Project Plan Presentation
3D Scene Reconstruction of Vehicle Accidents

The Capstone Experience
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Functional Specifications

• Reduces the amount of time and work required to analyze any damages on the car
• Helps customers understand and visualize how the analysts reached their conclusions
• Helps client and customers decide next steps
• Reinforces company’s primary objective: improving road and traffic safety
Design Specifications

• Provide a method for creating a 3D model of a crash scene from a video
• Aid adjusters in analyzing a crash scene
• Provide tools to annotate the scene
• Showcase potential ideas to client for a future deployment
Screen Mockup: Before/After View
Screen Mockup: Stacked View
Screen Mockup: Vehicle Sidebar
Screen Mockup: Properties Sidebar
Technical Specifications

• Development
  ▪ Unity and C#
    o UI Bound to Model.
    o Server Requests
  ▪ Python Server
    o Mp4 to CV to OBJ
  ▪ SQL Server

• Production
  ▪ Target: Windows; OS independent
  ▪ Unity and C#
  ▪ Python Server and SQL Server
System Architecture
System Components

• Hardware Platforms
  ▪ Windows; OS Independent

• Software Platforms / Technologies
  ▪ Unity and UI Toolkit
    o User Video Requirements
  ▪ Python Server (Dockerized)
    o Machine Learning
      ❖ Sci-Kit and OpenCV
    o DB Asset Access
Risks

Combining frontend and backend
Description: We need a smooth transition from our backend to our frontend so the program can work seamlessly.
Mitigation: We are testing a C# server that handles translation between requests and the Python machine learning model.

Refining the base model
Description: The depth maps created by the model has some inaccuracies as we test out different input images to the model.
Mitigation: As we try out more data and input images we might discover new bugs and edge cases that will need to be refined and fixed.

Unity UI toolkit in pre-release
Description: Our UI implementation uses Unity's UI Toolkit which currently is in pre-release.
Mitigation: If UI Toolkit does not work out for the project we will revert back to Unity UI.

Limited Model Accessibility for Feature Development and Testing
Description: Finding vehicle 3D models can be challenging as there is no easy way to access such a 3D model for the comparison of any damaged vehicle.
Mitigation: Finding the most popular daily driver cars 3D models in the U.S. will give us a much better chance of ensuring that the damaged vehicle can be compared.
Questions?