Plan Overview

A Data Management Plan created using DMPonline

Title: Room Occupancy estimation

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Affiliation: University of Strathclyde

Template: University of Strathclyde

Project abstract:

The reason for this study is to use machine-learning (the study of models that computer uses to perform a task) models to improve the estimation of room occupancy of an office room from CO2 sensor data captured via a commercially available environmental sensor device.

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Room Occupancy estimation

Administrative Data

Creator

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Co-investigator(s)

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Co-investigator(s) contact details

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Project title

Room occupancy estimation

Project Description

- We will conduct a simple semi-structured interview with the project partners (Swarmonline employees) that have agreed to do the interview with us. These project partners are the ones managing and/or using the rooms where the study will be conducted. The method of the interview will either one-on-one or focused group meeting.
- We will send out the participants' information sheet containing a consent form so that people who are interested could indicate by signing the consent form. During this process, the participants will be given the option of choosing between the two methods (one-on-one/focused group) for the interview.
- With the prior agreement of the CEO of SwarmOnline, we will install an already commercially available environmental sensor device called Netatmo (https://www.netatmo.com/en-gb/weather/weatherstation) in the office spaces to allow for the recording of variables like temperature, humidity, noise, pressure and carbon dioxide. No personal or identifiable information will be recorded at any time using this sensor. This will last for between one to three months.
- We will obtain room occupancy levels from the staff of the company (SwarmOnline) where the study will be conducted. This ground truth occupancy data will be obtained via a webcam installed by the company. The images will be counted and managed by a member of the staff of the company where the interview will be conducted. The data obtained via numerical count of these images can only be used for analytical purposes.
- Because these images will be managed by an employee of SwarmOnline, we will not have access to the identifiable images, rather only the numerical counts will be sent to us for the analysis. After which the employee of SwarmOnline with the images will destroy the images as agreed by the participants.
- We will analyse the data using a machine learning (regression and time series) method to determine how accurate the model is for predicting room occupancy using CO_2 concentrations**.**
- The same process applied in 2-3 above will be followed before a post-study interview that will be conducted with the same people to see if they find the results interesting (the quantitative data, the models and the results of the analysis will be shown to them).

Funder

SwarmOnline Ltd

Grant reference number

Question not answered.

Project start date

July 2019

Project end date

March 2020

Date of first version

September 2019

Date of last revision

February 2020

Related policies

Question not answered.

Existing data

Question not answered.

Data Collection

What data will be collected or created?

Data that will be collected includes but not limited to

- Interview results from the participants are qualitative data to be collected.
- temperature, humidity, noise, pressure and carbon dioxide are quantitative data to be collected from a commercially available sensor (Netatmo) installed in the office of the project partners.
- Room occupancy levels (occupancy data) obtained via numerical count of webcam images.

How will the data be collected or created?

- We will install an environmental sensor device called Netatmo (https://www.netatmo.com/en-gb/weather/weatherstation) in the office spaces to allow for the recording of variables of quantiative data such as temperature, humidity, noise, pressure and carbon dioxide.
- Occupancy data will be obtained will be obtained via a webcam installed by the company.
- The various data will be collected via a file 'csv' format.

Documentation and Metadata

What documentation or metadata will accompany the data?

- Data will only be stored in dated folders with a small text file in each folder describing what happened in the lab for that session and failing this, there
  will be a readme file for a wider folder area.
- Any programs created as part of the project will be commented as necessary for wider understanding.

Ethics and Legal Compliance

How will ethical issues relating to data be managed?

- There is no potential risk associated with this study. Firstly, the environmental sensor will only record the current environmental variables, and the webcam/digital camera will be able to track the number of people entering and leaving the room.
- A member of the staff of the company where the study will be conducted will be responsible for managing and recording the occupancy data in order to avoid breach of security. The images to be taken by the device will be only for the purposes of updating the number of occupants.
- No personal or office information will be tracked or recorded.

How will copyright and Intellectual property (IPR) issues be managed?

- All data created are owned by the University of Strathclyde.
- The University may negotiate a licence to the data with Swarmonline Limited, as per the studentship agreement between the University and Swarmonline.
- If any information, data, software or other materials are provided for the use of the project, they will remain the property of the introducing party, as per the studentship agreement.

Storage and Backup

How will data be stored, backed up and shared during the research project?

- Data will be stored on the University servers, with USB sticks only being used for moving data to a computer that is on the server.
- There is a dedicated server area that only I have access to, and a separate area for sharing data as necessary.
- Data sharing is also possible off-site via the University Strathcloud service.
- Data is regularly backed up on the University servers to off-site servers.

How will access and security to data be managed during the research project?

- All data on the univeristy drives can only be accessed by staff/students and when not in use, the USB sticks will be wiped and stored in a locked drawer; I will be the only person to have access to the USB stick.
- All non-networked PCs are password protected and stay in the lab which is only
  accessible via access card.

Selection and Preservation

Which data should be retained, shared, preserved and destroyed

- The voice data recorded on computer device will be used for the purposes of this study and then disposed of.
- All the data obtained will be protected based on the core principles of University of Strathclyde's GDPR.
- The guidance on how long to retain the audio records is stated on the University of Strathclyde information and records management guidance notes.
- The audio record will be held for maximum of 1 year or at the end of the PhD research, after which it will be deleted/destroyed from the secured server where it is stored

What is the long-term preservation plan for data?

All relevant data will be uploaded to PURE, with any other repositories containing a link to the PURE repository

Data Sharing

How will the data be shared?

Useful data will be shared on the University's data repoistory system, PURE, where it'll be preserved for a minimum of 10 years. Any openly shared
data will be shared via the public portal for PURE. Any publications that arise as a result of the project will contain a link to the PURE repository as
well as a DOI link.

Are any restrictions on data sharing required?

As mcuh data as possible will be shared. However, it might be necessary that property of Swarmonline may not be sharable, but this shall be avoided where possible in publications.

Responsibilities and Resources

Who will be responsible for data management?

I (Chika Ugwuanyi) will be responsible for data management.
Access to University data storage solutions (various drives, PURE, etc.), USB stick, and security software to scan the USB stick.

What resources will you require to deliver your plan?

Access to the university storage places, ie. H:, I: drives, Pure