

KING FAHD UNIVERSITY OF PETROLEUM AND MINERALS

Smart campus

A Senior design project

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Introduction:

The idea behind the project is to design a smart campus that has a set of features to meet with the technical requirements provided by our advisor. The project is proposed to introduce a new solution, namely to have a smart campus that is able to do the following:

- ☞ Deliver messages to recipients
- ☞ Give ability to purchase without cash
- ☞ Automatic attendance
- ☞ Provide intelligent access control
- ☞ Environment aware
- ☞ Real time data
- ☞ More services could be implementable on top of the architecture.

The project is directed towards utilizing the technology out there into creating a network of things that helps make the system more useful and provide high quality services in cooperation with many other services.

Problem Statement:

Motivation:

The project is proposed to eliminate the following:

- ☞ Wasted time, and thus money:

If we can utilize technology in the workplace and or campus to save time and make people more productive , then it will subsequently save money.

- ☞ Human error:

By automating work, errors that can happen by human miscalculations will be eliminated.

- ☞ Identity fraud:

Implementing smart authentication systems will ultimately result in the elimination of Identity fraud.

☞ Inconvenience:

In conventional ways, there are many things that are implemented in an inconvenient fashion. The project is set out to provide convenience to its users by eliminating the conventional way of doing things.

Impact:

Campus community will have more productive day having most routine jobs automated where they get to focus on jobs that are best done by people.

Project Specifications

Customer requirements

☞ Non-invasive:

The user shouldn't find the service invasive by, for example, wearing bracelets or having to carry cards, Keys, cash ... etc. As much as possible. Unless it's highly needed with no feasible alternative.

☞ Convenient:

The System must provide convenience by getting things done as fast and accurate as possible when compared to conventional ways.

☞ To be Modular:

Added services should work with the available services.

☞ Efficient:

Doesn't burden the infrastructure un-necessarily.

Technical Specifications

☞ Automated

Doesn't need human interaction

☞ Bandwidth efficient.

The system must utilize the hardware provided and it shouldn't be hogging the network bandwidth. If more Bandwidth is needed then the infrastructure must accommodate for that change.

☞ Modularity.

The system must provide modularity , meaning that more services can be built on top of it as well as services can communicate with other services simply with a goal of making it a PnP.

Task Schedule

taskID	Task	owner	Status	start	End
1	Research SOA.	Ali	Done	Week4	Week5
2	Research SOAP.	Sultan	Done	Week4	Week5
3	Research image Detection and Recognition.	Ali	Done	Week5	Week6
4	Decide on hardware.	Sultan	Done	Week6	Week6
5	Order parts and receive them	Ali	ongoing	Week7	-----
6	Design the infrastructure.	Sultan	Ongoing	Week7	-----
7	Get familiar with Hardware and libraries	Sultan	Waiting for 5	-----	-----
8	Implement the prototype.	Sultan	Waiting for 7	-----	-----
9	Implement the architecture.	Ali	Waiting for 6	-----	-----
10	Integrate the prototype with the architecture.	Ali	Waiting for 8,9	-----	-----

Completed tasks

Research SOA

Used Wikipedia and other websites to understand Service oriented architecture.

Research SOAP

Used Wikipedia and other websites to understand simple object access protocol. and how to utilize it for the project need.

Problem faced:

Need to understand XML in order to understand SOAP.

Research image Detection and Recognition:

Used the internet to find image recognition solutions.

Problem faced:

Ready solutions work with one face at a time. We will be implementing our own solution using openCV

Decide on hardware:

We evaluated several hardware solutions including using a mobile phone or a laptop or a web cam connected to the classroom workstation. In the end we found that the best solution would be to use a Raspberry Pi for its price and portability while maintaining the advantages of a modern OS.