2021未来技术学院课程设计作品展

Student Project Design Show on AI and Big Data 2021

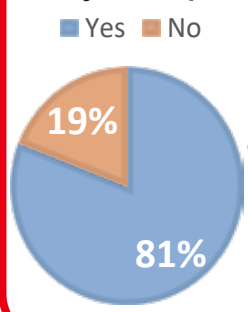
CD EYES

--An Application of Crowd Density Supervision in Campus Public Facilities

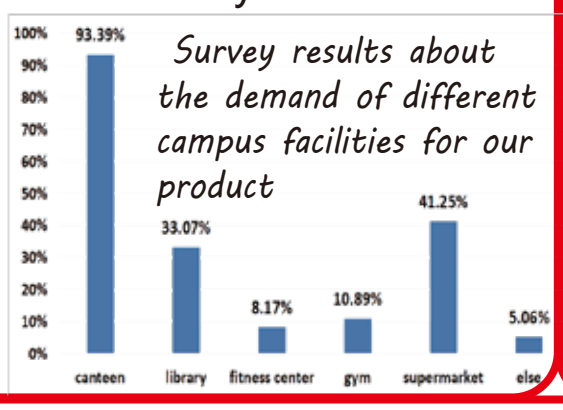
Background

1.Tremendous amounts of people usually gather in certain facilities in a certain time period.

2.People want to know the crowd density of the facilities they are planning to go.



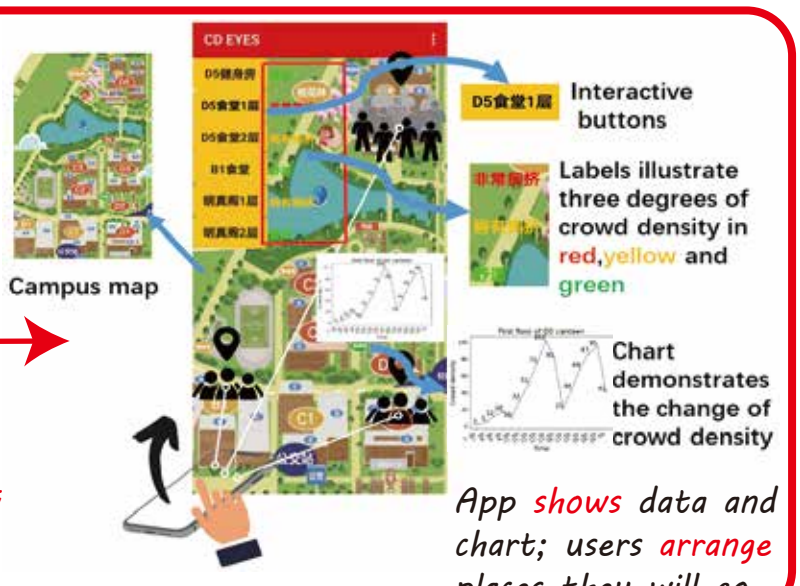
Survey results about the demand for our product among students



Survey results about the demand of different campus facilities for our product

APP

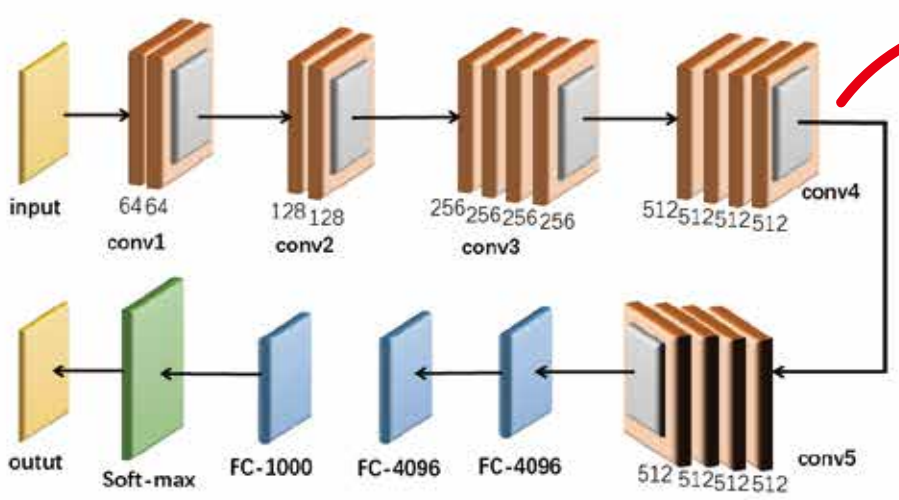
App users interact with buttons



App shows data and chart; users arrange places they will go

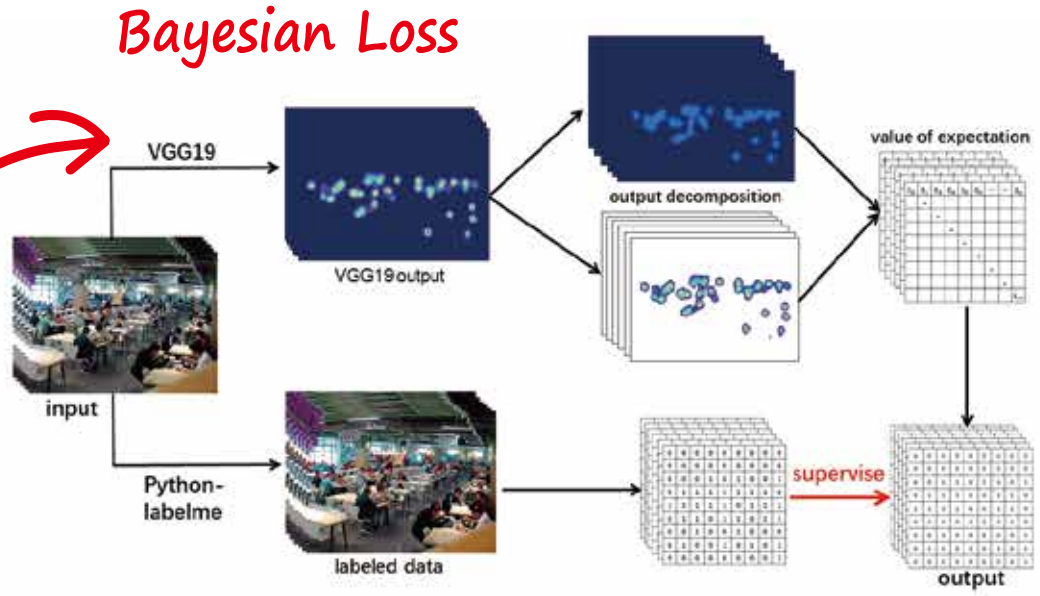
Model

CNN (VGG-19)



Pipeline of VGG-19

Bayesian Loss



Pipeline of our model

Process

Step1
Local server receives real-time videos from cameras

videos

Step2
Local server calculates the crowd density, draws the charts showing how the crowd densitiy changes

Algorithm1: crowd density

Algorithm2: charts

Step3
Data and charts are received by cloud server sent to App

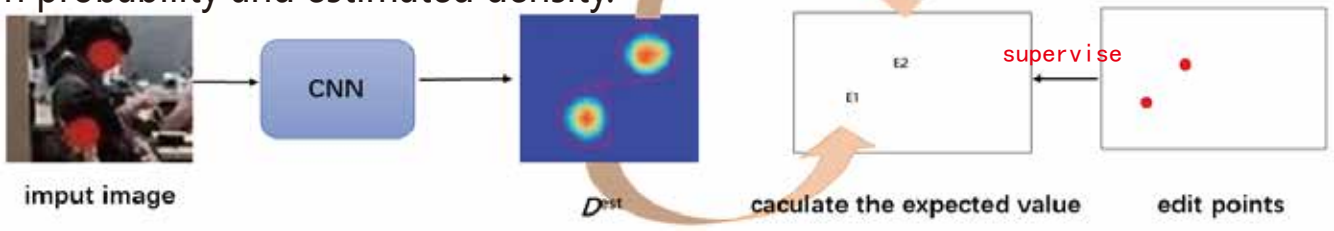
Step4
Crowd density and charts are showed to users

Model Innovation

1.An additional background label "dummy background point" is introduced to improve the accuracy of the posterior probability

2.The expected count is calculated by summing the product of the contribution probability and estimated density.

Geometrical interpretation of the "dummy background point"



Pipeline of the training process

Training Results

Epoch	Loss	MSE	MAE
0	44.94	58.17	42.39
1	11.06	8.93	7.98
10	2.45	3.50	1.66
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

Benchmark evaluation on our crowd counting dataset using MAE and MSE matrics

Count: 106 Estimate: 98

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作品名称

CD EYES
校园公共场所人群密度监测应用