

CNERG F24: Smart Campus Research

Principal Investigator: Adam Holland

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Smart Campus Research Team

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Supervisor: Sean Yo

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Sprint Goal

- ▶ Sensors
 - ▶ Install and validate sensors (HX-HE3).
 - ▶ Confirm sensor functionality and performance, decide on additional purchases.
- ▶ Dashboard
 - ▶ First attempts at building in unity.
 - ▶ Look in to purchasing assets and tools.
 - ▶ Determine what information to include in dashboard and how it will be displayed.
- ▶ 3D Simulation
 - ▶ Review NPC/AI integration.
 - ▶ Review AI Investigation Roll-a-ball machine learning.
- ▶ DB Server
 - ▶ DB Server Setup.

Sprint Activities Completed

- ▶ Sensors
 - ▶ Working on validate sensors. (Install sensors with receiver device on hinge side of door)
 - ▶ Determine location to test and validate sensors.
 - ▶ Draft memo to notify team of sensor installation to collect anonymous data. (In/out movement in rooms).
- ▶ Dashboard
 - ▶ Test data visualization tools (Power BI, Grafana, XChart).
 - ▶ Prototype dashboard design layouts.
- ▶ 3D Simulation
 - ▶ Examine AI Investigation Roll-a-ball project for use in 3D simulation.
- ▶ DB Server
 - ▶ Setup VM with Azure.
 - ▶ Setup InfluxDB with VM.

Demo (Database)

- DB Server : Setup InfluxDB with Azure VM
- : Below is InfluxDB web service UI

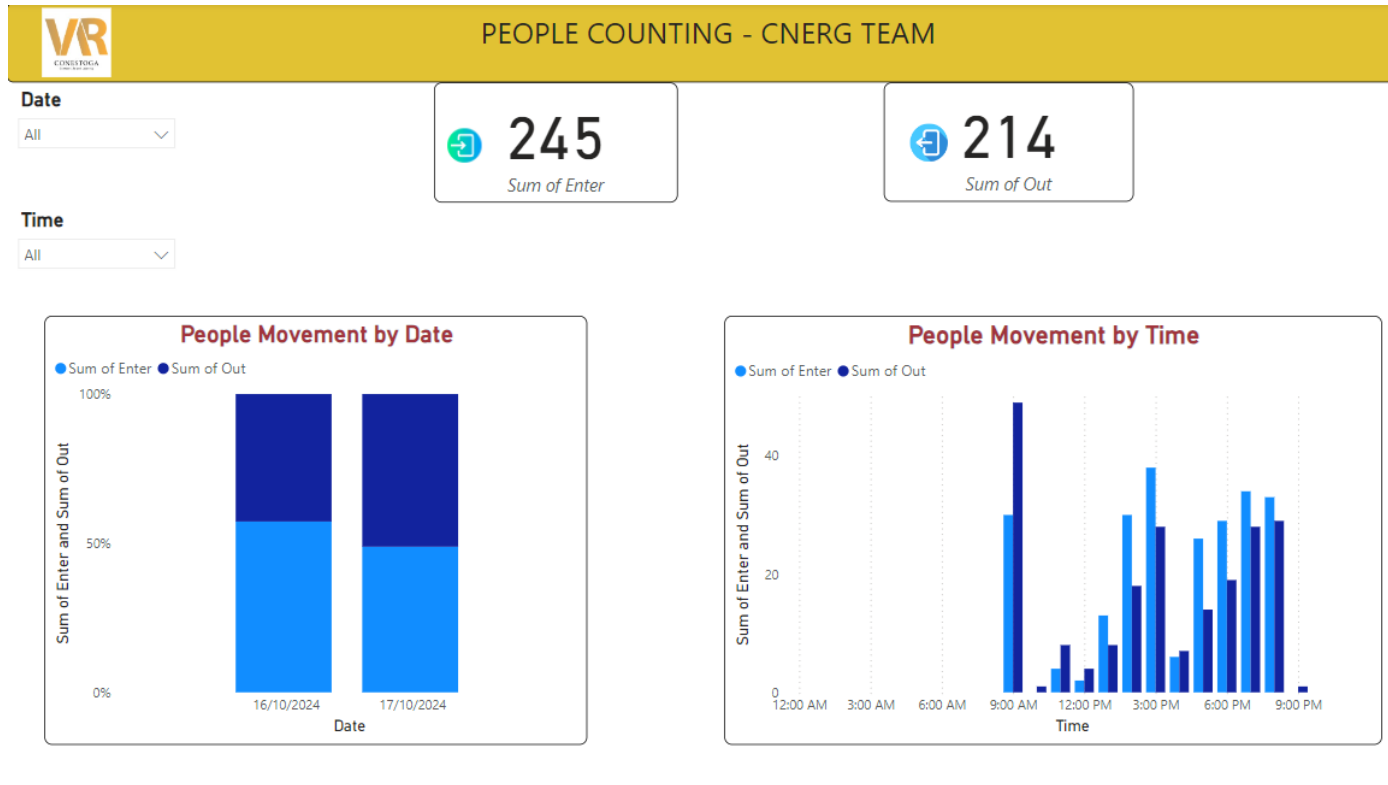
The screenshot displays the InfluxDB Data Explorer interface. The top section shows a table of data with columns: `_start`, `_stop`, `_time`, `_value`, `DOOR_ID`, `_field`, and `_measurement`. The data is filtered by `DOOR_ID = 0` and `_field = IN`. The bottom section shows the query editor with the following query:

```
Query 1 (0.05s)
FROM
  Search buckets
  foot_traffic_db_v1
  _monitoring
  _tasks
  + Create Bucket
Filter
  _measurement 1
  Search _measurement tag va
  foot_traffic
Filter
  DOOR_ID 3
  Search DOOR_ID tag values
  0
  1
  2
Filter
  _field 2
  Search _field tag values
  IN
  OUT
```

The right sidebar shows the window period set to `Past 30d` and the aggregate function set to `mean`.

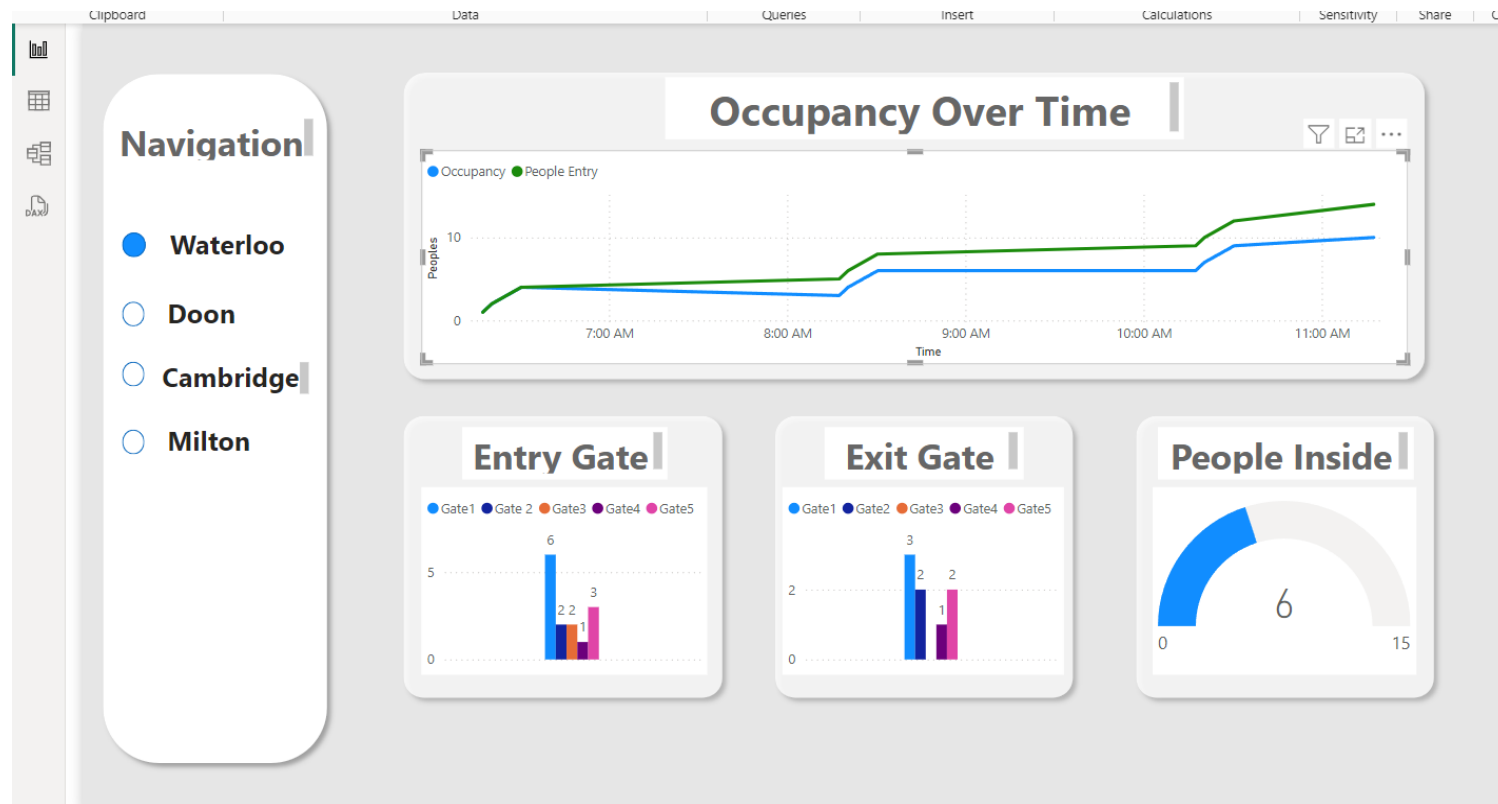
Demo (Dashboard Prototype)

- Prototype dashboard design for data visualization.



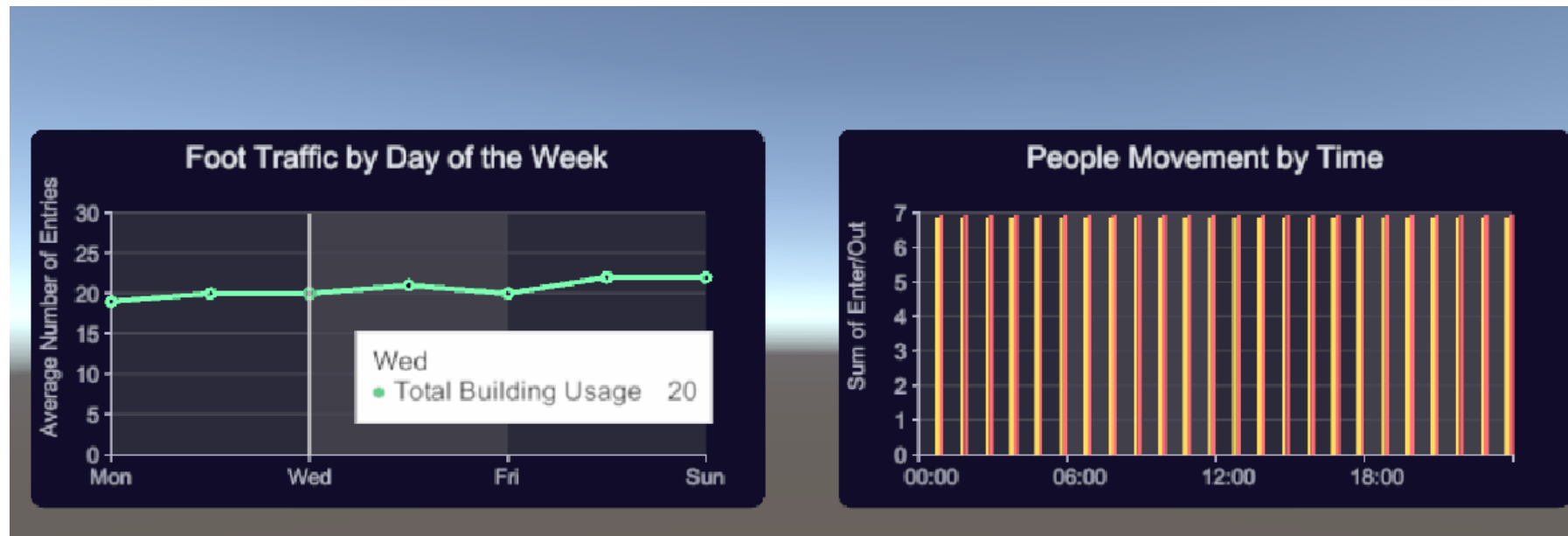
Demo (Dashboard Prototype)

- Prototype dashboard design for data visualization.



Demo (Dashboard)

- XChart data visualization in Unity



Demo (Dashboard)

- XChart data visualization in Unity with Tilt Five



Next Steps

▶ Sensors

- ▶ Complete validating sensors functions and shortcomings. (Validate electronic count to actual count)
- ▶ Post notice about sensors being used to collect anonymous data.
- ▶ Install sensors in locations. (First in CVRI space, then student lounge, and someone watching and counting with sensors)
- ▶ Order more sensors (HX-HE3).
- ▶ Collect data from sensors and validate data.

▶ Dashboard

- ▶ UI/Dashboard validation. (UX)
- ▶ Interactive dashboard. (Interaction features)

▶ 3D Simulation

- ▶ Look into AI heuristics applications.
- ▶ Use data from sensors in 3D simulation.
- ▶ Simulation should communicate our intention is to not track people.

▶ Digital Twin

- ▶ Get a hold of blueprints for spaces to recreate.

Optimization opportunities

- ▶ Sensors
 - ▶ HX-HE2 sensor that can record in/out data in 5-minute periods.
- ▶ Dashboard
 - ▶ Utilize Canvas features for better data visualization
 - ▶ Paid assets.
- ▶ 3D Simulation
 - ▶ NPC heuristics.
- ▶ Digital Twin
 - ▶ CAD files for building digital twin environment(s).

People to recognize and thank:

(mentioned in no specific order)

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- ▶ Carolina
- ▶ Topher
- ▶ Anzhelika
- ▶ Arsh
- ▶ Jonathan
- ▶ Facilities
- ▶ Security

Any Questions?