CNERG :
Smart Campus Research

Fall 2024 Sprint 3

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Smart Campus Research Team

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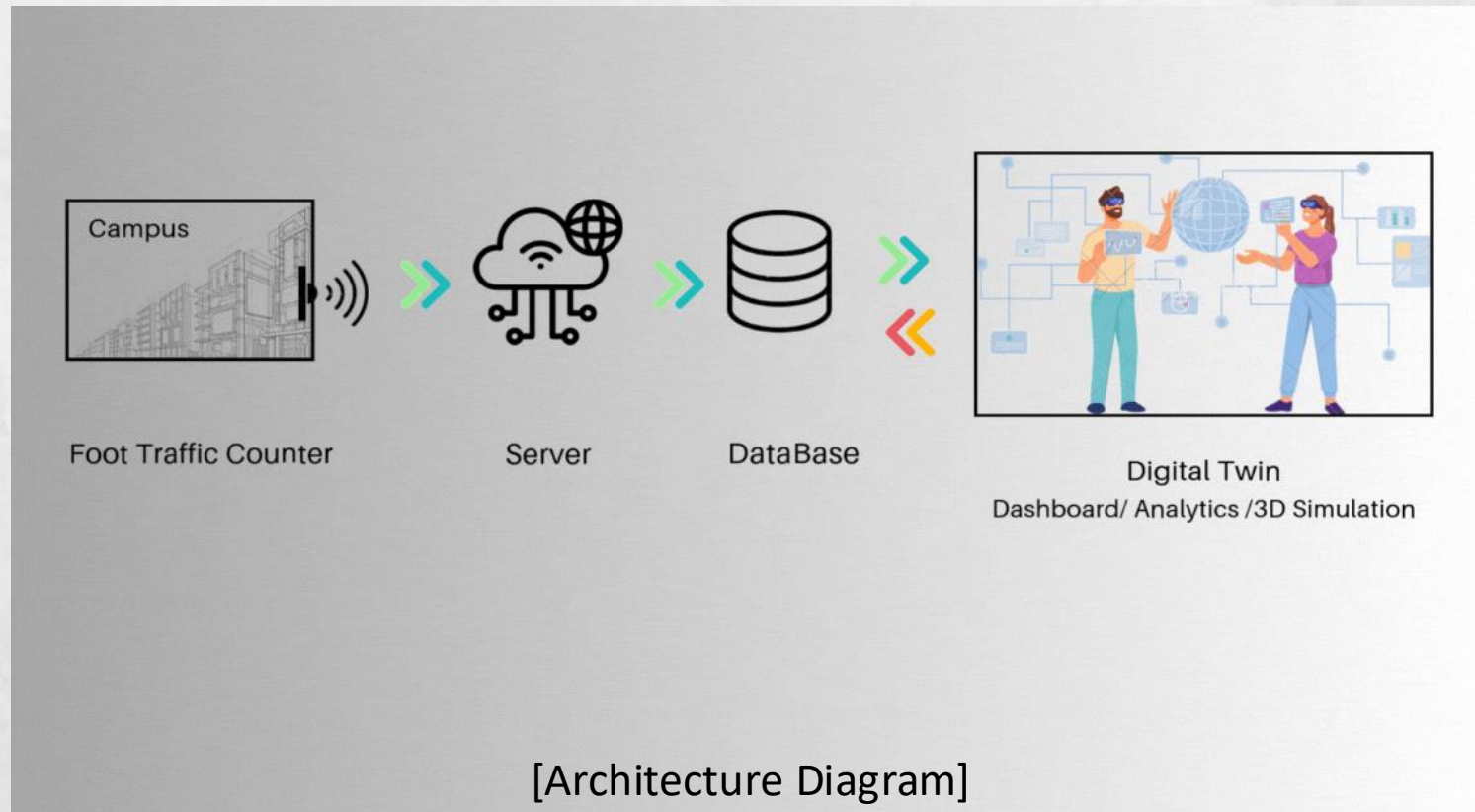
Eunie Jo

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Project Overview

➢ Digital Twin

  o "3D Model" of Waterloo Campus ground floor

  o Acquire Data (In & Out traffic)

    ▪ Pedestrian counting using sensors

  o App to "Replay" data

➢ Demo prototype

➢ Documentation

  o What works?

  o What doesn't work?

Project Overview

➢ 3D simulation uses to analyzes pedestrian foot traffic data, visualizing insights through interactive dashboards for smarter decision-making

Campus

Foot Traffic Counter   Server   DataBase

Digital Twin
Dashboard/ Analytics /3D Simulation

[Architecture Diagram]

Project Overview

➢ Problem:
  o Visualize data of pedestrian foot traffic.

➢ Solution:
  o Gather data and use it to simulate pedestrian foot traffic in a digital twin using AR/VR technology.

➢ Value:
  o Can be used as an aide in developing a smart campus.
  o Use space efficiently & effectively.
  o Emergency planning, building codes, and regulatory compliance.

Sprint Goal

- ➢ Project Planning
  - o Finalize the project plan and identify key decisions for upcoming discussions.
  - o Define the project scope, milestones, and deliverables.
  - o Brainstorming
- ➢ Research on Required Technologies
  - o Conduct research on technologies needed for the project.
    - ▪ AR/VR: Tilt5, Unity, Metaquest
  - o Focus on tools for 3D simulation, foot traffic sensors, data visualization, and database management.

Sprint Goal

- Project Planning
  - Finalize the project plan and identify key decisions for upcoming discussions.
  - Define the project scope, milestones, and deliverables.
- Research on Required Technologies
  - Unity Roll a ball
  - Tilt Five Roll a ball
  - Unity
  - Sensors

Sprint Obstacles

- Project Planning
  - Divergence discovery, Project planning tools
- Research on Required Technologies
  - Tilt Five
    - New technology with not a lot of documentation
  - Sensors
    - Avoid cameras and AI
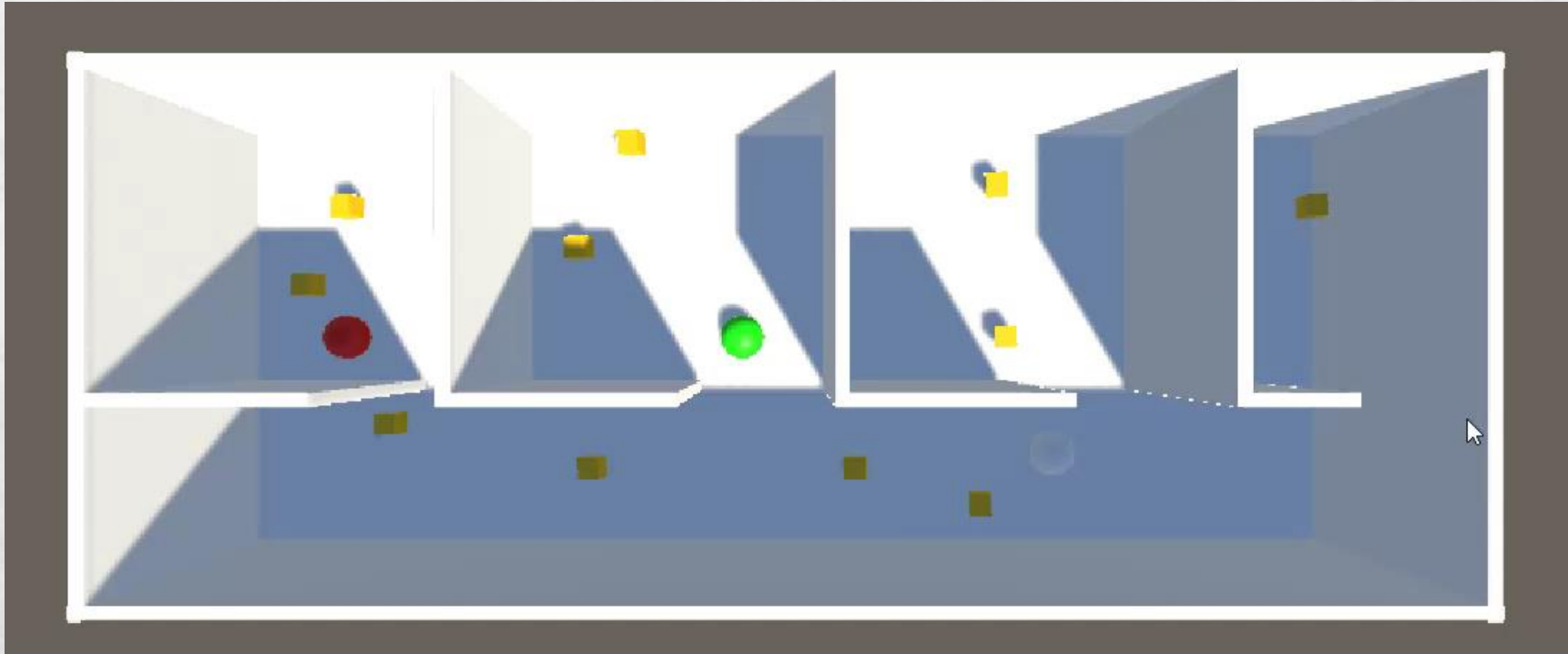   - Confirming sensor capabilities
      - Facilities considerations (mounting/placement), IT/IoT Wireless
      - Acquiring data (APIs/Subscriptions), Timezones

Demo

- **3D Simulation Demo**
  - Prepare and present a 3D simulation demo using Unity and Tilt5 to demonstrate simulation capabilities.

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Next Plan

- Sensor Installation and Accuracy Verification
  - Research and select sensors
  - Install sensors, coordinating with the facilities team for installation. To ensure data accuracy, test various sensors and compare results using manual counts or video recordings.
- Dashboard Implementation in Unity
  - Develop a dashboard within Unity to visualize data.
- Azure Server and Database Setup
  - Set up the server and database on Azure to manage sensor data
- 3D Simulation
  - Continue development of 3D simulation
  - AI Integration

Q & A