Project Description

Team ITU - 02.10.2013

Project Description from IT University of Copenhagen (from Advisor)

Development of an Occupancy Analyzer, which can detect people in rooms and predict the movement. The project has to be done in collaboration work with a student team from the Strathmore University in Kenya

Requirements:

- Use of Webcams, RaspberryPIs and Android Smart Phones
- RaspberryPIs do the image processing

In short, the project is:

- Use a Raspberry Pi to grab a stream of frames from a webcam and process this to detect and model the movement of occupants.
- Connect the output from multiple such Raspberry Pis to get a model spanning multiple ‘rooms’.
- Make an android app which can display the current webcam images and overlay the movement model: Which probabilities can we extract and how can we vizualize this?

Hardware for the students:

- 3 Raspberry PIs
- 3 Webcams
- HDMI-Cable

Expected effort:

- 15 ECTS points (maximum of 20 hours per week per person)

Mandatory Hand-ins/Exams:

- Prototype
- Report of the project (includes a report of the collaboration work as well)
- Oral exam

Meeting with the advisor:

- Weekly every Tuesday
- Report of the progress of the project

Expectations and suggestions of Team ITU

Occupancy Analyzer

We are going to build a model with shoeboxes and Lego figures, which demonstrate rooms and people in it. The prototype of the occupancy analyzer will handle the information gathered from this model. We will set different situations and try to predict the next “moves” of the considered object.

Collaboration Work within Team ITU

We are going to have at least one weekly meeting, where we update our progress and work together on the project. We will split up the assignments in our team, so that each member of the ITU team has something to do during the week. We will track our times, which we spent in the project, in the free time tracking tool toggle. We have a Google Drive Folder to share documents and information. We may use the SCRUM technique.

Collaboration Work with Team Kenya

We like to work together as a global team, but each team may have their own focal points, based on the guidelines of the respective advisors. Arguments and decisions for the architecture, programming language, implementation choices and problems to investigate should be done together. We expect that each team built up knowledge on their own to have a basis for group discussions. We expect the Kenyan team to come up with ideas and arguments equally like we do. We like to have at least a weekly meeting via chat. We like to use Google Drive for exchanging documents and information and email for the general communication.

Our work so far

We had to start in the beginning of September. The advisor expected us to already start the project although the Kenyan team wasn’t known. We basically done some research.

- Started with the project “Vector Shooter” in the beginning of September. The project changed to “Occupancy Analyzer” on the 17th September. Since then Team ITU started to work on the topic of the new project.
- Created collaboration documents
  - Member profiles
  - Skill-/Motivation-Sheets
  - Meeting reports
- Initialized collaboration tools
  - Google drive
  - Toggl
- Research on image processing
- Research and installation of operating system on Raspberry PI
- Benchmark of Python and Java on Raspberry PI (comparing image processing libraries)
- Let the Raspberry PI sending it’s IP to us, so that we can use Remote Desktop on it
- Draft an introduction for the report

Next steps we planned for our team

These tasks were detected by ourselves or our advisor advised us to do so:

- Try to capture motion data on a Raspberry PI

- Making a basic image set
- Research on different prediction models (e.g. neuronal nets)
- Research on related work
- Decision for a system architecture
- Merging knowledge, research results and work of both teams