

AI-Powered Smart Queue Tracker

META4

Overview - The Problem

- KAIST is a dynamic and highly frequented environment with students, professors, visitors and other university staff between locations (namely cafeterias, libraries and classrooms)
- This constant movement can cause lines and bottle necks in:
 - Cafeterias
 - Library



Waiting up to 20 minutes during peak hours (i.e first 10 minutes after class)

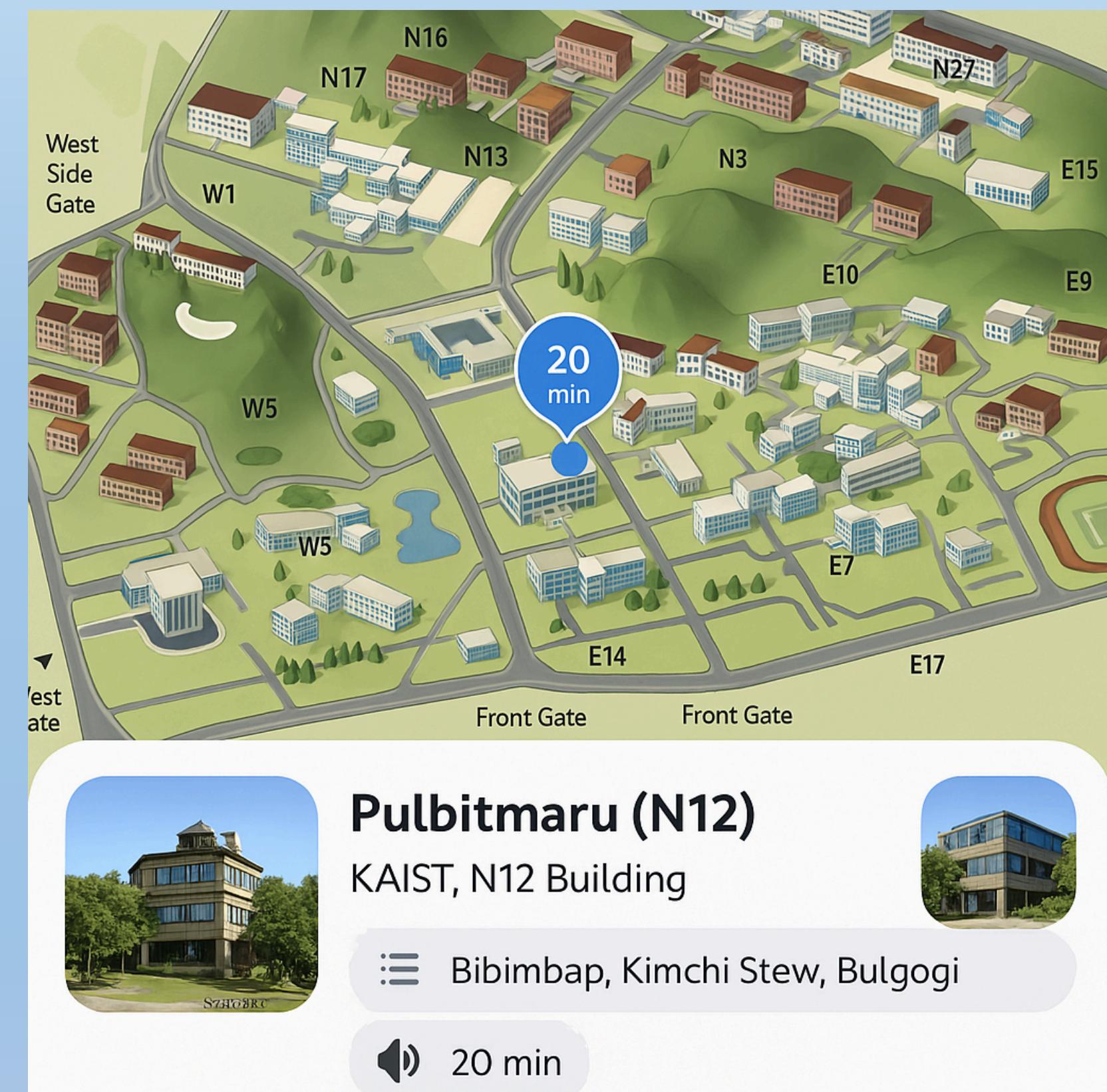
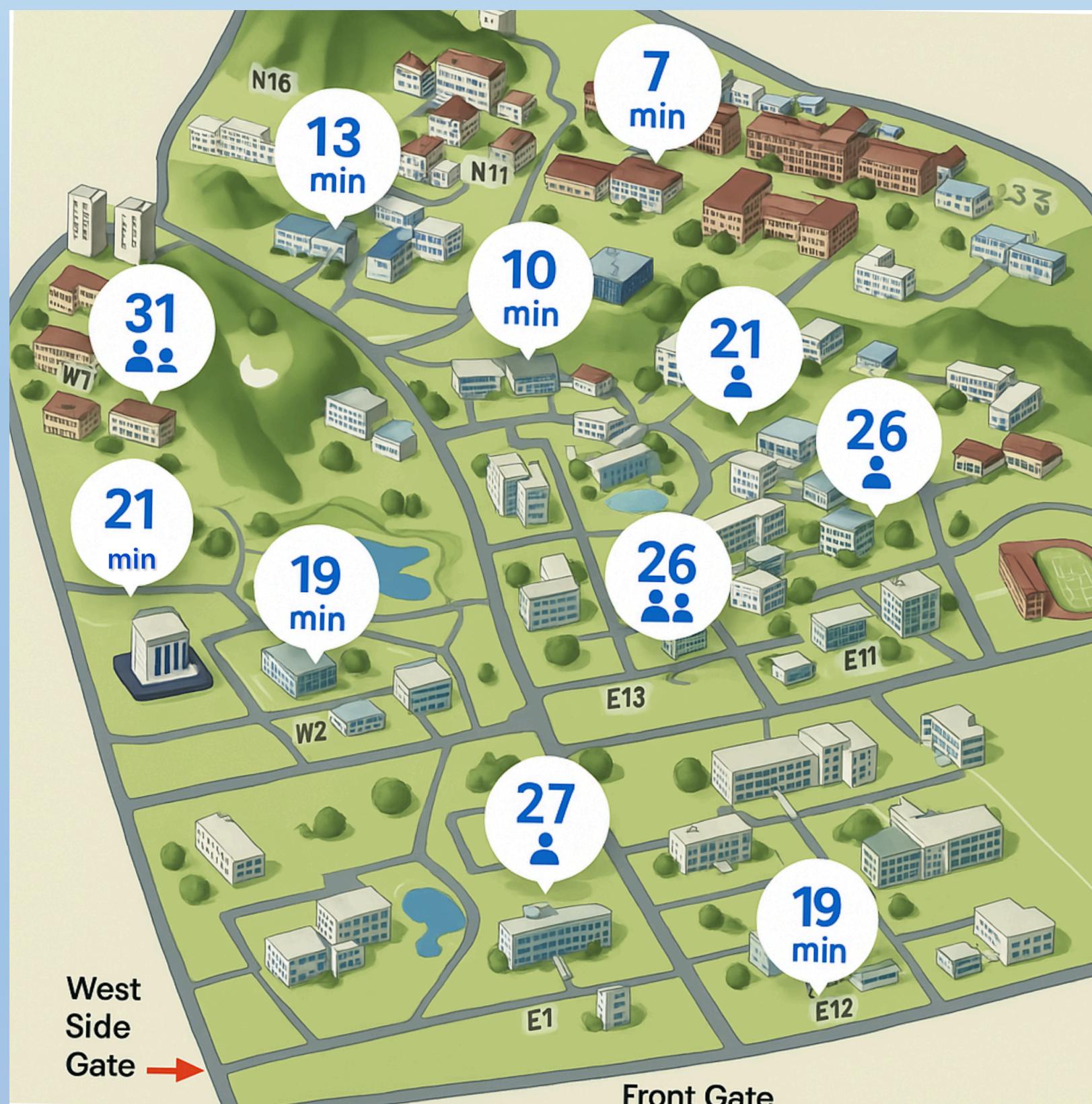


Almost full space during peak times (i.e the week before midterms & finals)

Wouldn't be great if there was a service that could help you reduce all this wasted time and find right time and space?

Our Solution - AI-Powered Smart Queue Tracker

- Aims to reduce the waiting time for students in queues at various university spaces, including cafeterias and libraries



Our Brainstorming

Prompt 1

Who are the different types of users interacting with this system?

10 min

Externals	students	Professors	Cafeteria Staff	Visiting family
Marco Miglioranza	jenghyun Kim	Julien	Fozzie	Javad
school employee	Visiting high school students	Admin	Desperate Students during midterm/final week	People with different diet constraints
jenghyun Kim	Javad	Julien	Javad	Javad

Are there external systems/services interacting?

library site for booking some library places(https://library.kaist.ac.kr/main.do)	KAIST cafeteria information website (https://www.kaist.ac.kr/en/html/campus/053001.html)	Type anything, @mention anyone
jenghyun Kim	Julien	Julien
Type anything, @mention anyone	Type anything, @mention anyone	Type anything, @mention anyone
Type anything, @mention anyone	Type anything, @mention anyone	Type anything, @mention anyone

Prompt 2

What are the main things each actor wants to accomplish?

10 min

Viewing status of a library/ cafeteria	Knowing about queue waiting time	Enjoying beautiful views and cherry blossoms at KAIST. Making picnic, laying down on grass enjoying sun bath.	Find a free seat	To find menu that follows their diet constraints
Marco Miglioranza	Marco Miglioranza	Javad	Marco Miglioranza	Javad
Discovering new places to go (eat, study,) by looking on the map and get information about these places	To have enough place to eat with other visiting students from his/her tour group. Place where they can speak and be loud too?	Viewing the daily menu of the cafeteria, with the price	Knowing what is the cheapest menu at KAIST	Finding not crowded and quite place to lock in for exams.
Julien	Javad	Julien	Javad	Javad
Set some places as they favorite place to get notified about it	View the peak time of the desired location	Marco Miglioranza	Finding places next to coffee shops or general shops for quick breaks and energy refill (energy drink, coffee, snacks)	Javad
Julien	Marco Miglioranza		Javad	

Prompt 3

Do we have non-performance, av

must measure crowds in minutes update pr minutes

jenghyun Kim Marco Miglioranza

The system must inform users in real time about how crowded a place is, with minimal latency or delay → the system must support real-time data processing

Database updated in minutes

Julien Marco Miglioranza

Students are using our app to choose where they are going to eat or study

The system predicts the based on of a place

Julien Julien

Professor and Faculty members are also using our software

Reduce w crowding

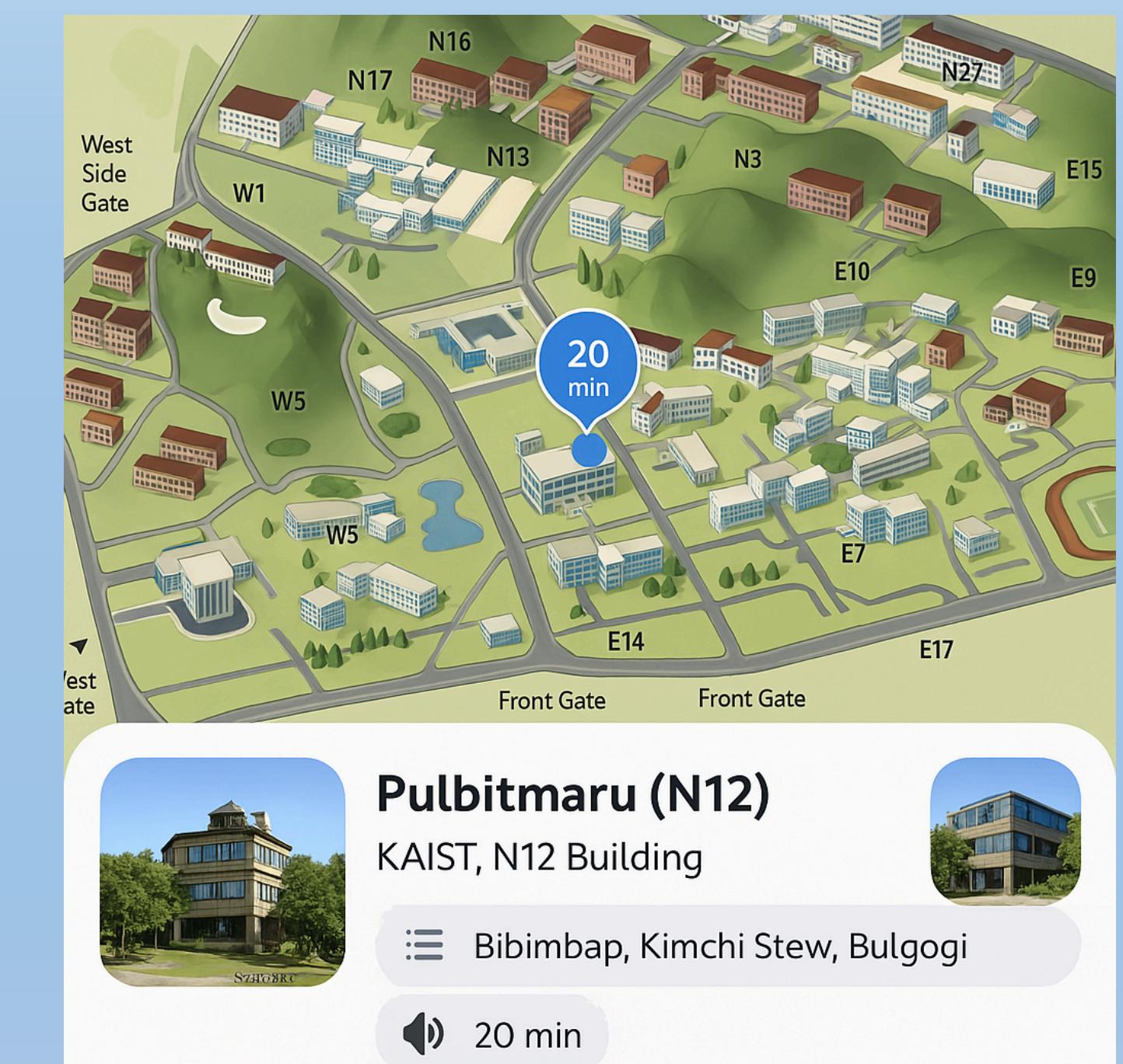
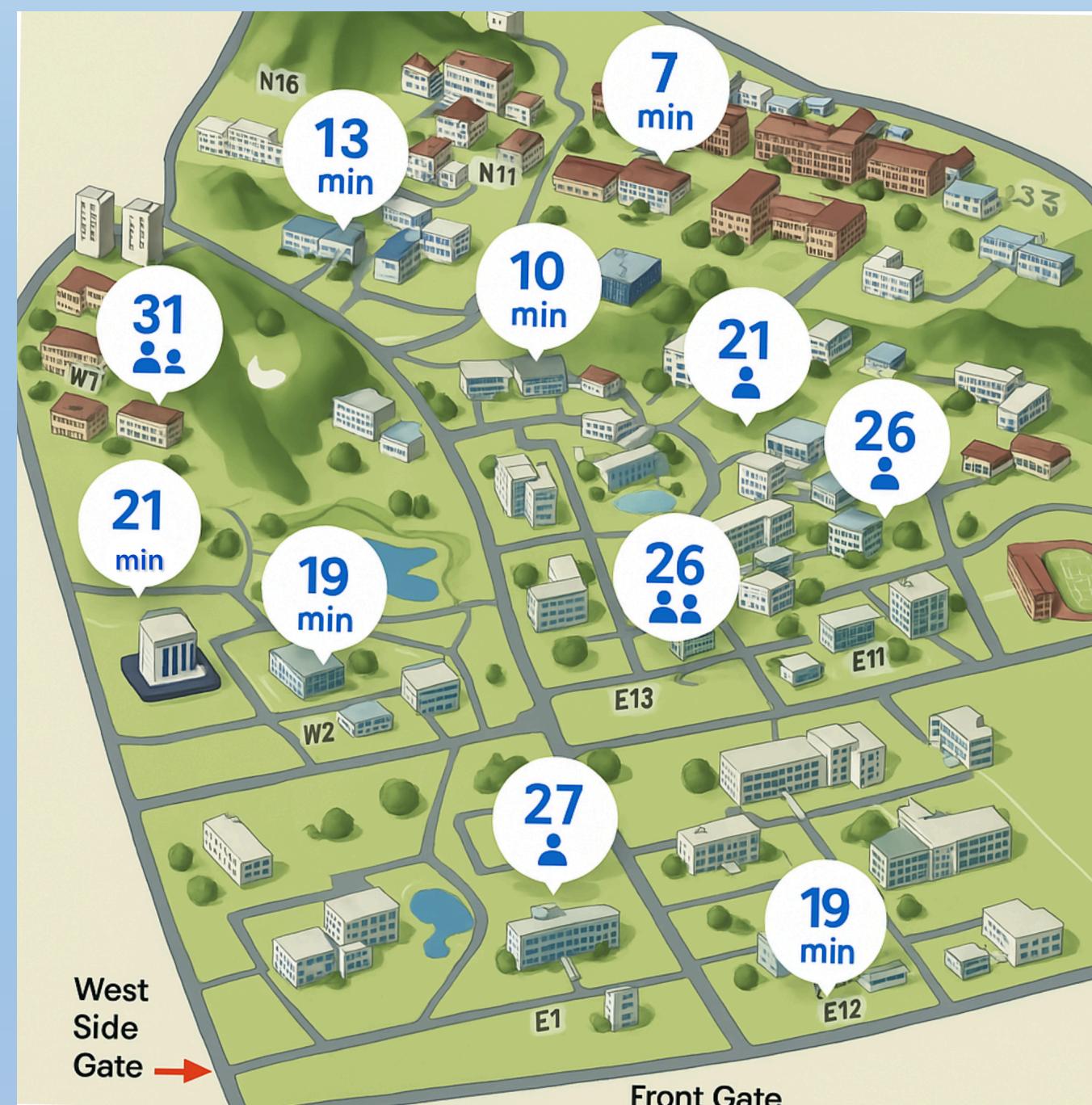
- + ?

New shapes!

Using sticky notes and prompts in Figjam

Functional requirements from brainstorming

- Display wait times or available seats for each facility via interactive map bubbles.
- Notify users about extremely overcrowded areas or special offers from campus facilities.
- Clicking a bubble reveals key facility info, such as services, wait time, and menu items.



Software Process - Scrumban

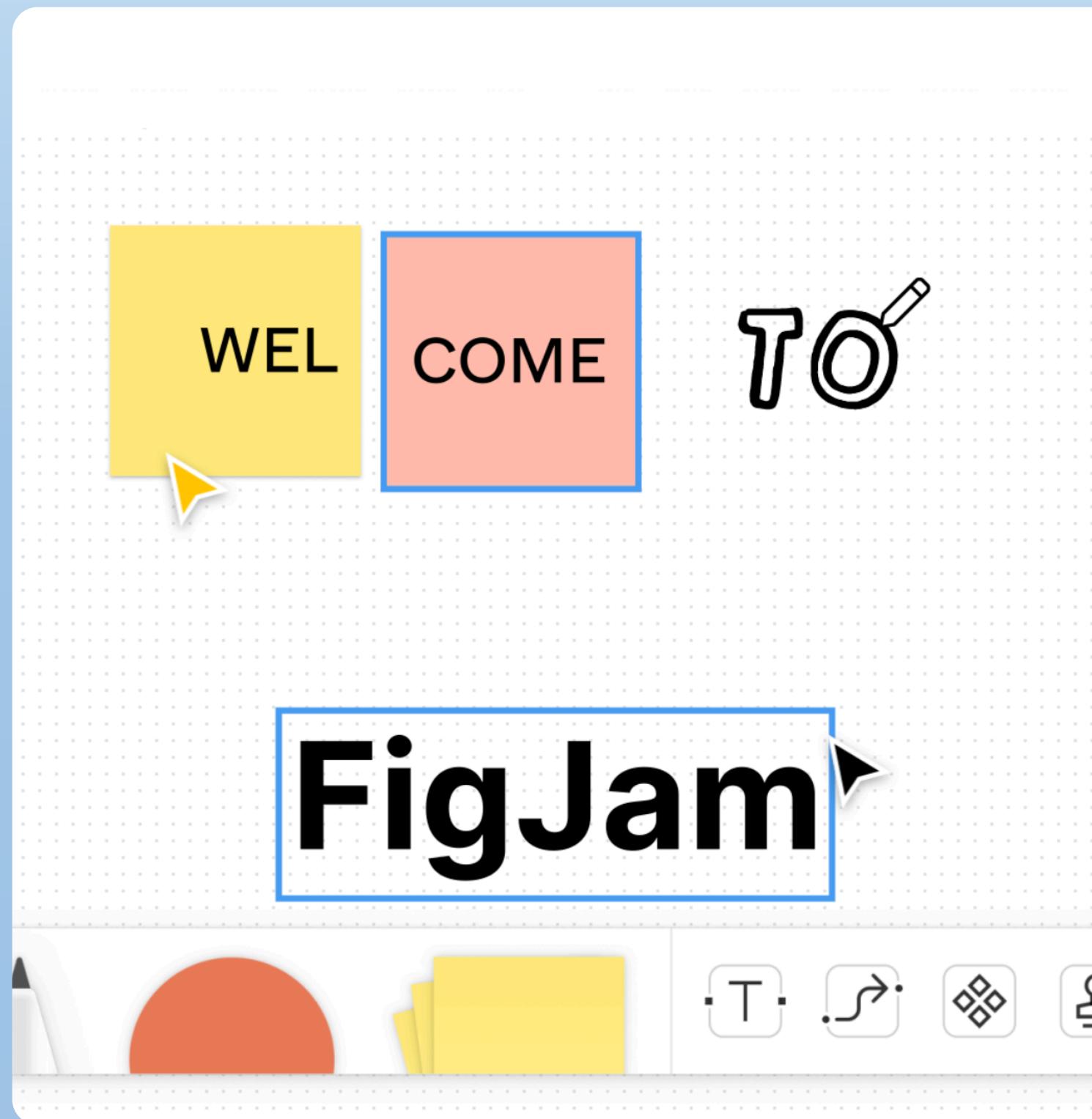
- Ideal for our project because the requirements are volatile
- Use both benefits of Scrum and Kanban
 - Defined goals and clear structure through sprints (Scrum)
 - Flexibility if needed, to provide on-time and efficient development

Roles

- **Project Manager** - Julien
- **Scrum Master** - A new one each sprint with Luke being the first one
- **Development Team**
 - *Hardware* - **Marco**, *Front end* - **Luke**, *Back end* - **Julien & Janghyun**, *AI/ML* - **Marco & Javad**

Project Management Tools that we are using

FigJam



Jira

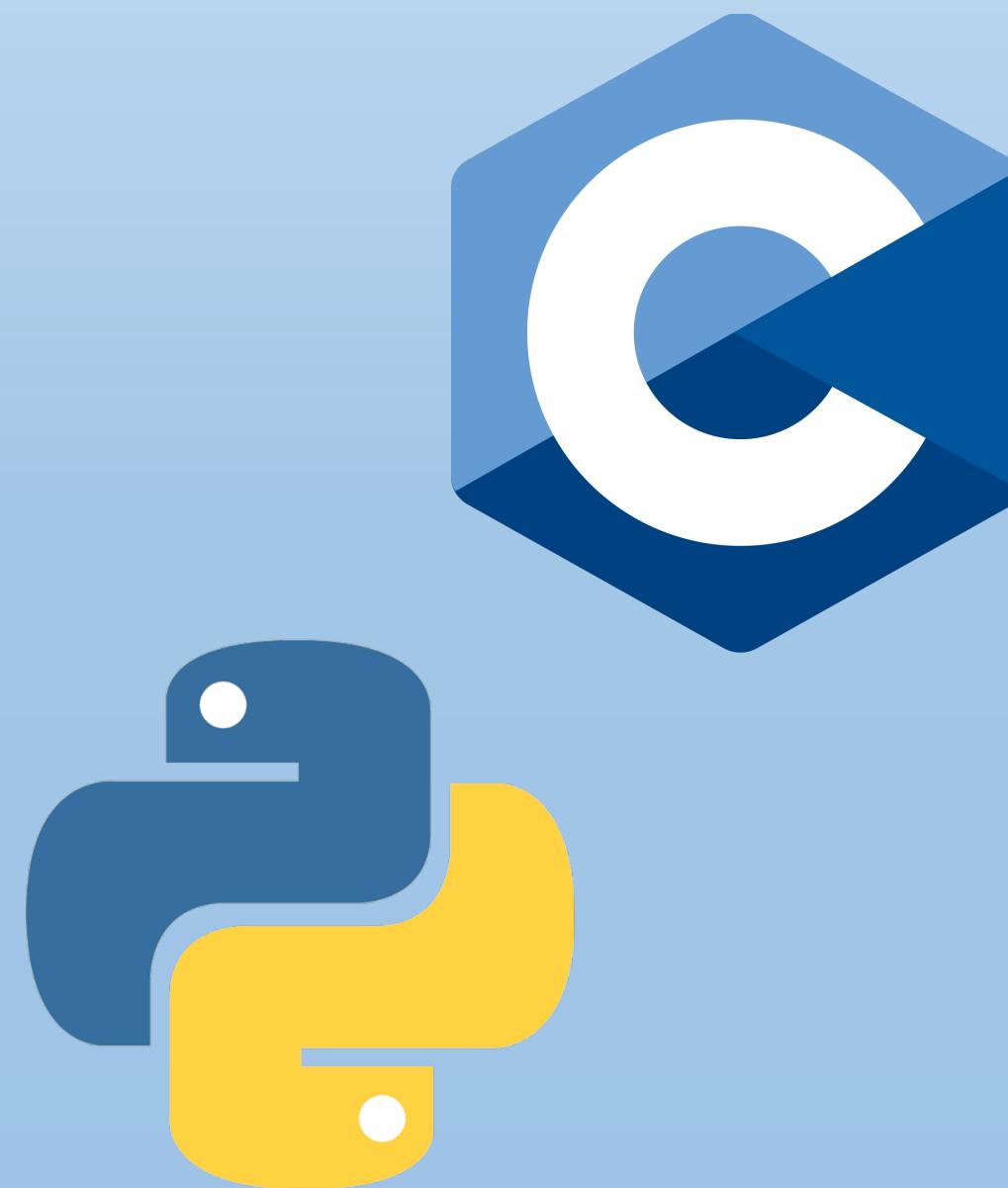
A screenshot of the Jira software interface, specifically the "Board" view. The board is organized into three columns: "TO DO 5", "IN PROGRESS 5", and "CODE REVIEW 2".

- TO DO 5:**
 - Engage Jupiter Express for outer solar system travel (Space Travel Partners, 5, TIS-25)
 - Create 90 day plans for all departments in the Mars Office (Local Mars Office, 9, TIS-12)
 - Engage Saturn's Rings Resort as a preferred provider (Space Travel Partners, 3, TIS-17)
 - Enable Speedy SpaceCraft as the preferred (Space Travel Partners, 3, TIS-18)
- IN PROGRESS 5:**
 - Requesting available flights is now taking > 5 seconds (SeeSpaceEZ Plus, 3, TIS-8)
 - Engage Saturn Shuttle Lines for group tours (Space Travel Partners, 4, TIS-15)
 - Establish a catering vendor to provide meal service (Local Mars Office, 4, TIS-15)
 - Engage Saturn Shuttle Lines for group tours (Space Travel Partners, 4, TIS-15)
- CODE REVIEW 2:**
 - Register with the Mars Ministry of Revenue (Local Mars Office, 3, TIS-15)
 - Draft network plan for Mars Office (Local Mars Office, 3, TIS-15)

Github

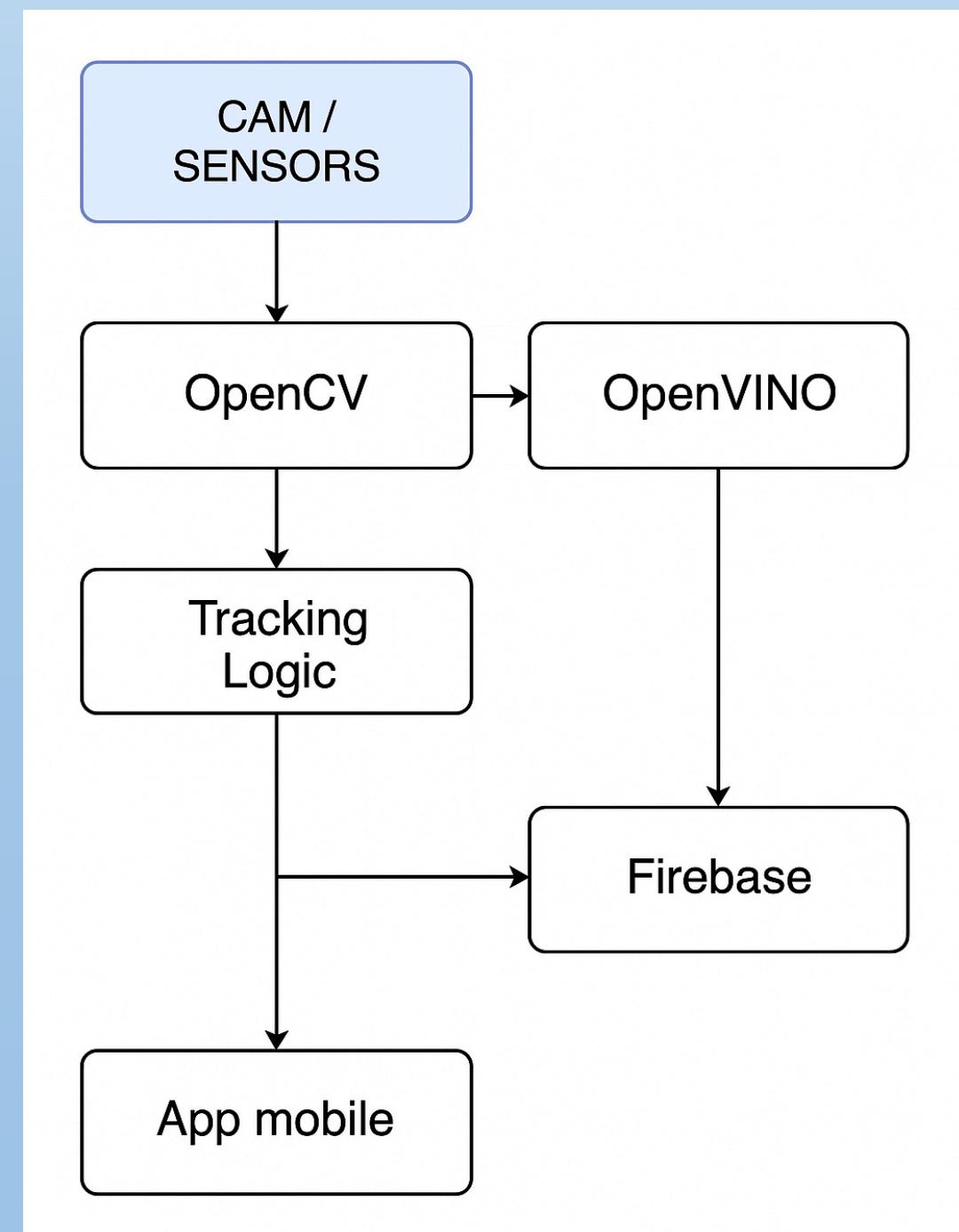


Software Tools that we are using



Programming Languages

OpenVINO + OpenCV + YOLO



Custom ML Model for queue
detection and predictions



Cloud Storage

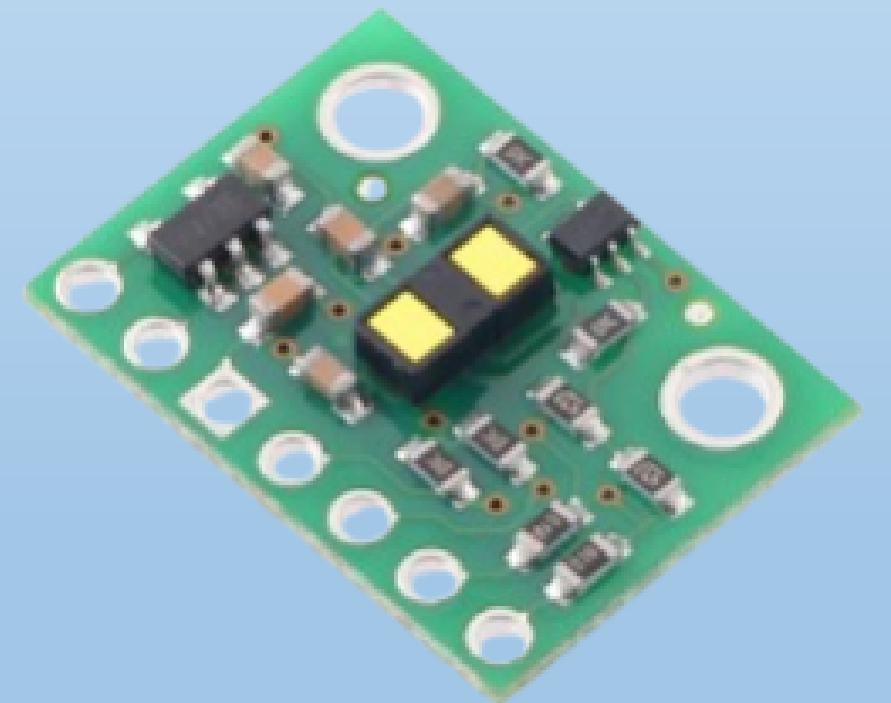
Hardware Tools that we are going to use

- The main hardware devices needed to create this solution include:

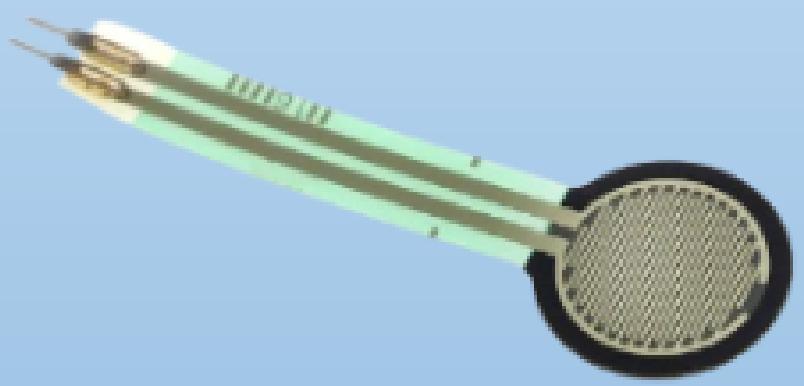


**Camera for real-time images of
the queue**

& a microcontroller to manage
sensor data collection



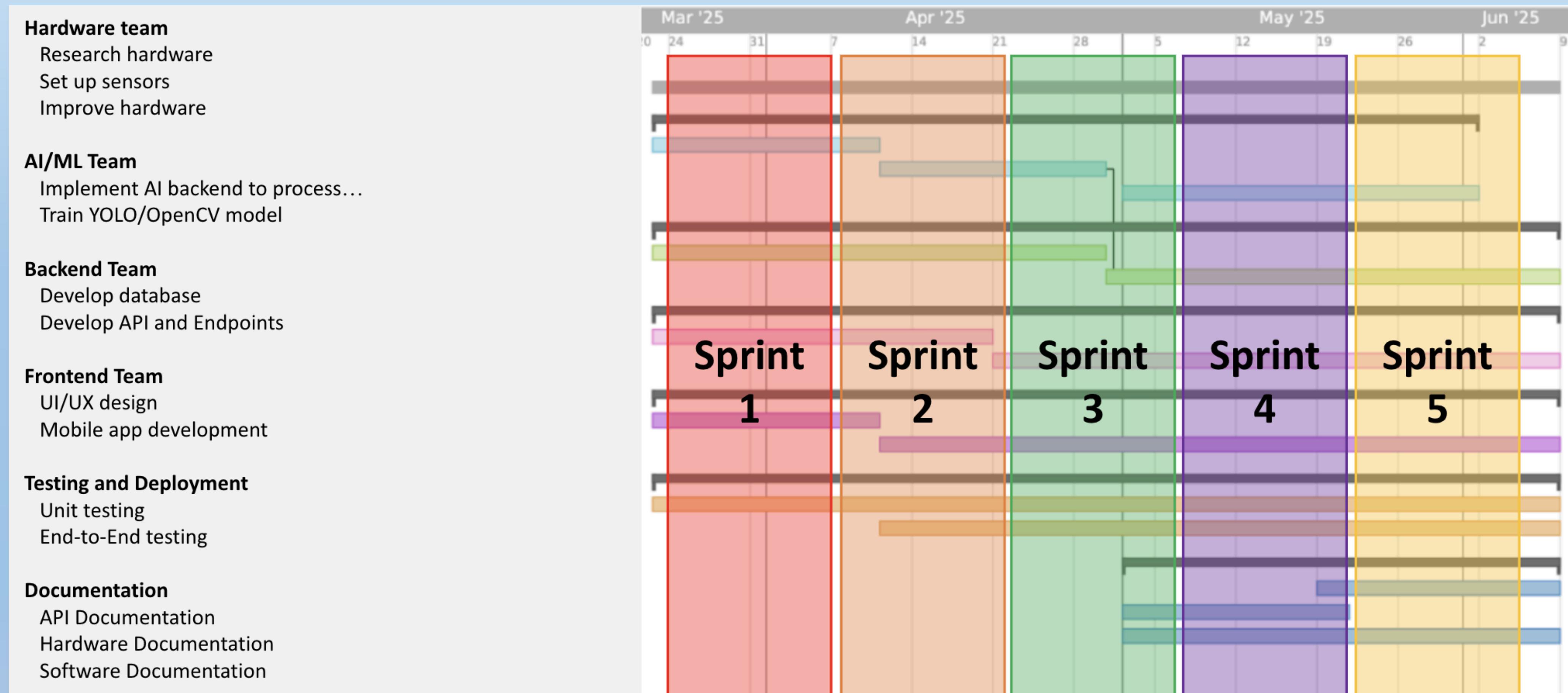
Distance Sensor to measure length of queue



**Pressure sensor to detect
occupancy inside**

Schedule

- Gantt chart of our project



Thank you for Listening!

Questions?