



NANYANG
TECHNOLOGICAL
UNIVERSITY
SINGAPORE



SINGAPORE-INDIA HACKATHON

Solutions for Humanity – Sowing the seeds of future partnership

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Organised by



MORAGS

INTRODUCTION

- Effective parking solution with multiple parking lots.
 - Visitor does not know where to park.
 - Visitor finds no parking space in a parking lot.
- Our product works in two phases
 - **Bootstrapping:** Interaction with admin in setting up the module, by taking information on parking lots and buildings, and getting live feed from camera.
 - **Deploying:** Bootstrapped server keeps running and interacts with user, takes their destination and recommends them the nearest available parking using the distances received while bootstrapping.

APPROACH AND METHODOLOGY

- **Coalition games with a mediator:** This makes sure that if any player (user) deviates from the game (parking at allocated space) he will have lower payoffs (More distance to cover).
- **Monitor parking lots using CCTV:** Lay down some patterns on the parking spaces and then use live feed from cctv at low fps for processing at a reduced computational cost.
- **Store refs and compare live feed:** Lightning conditions changes over a span of day, so store references at different times and calculate the diff with live feed to check the state.
- **Requesting a parking spot:** When a user queries for a parking space, a free parking space (if available) is provisionally allocated to him with a period of expiry, so that he may have time to reach the parking lot.

ADVANTAGES

- **Realtime**
 - The states are updated across all the parking lots
- **Outlier detection**
 - unusual objects, rogue parking, etc
- **Parking groups**
 - General, prime, senior citizen, differently abled, etc.
- **Integration**
 - Can be integrated with existing surveillance feeds right away.
 - We have Integrated with google maps API.
 - With machine learning models for object classification and tracking.

PROGRAM WALKTHROUGH

Step 1: defining parking lots

Define the parking lots below

Please enter the name, the position of the parking lot in decimal coordinates and the capacity of each parking lot.

Name	Latitude	Longitude	Capacity
<input type="text" value="PL05"/>	<input type="text" value="1.45621"/>	<input type="text" value="23.0203"/>	<input type="text" value="23"/>
<input type="text" value="PL06"/>	<input type="text" value="1.33256"/>	<input type="text" value="23.3650"/>	<input type="text" value="50"/>
<input type="text" value="EP25"/>	<input type="text" value="1.33652"/>	<input type="text" value="23.66589"/>	<input type="text" value="15"/>

+ Add a parking lot

Next

Step 2: defining destinations

Add the destinations below

Please enter the name and coordinates in decimal notation for the destinations. Parking lots are allotted once the user requests parking for a particular destination.

Name	Latitude	Longitude
<input type="text" value="Library"/>	<input type="text" value="1.2154"/>	<input type="text" value="23.9985"/>
<input type="text" value="Canteen"/>	<input type="text" value="1.11254"/>	<input type="text" value="23.2365"/>
<input type="text" value="Academics"/>	<input type="text" value="1.01225"/>	<input type="text" value="23.66985"/>

+ Add a building

Next

Step 3: defining distances between parking lots and buildings

Interconnect distances

Please enter the distances between each parking lot and the buildings.

Library <-> PL01 0

Library <-> PL02 0

Library <-> EP6 0

Canteen <-> PL01 0

Canteen <-> PL02 0

Canteen <-> EP6 0

Office <-> PL01 0

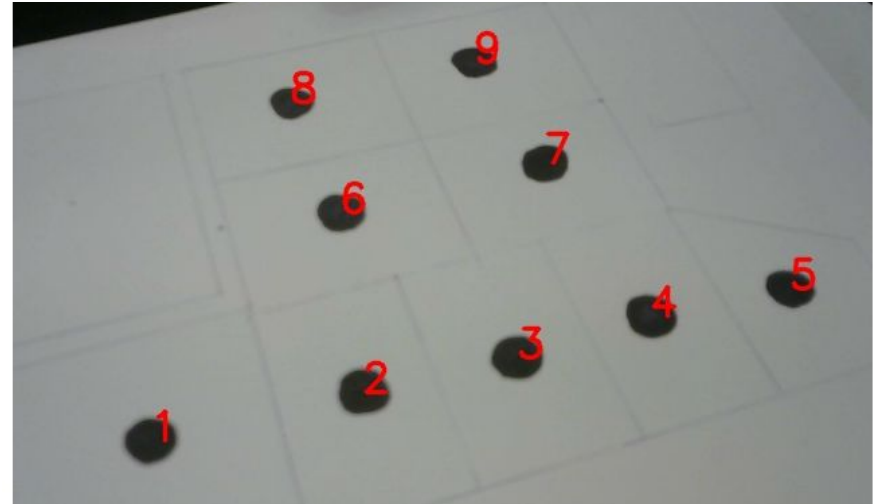
Office <-> PL02 0

Office <-> EP6 0

Next

DEFINING PARKING SPACES

- The markings are the detected parking spaces in a given parking lot
- The user inputs the mapping between the ids assigned and the labels of the parking space
- The user also indicates the group the parking space belongs to



Id	Label	Group
1	<input type="text" value="S01"/>	<input type="text" value="Senior"/>
8	<input type="text" value="G01"/>	<input type="text" value="General"/>
6	<input type="text" value="H01"/>	<input type="text" value="Handicapped"/>

Querying a parking space

Parking Lots

PL002

Location: 1.3185461, 103.8619946

Capacity: 23

Free spaces:

- General: 9

Request parking

Select destination: NEC ▾

Select type of parking space: General ▾

Go

Navigate from parking lot to destination

Parking space:	q
Parking lot:	PL002

Request parking

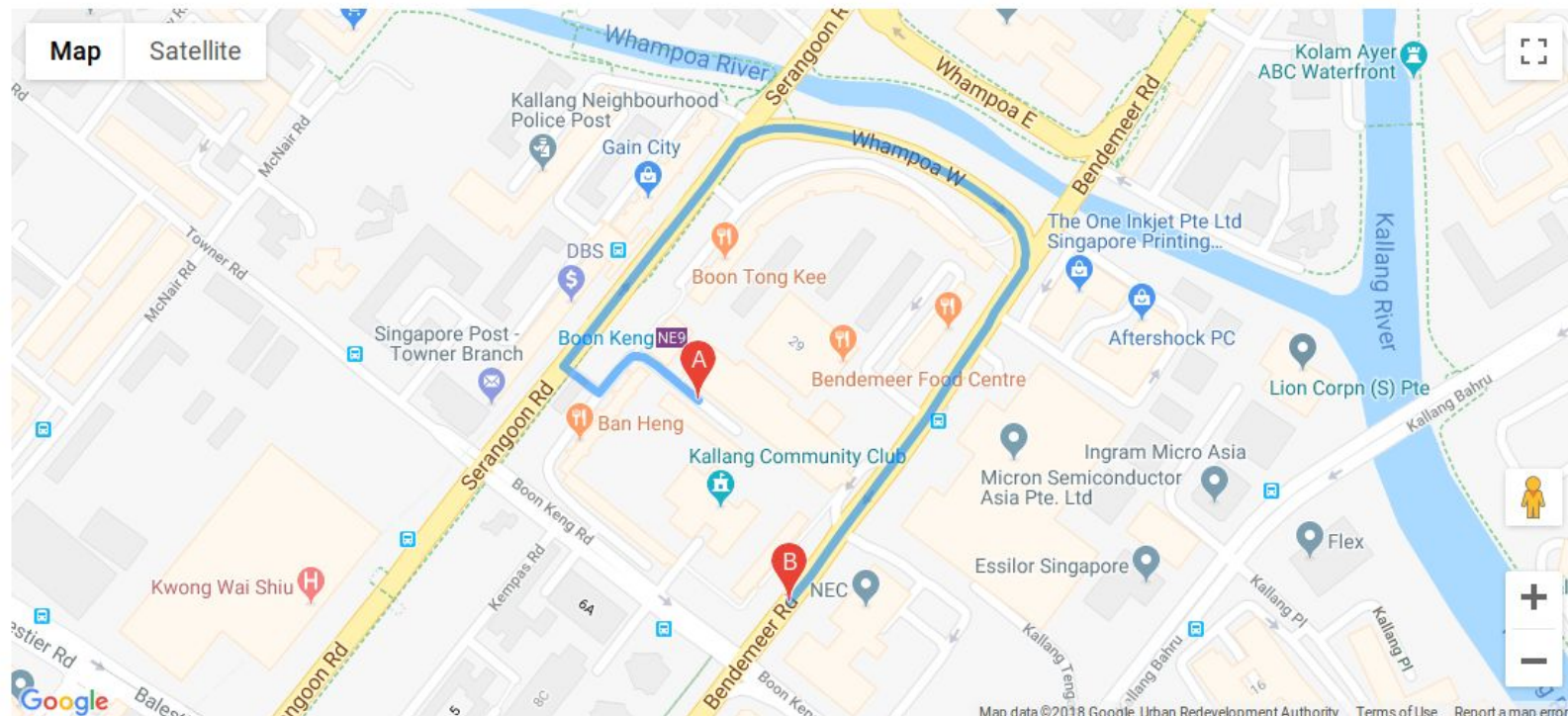
Select destination: NEC ▾

Select type of parking space: General ▾

Go

Navigate from parking lot to destination

Parking space:	q
Parking lot:	PL002



MARKET

- Many visitors find it difficult to park in common places / new places
- Campus / Malls / mainly any building
- Seamlessly integrates with existing cameras installed for security
- Other features such as the use of Machine learning for classification and tracking are possible



BUSINESS MODEL

- Revenue by providing Prime member parking spots.
- Ticket pricing based on groups
- Purely customer centric approach hence attracts more customers.
- Ticketing can be integrated to this solution in combination with object tracking to automate paid parking.



THANK YOU