

# People Counting and Space Utilization

ECE Capstone Design Project, Spring'18

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## **Introduction:**

This design plans to use raspberry pi to count the number of people in a certain room, then reports the space utilization of this room space. With this side of our life, managers could have better security monitor since accurate data would be provided by this system. Users, on the other side, could have immediate report of crowded degree of some places.

## **Motivation:**

We, as students, often go to libraries or study rooms. Sometimes the rooms are crowded, and the rooms may be empty. Experience tells us that the study rooms and libraries are often crowded before final exams, but we want to know how crowded those rooms are. Also, we may want to know the real-time situation in those rooms. With the help of this system, we believe that we can find more answers.

## **Design:**

The system is based on raspberry pi and object detection. We plan to use the camera of raspberry pi to take pictures of a study room and transmit this picture to our raspberry pi. After analysing in raspberry pi with object detection algorithm, only the numerical data will be shown or sent to server for checking or archiving. After experiments and reliability check, no image data will saved either in raspberry pi local or on the server to protect privacy.

## **Improvements:**

If our basic design can be realized, our next challenge is to enlarge the detected space. The university has some huge rooms on campus; the town has a lot of large rooms in different buildings as well. We may work on using multiple cameras to collect information of the whole room rather a corner and get the bigger idea of the crowded level. Also, we want to work on the analysis frequency. Some rooms may have periodic people movement like classrooms, i.e. the number of people during a class stays stable while this number rapidly changes after class. If the analysis frequency can change with the period, the power consumption and system reliability in long term may get improved.

## **Conclusion:**

This design focuses on providing people a small side of daily life. Knowing how many people are currently in a room or how crowded is the room now cannot change many people's schedule, but we believe this design can provide convenience

by show this small side of life.