCU

Project Overview

Personalized Augmented Reality Experience

• Functionalities
  ▪ Provide a Personalized Experience for Customers
  ▪ By Offering Relevant Options when Servicing Account
  ▪ Utilizing Facial Recognition and Augmented Reality
• Features
  ▪ Offer a Personalized Augmented Experience to Members
  ▪ Identify Key Reasons Member May Need Assistance
  ▪ Allow Users to Securely Service Accounts
• Technologies
  ▪ Scripting Languages
  ▪ HTML / CSS
  ▪ Android Development (Java / Kotlin)
  ▪ iOS Development (Objective-C / Swift)
  ▪ MySQL
  ▪ Geofencing Technology
Team Roosevelt Innovations Knowledge Science

Project Overview

Microsoft Excel Data Extractor/Modeler

- Functionalities
  - Improve Efficiency and Accuracy of Operations
  - By Automatically Processing Excel Files
  - With a Novel, Robust System

- Features
  - Support Upload, Extraction, and Modeling Data
  - Reduce User Error via Automation
  - Convert Data to Domain Specific Language Code
  - Provide User-friendly Experience with UI

- Technologies
  - Angular
  - TypeScript / JavaScript
  - MongoDB
  - Microsoft Excel
Team RPM

Project Overview

Voice Transcription API

• Functionalities
  ▪ Provide Over-the-Phone Customer Support
  ▪ On Customer’s Personal Phones
  ▪ In Real-time via Deep Learning

• Features
  ▪ Answer Carrier and Customer Questions
  ▪ Store Data in Profiling System from Conversations
  ▪ Identify Carrier/Customer by Voice

• Technologies
  ▪ OpenAI
  ▪ C#
  ▪ Twilio
  ▪ React
Team Stryker

Project Overview

Dynamic Visualization of Architecture Diagrams

• Functionalities
  ▪ Easily Identify Data Integrations Between Systems
  ▪ Through Visually Representing Data Connections
  ▪ By Generating Diagrams on a Web-Based Tool

• Features
  ▪ Query Databases to Find Data Connections
  ▪ Visualize Integrations Between Systems
  ▪ Generate System Architecture Diagrams
  ▪ Option to Export Diagrams to Microsoft Visio for Edits

• Technologies
  ▪ Microsoft Azure
  ▪ Front-end UI
  ▪ Back-end Development
  ▪ Database Tools
EVA: Enhanced Video Assistant

• Functionalities
  ▪ Make Video Editing Seamless
  ▪ By Trimming and Enhancing Video Content
  ▪ Using Machine Learning Models

• Features
  ▪ Identify the Important Parts of Videos
  ▪ Generate Videos of the Best Segments
  ▪ Dynamically Normalize and Enhance Audio
  ▪ Create an AI Focus Group That Will Critique Videos
  ▪ Design an Intuitive Web App

• Technologies
  ▪ Angular
  ▪ React
  ▪ Ffmpeg
  ▪ Microsoft Azure
Team Union Pacific

Project Overview

Rules Test Practice Tool

• Functionalities
  ▪ To Increase Efficiency and Productivity
  ▪ By Train Employees for Annual Exams
  ▪ With a Website and Mobile App

• Features
  ▪ Consolidating Training Material into One Location
  ▪ Support Many File Types Throughout the System
    o PowerPoints
    o PDFs
    o CSVs
    o JSON Files
  ▪ Automatically Create Practice Exams from Example Content

• Technologies
  ▪ React
  ▪ SCORM
Team United Airlines Training

Project Overview

Automated Process for Airworthiness Release

• Functionalities
  ▪ Save Time and Reduce Error in Aircraft Safety Checking
  ▪ Streamline the Airworthiness Release Process
  ▪ In a Multi-step Process for Technicians

• Features
  ▪ Check for Specified Courses in Training Records
  ▪ Automatically Send Relevant Documents to Technicians
  ▪ Build Intuitive Progress Checker for Safety Checks
  ▪ Incorporate Digital Signatures
  ▪ Automate Data Validation and Storage

• Technologies
  ▪ Microsoft Power Apps
  ▪ Microsoft SharePoint
Auditing Assistant Using Video AI Platforms

- Functionalities
  - Ensure Car Dealership Compliance
  - With Standards and Guidelines Set by Car Manufacturer
  - By Analyzing Dealership Video Footage

- Features
  - Use Smartphone or Camera Footage of Dealership
  - Analyze Video Using APIs to Determine Compliance
  - Store Findings in Database
  - Display Results on Web Application

- Technologies
  - Smartphone or 360 Degree Camera
  - Client / Server Architecture
  - .NET Web APIs / .NET Maui
  - Apache Cordova
  - Ionic Framework
  - Angular
  - SQL / TypeScript
Team UWM
Project Overview

IT Datamart Microservice for BitBucket

• Functionalities
  ▪ Gather Relevant Data from Diffused Systems
  ▪ To Analyze Production Risks and Performance
  ▪ By Capturing and Storing Data from Bitbucket

• Features
  ▪ Microservice Application to Store Records
  ▪ Maintain Historical Retention of Changes to Each Record
  ▪ Evaluate Relevant Data of Code Repositories
  ▪ Provide Visual Dashboard to Represent Analytics

• Technologies
  ▪ Bitbucket
  ▪ Jenkins
  ▪ C#
  ▪ SQL
Team Vectra AI

Project Overview

Hybrid Cyberattack Simulator

• Functionalities
  ▪ Enhance Cyber Attack Simulation Software
  ▪ To Enable Simulations of Hybrid Attacks
  ▪ To Train AI Models that Detect Malicious Behavior

• Features
  ▪ Enable Parameterized Input
  ▪ Support Automated Suites of Tests
  ▪ Create and Visualize Realistic Attack Data

• Technologies
  ▪ Vectra C2 Simulator
  ▪ MAAD Attack Framework
  ▪ DeRF
Team Whirlpool

Project Overview

Personalizing the Culinary Experience

• Functionalities
  ▪ Personalize Smart Appliances
  ▪ By Suggesting Specific Recipes and Recommendations
  ▪ Tailored to the User via Machine Learning

• Features
  ▪ Track and Analyze User Interactions with Appliances
  ▪ Use ML Algorithms to Identify Consumer Patterns
  ▪ Generate Personalized User Profiles
  ▪ Offer Customized Recipes, Cooking Methods, and More

• Technologies
  ▪ Python
  ▪ NoSQL and Vector Database
  ▪ JavaScript
  ▪ Deep Learning Framework
Team WK Kellogg Co

Project Overview

Next Gen Smart Factory

• Functionalities
  ▪ Make Factory Logistics Easier
  ▪ By Tracking Metrics and Issues
  ▪ On an Easy-To-Use Web App

• Features
  ▪ Analyze Existing Data Integration Tools
  ▪ Integrate Maintenance Schedulers
  ▪ Track Goods Errors and Defects
  ▪ Create Several Unique Databases
  ▪ Design an Intuitive Web App

• Technologies
  ▪ Microsoft Power apps
  ▪ .Net Framework
  ▪ SQL Server
Attendance Today

• Get out your laptops.
• Sign into Google with MSU Credentials
• Google Form
  https://forms.gle/kaw8UUgKVC5vEP946
• https://shorturl.at/bckNW
Team Member Survey

• Check Student ID
• NetID
  ▪ Yes: dyksen
  ▪ No: dyksen@msu.edu
• Use Upper and Lower Case
  ▪ Yes: Lansing, Michigan
  ▪ No: LANSING, MICHIGAN
• Hometown Country, NOT County
  ▪ Yes: USA, China
  ▪ No: United States, Ingham, Wayne
• Use Floating-Point Numbers Only For GPAs
  ▪ Yes: 3.7, 2.8
  ▪ No: 3.5-3.7, ~3.5, About 3.5
Team Member Survey

• Get out your laptops.
• Open browser.
• Log into Google with MSU credentials.
• Go to www.capstone.cse.msu.edu.
• Click on...
  ▪ + Other Links
  ▪ > Downloads
  ▪ Team Member Survey: Google Form
First Assignments

• Read the **Syllabus**.

• Check out the **Website**.

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

• Find the meeting slides.  
  [capstone.cse.msu.edu/schedules/weekly-schedule](http://capstone.cse.msu.edu/schedules/weekly-schedule)
What’s ahead?

• Teams
  ▪ Receive team assignments later today. (Keep checking your email.)
  ▪ Meet initially later today or by tomorrow morning.
  ▪ Start researching technologies.
  ▪ Start configuring lab machines.
    o Team assignments given in emailed project proposals.
    o Instructors will email remote access instructions.

• Project Sponsor / Client Contact
  ▪ Contact by email ASAP and certainly by tomorrow COB. (COB == Close of Business)
  ▪ Complete conference call or online meeting by Friday.
  ▪ Review project proposal.
What’s ahead?

- Team Photos
  - Coordinated by James
  - Friday, January 26, 9:00 a.m. – 5:00 p.m.
    - James will make a schedule.
    - On-Time Attendance Required
    - Put on your calendar now. ← Note
  - Scheduled via Google From
    - Email From James
    - Look for it.
    - Respond to it as a team ASAP.

Questions?
Capstone Overview

✓ Course Logistics

✓ Client Projects

➢ Course Logistics (Continued)