

CD EYES

An Application of Crowd Density Supervision in Campus Public Facilities



Class: AI class2



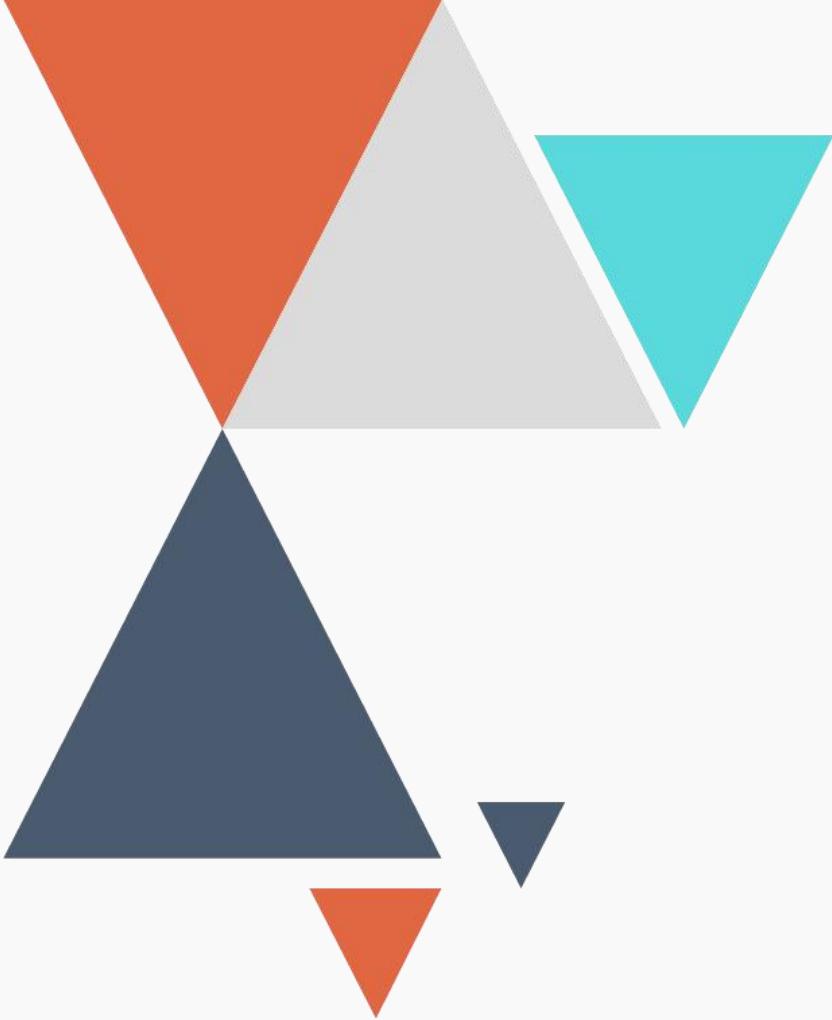
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Instructor: 陈轲 青春美

CONTENT

- 01. Introduction
- 02. Demonstration
- 03. Construction
- 04. Innovation
- 05. Details
- 06. Conclusion
- 07. Future plan

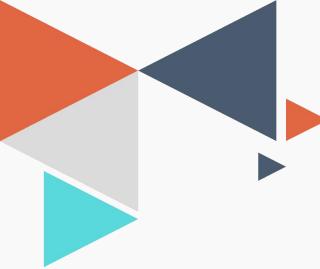




PART 01

INTRODUCTION

- Background
- Motivation
- Significance



01. Introduction

-- Background

First floor of
D5 canteen



B1 canteen



Gym



Second floor of
D5 canteen

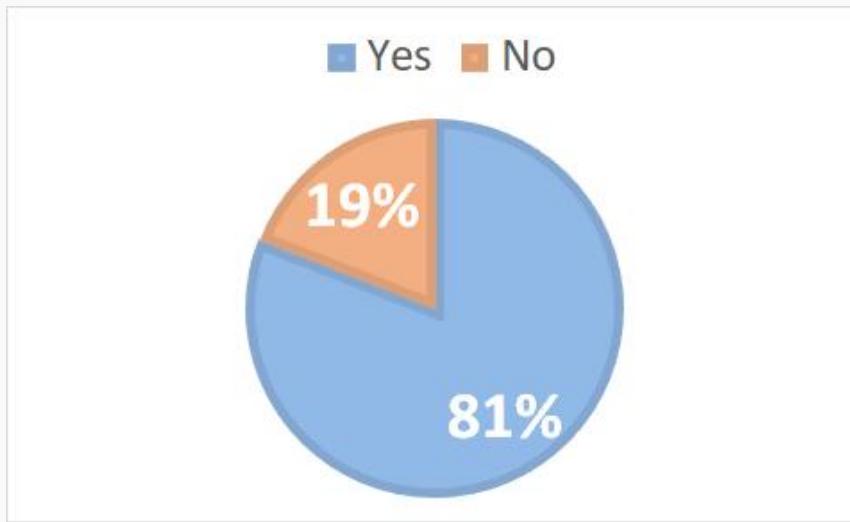


Library



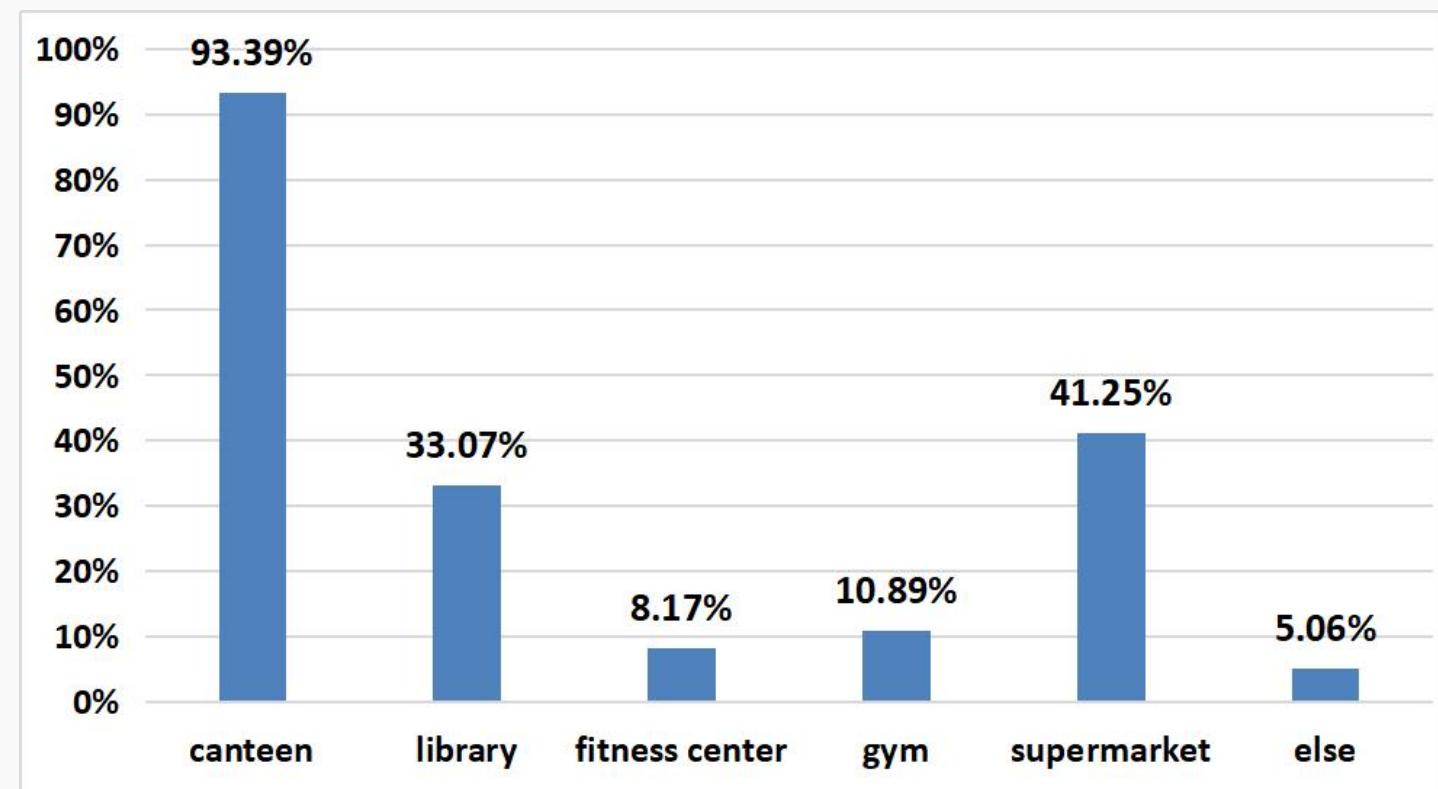
01. Introduction

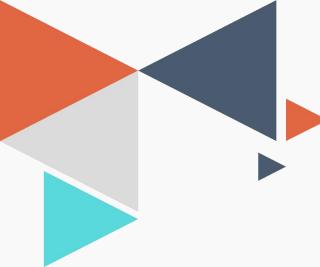
-- Motivation



The demand for our product
among students

The demand of different campus
facilities for our product





01. Introduction

-- Significance

Students

Manage time better

1

Reduce waiting time

2

Improve life efficiency

3

School manager

Identify needs

1

Control crowd density

2

Allocate public resources

3





PART 02

DEMOSTATION

02. Demostration



Merge

CD EYES

D5健身房

人群密度:



D5食堂1层

人群密度:



D5食堂2层

人群密度:



B1食堂

人群密度:



明真阁1层

人群密度:



明真阁2层

人群密度:

C3

人群密度:



C2

人群密度:



B1

人群密度:



C1

人群密度:



D1

人群密度:



公交站

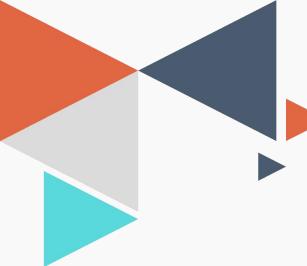
公交



PART 03

CONSTRUCTION

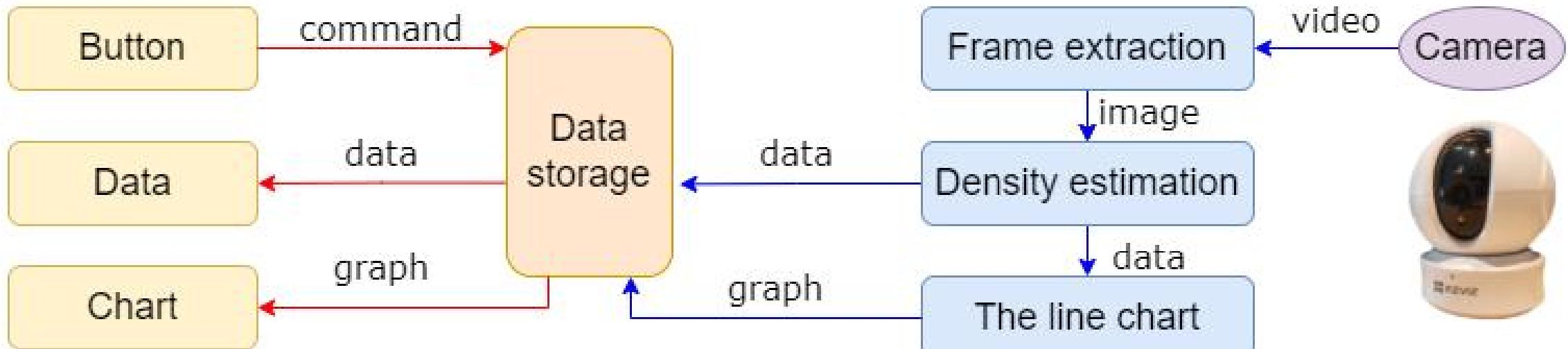
- Flow chart
- Main work



03. Construction

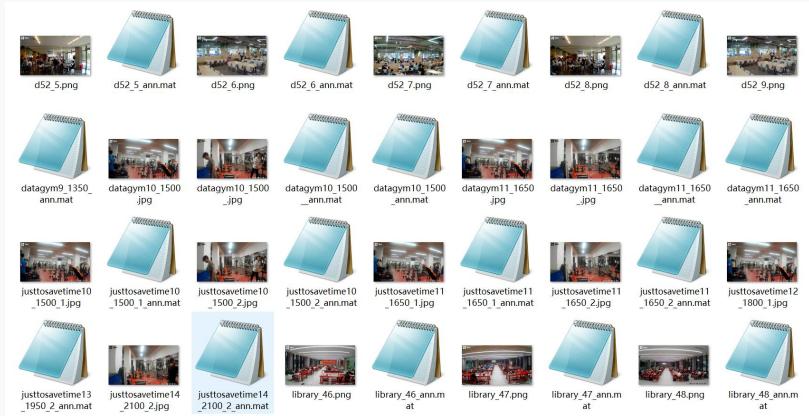
-- Flow chart

APP **Cloud Server** **Edge** **Terminal**

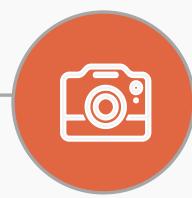


03. Construction

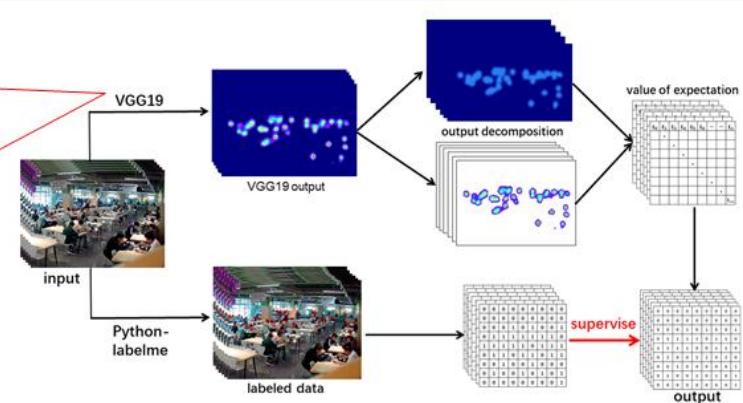
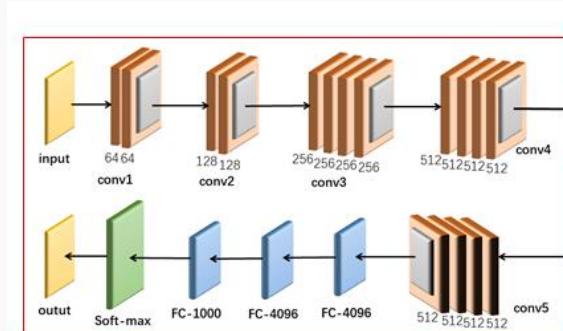
-- Main work



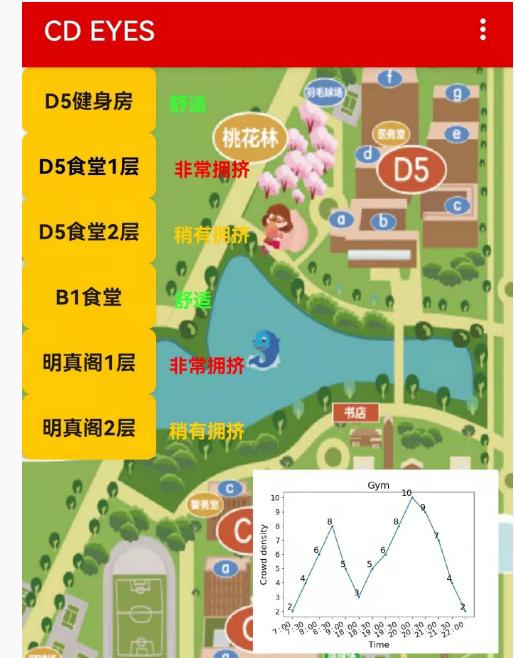
Model



Dataset



App





PART 04

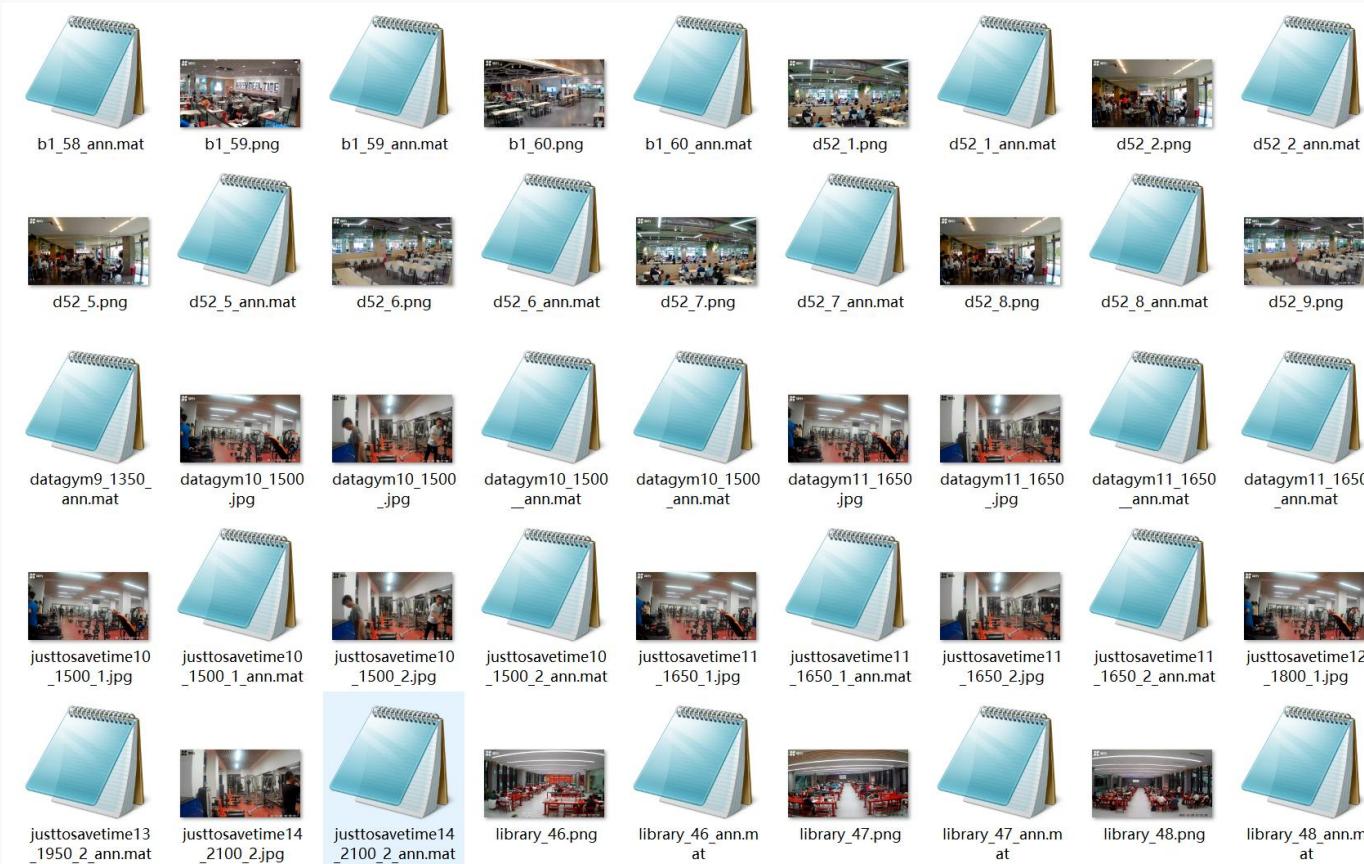
INNOVATION

- Dataset
- Application
- Algorithm

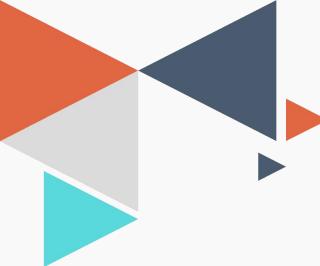


04. Innovation

-- Generation of SCUT crowd dataset



- **Size of training set: 434 images and mat**
- **Size of test set: 112 images and mat**
- **Number of people: 12-128 in each picture**



04. Innovation

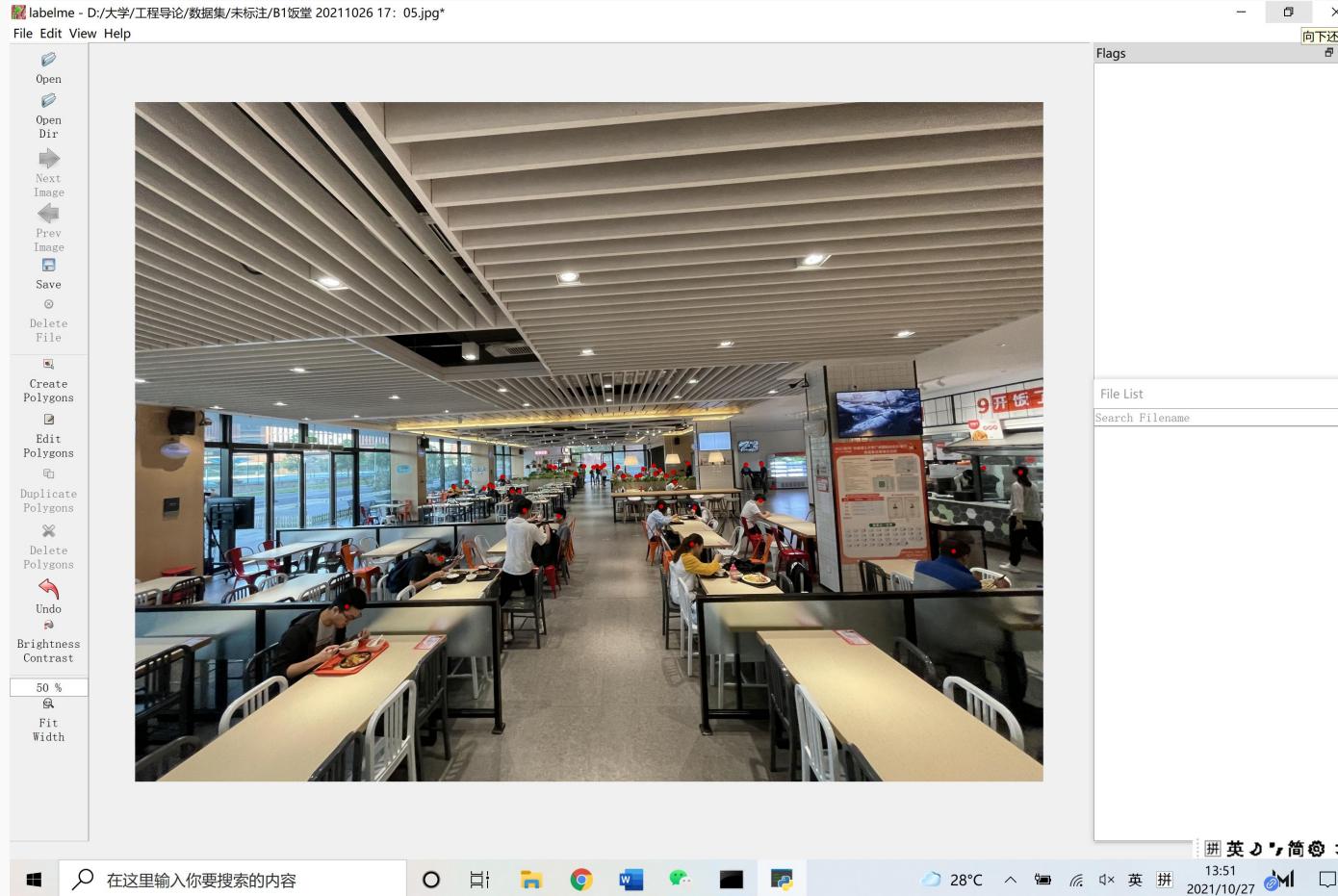
-- Generation of SCUT crowd dataset



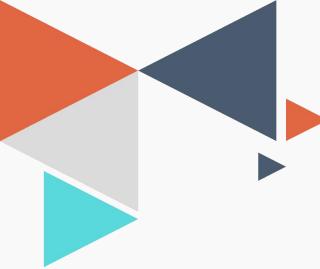
- **Collection locations:** public facilities in our campus
- **Collection method:** take videos and extract frames
- **Frame extraction frequency:** every **10** minutes

04. Innovation

-- Generation of SCUT crowd dataset



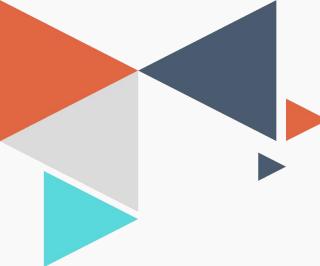
- **Image annotation tool: LabelMe**
- **Annotation method: label with points**



04. Innovation -- Application

- **Significance:** provide a platform for the algorithm
- **Function:** display the crowd density in real time
- **Advantage:** convenient to use

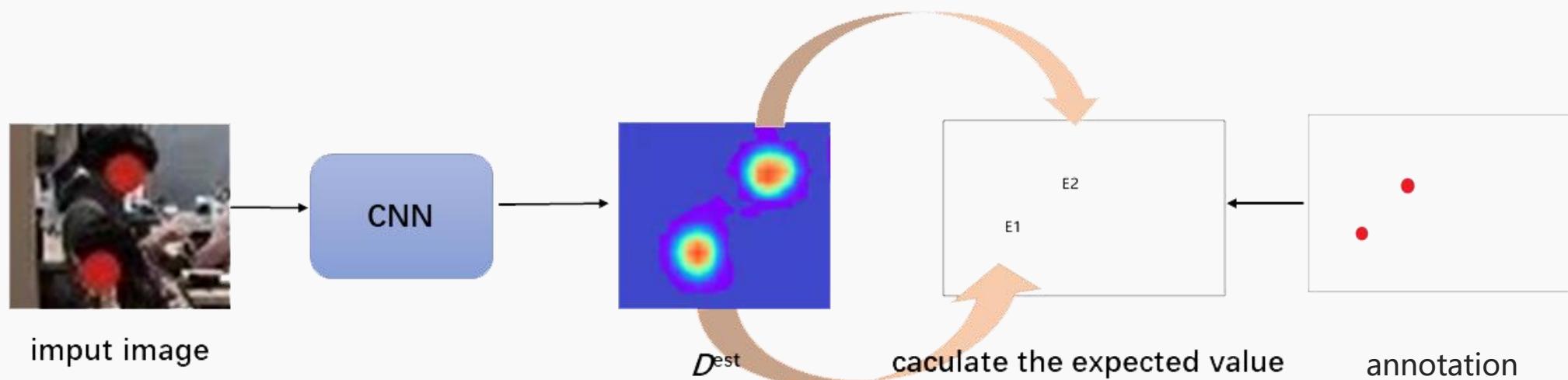




04. Innovation

-- Model

- Problem: domain gap between phones and cameras
- Solution: recreate the dataset to fine-tune the model

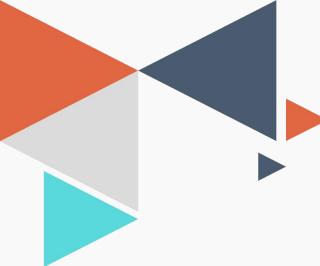




PART 05

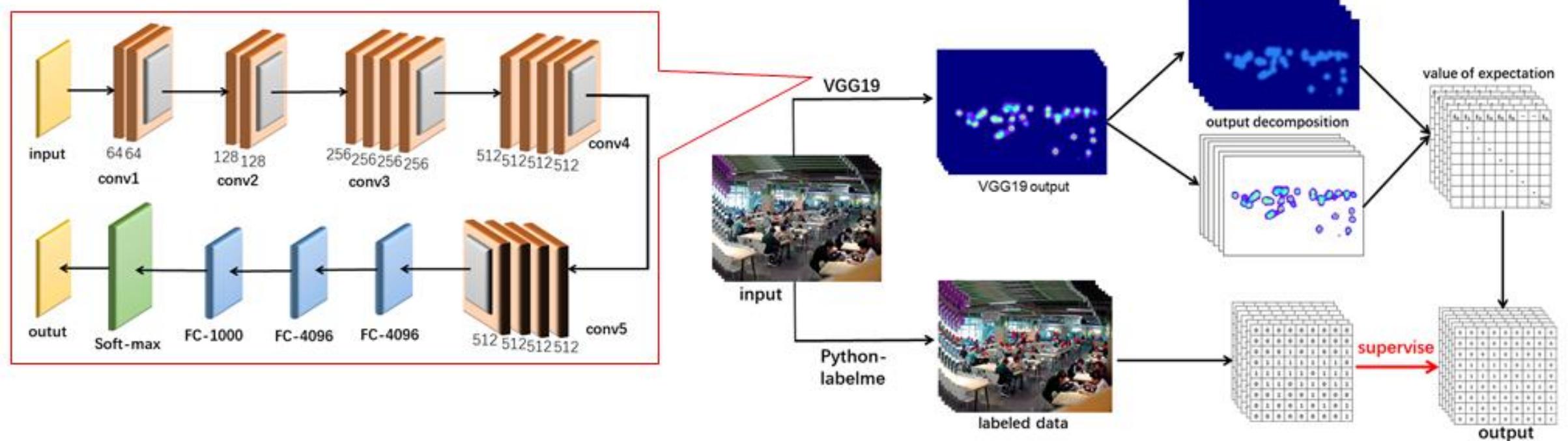
DETAILS

- Model
- Training result
- Function of app



05. Details

-- Model

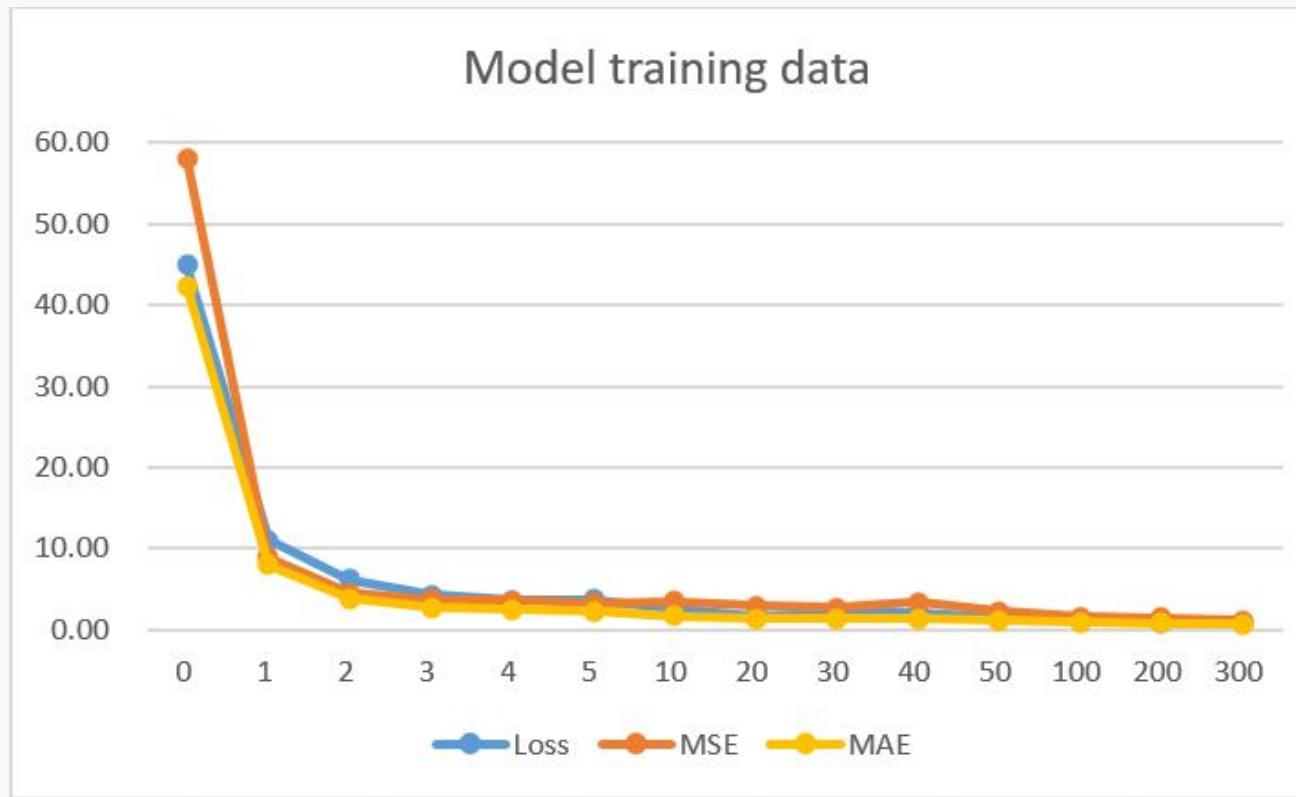


CNN(VGG-19)

Bayesian Loss

05. Details

-- Training result



Epoch	Loss	MSE	MAE
0	44.94	58.17	42.39
1	11.06	8.93	7.98
2	6.14	4.49	3.77
3	4.23	3.74	2.67
4	3.56	3.54	2.40
5	3.69	3.19	2.19
10	2.45	3.50	1.66
20	1.69	2.88	1.36
30	2.10	2.70	1.32
40	1.97	3.36	1.30
50	1.40	2.21	1.14
100	1.13	1.57	0.90
200	0.89	1.47	0.76
300	0.76	1.09	0.65

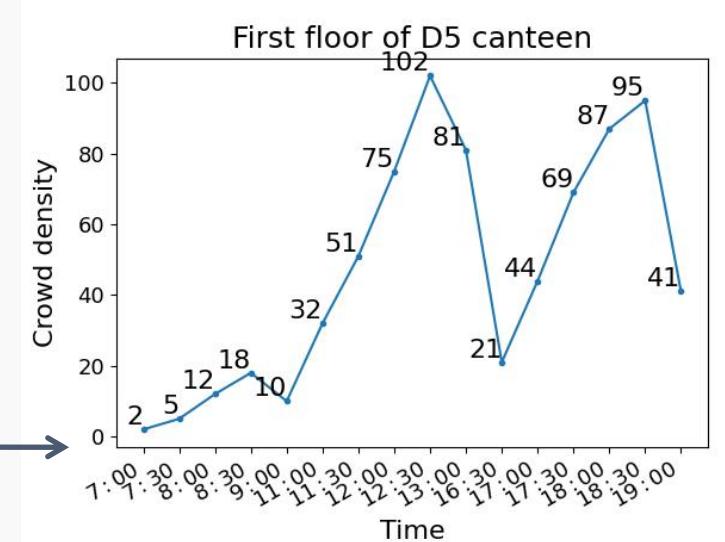
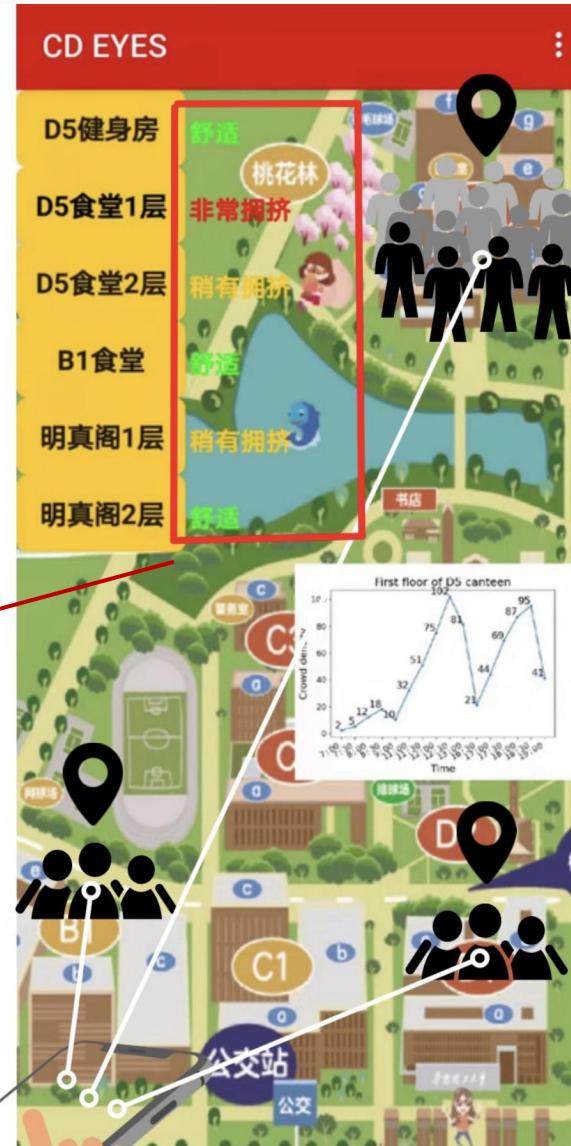
05.Details

-- Function of app

Interactive buttons of six selected scenes



Labels illustrate three degrees of crowd density in red, yellow and green



Line chart demonstrates the change of crowd density in opening hours



PART 06

Conclusion



06. Conclusion

-- Innovation



Dataset



Application

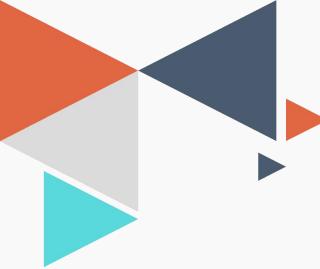


Algorithm

PART 07

Future plan

- 100 steps
- More functions



07. Future plan

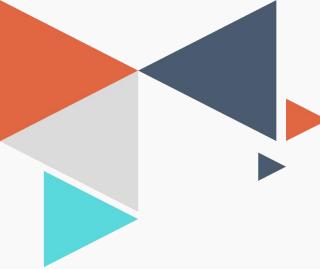
-- 100 steps

华南理工大学 2022 年“百步梯攀登计划”

立项申请书

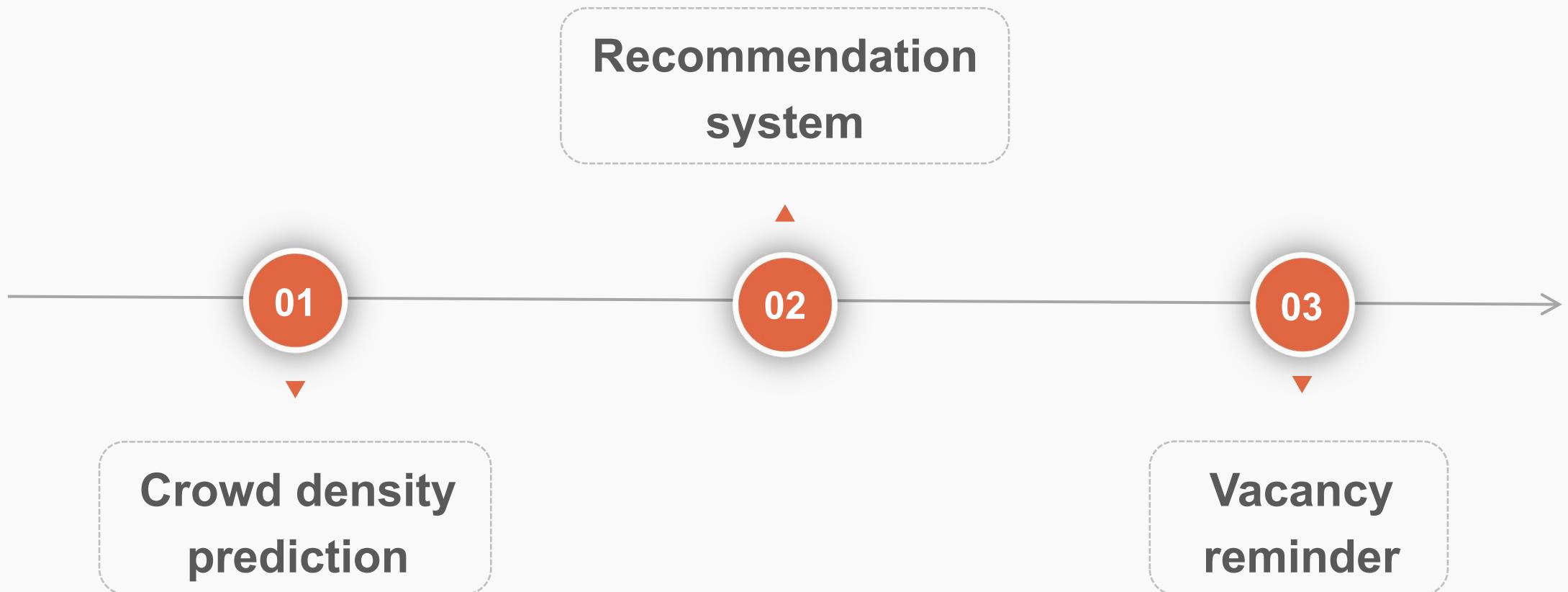
课 题 名 称

CD EYES——校园公共场所人群密度监测应用



07. Future plan

-- More functions



THANKS FOR WATCHING AND GUIDANCE



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