

# Occupancy Analyzer

Detection and prediction of occupancies with  
limited resources

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Report



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## **Abstract**

Write abstract text...

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# 1 | Introduction

## 1.1 Context

Smart use of energy resources is an ongoing topic these days. The reduction of expenses is mostly the biggest impulse for companies. But also the debate around climate change brings a new legislation to reduce the waste of energy resources, whose production is damaging to the environment and future generations. The IT University of Copenhagen (ITU) has an interest in producing an occupancy model for commercial buildings, like the ITU building, to detect where energy resources are needed and where it can be saved. Energy resources are needed for e.g. lighting and heat-regulating systems, which are relevant for occupants in a commercial building. With the detected occupancy data the ITU can predict occupancy and develop concepts for a smart use of energy resources in commercial buildings.

The Strathmore university in Kenya has also an interest in building up an occupancy model, but mainly for surveillance reasons. Surveillance can be used for several purposes like traffic monitoring, public safety and facilities surveillance. An IT-based surveillance system can automatically analyse the scene without the use of human resources. By analysing the scene the detection of occupancy is a major part. Moreover a real-time prediction model on the occupancy data can be used for preventing criminal behaviour by triggering alarm or other surveillance systems.

Currently there is no existing infrastructure to build up an occupancy model in the Strathmore university or the ITU building. Both universities want a solution for an occupancy analyzer based on Raspberry Pis due to the minimal consumption of computational and monetary resources.

A group of students from both universities have to collaborate to come up with a solution for an occupancy analyzer, which can satisfy the needs of both university interests. Ideally a product should have been developed,

which can be adapted to fit one or the other university needs. Furthermore a collaboration project is mandatory for the student group from ITU, in which they have to face the challenges of global collaboration, navigate compromises and come up with a solution.

This report contains the product result, details of the project work and the learning outcomes, which were achieved in the project with the globally distributed team. The project team consists of international students located in Nairobi, Kenya (East African Time) and Copenhagen, Denmark (Central European Time).

## **1.2 Problem**

## **1.3 Related Work**

## **1.4 Approach**

## **1.5 Report Structure**

## 2 | Analysis

### 3 | Design

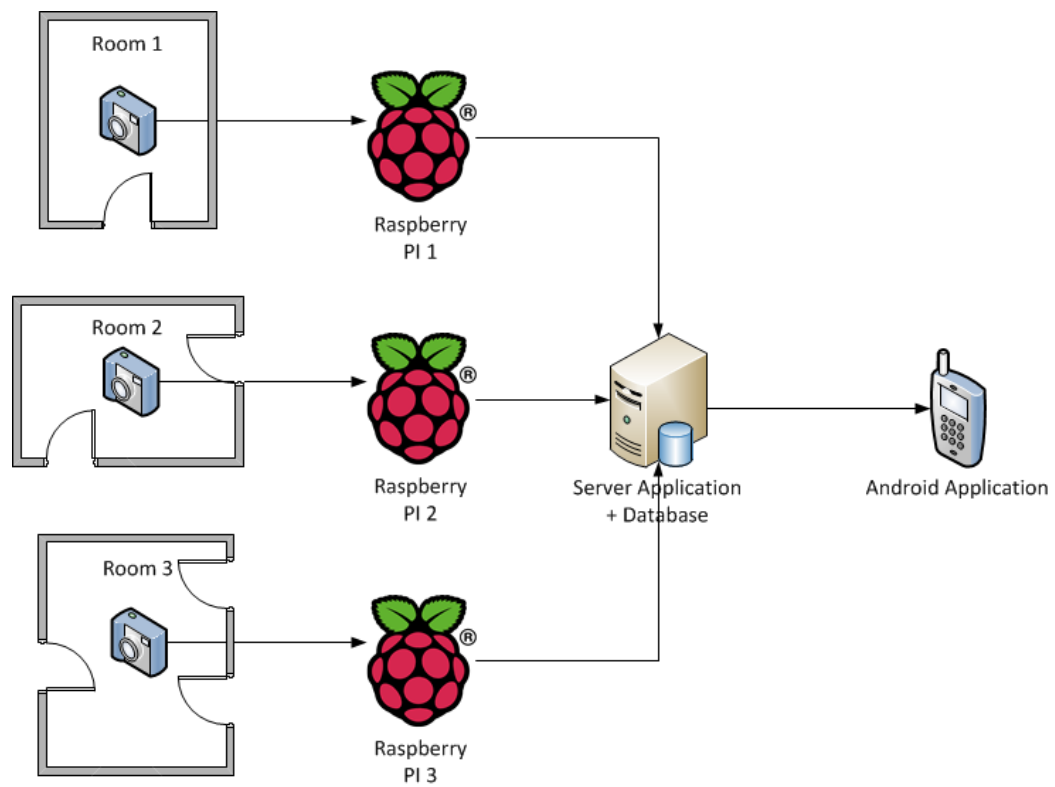


Figure 3.1: System overview of the occupancy analyzer

## 4 | Implementation



## 5 | Evaluation

### 5.1 Verification

### 5.2 Benchmarks

## 6 | Collaboration

## 7 | Discussion

## 8 | Conclusion

## 9 | References