NORRSKEN

Pilot Study

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Project Management

Summary

Walking home late at night can be a daunting experience. The newspapers write about assaults and harassment, the northern winter climate contribute with shorter days and darker nights. Existing street lights helps with the problem but the feeling of uncertainty and fear persist. Norrsken will investigate how a technical solution could be applied to create an increased sense of safety. The project is carried out in collaboration with the municipality of Umeå and Umeå University as part of the courses Interactivity in Smart Environments and Project Management.

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Project Description

1.1 Purpose

Design a proposal for a safe smart city environment where individuals' personal preferences and needs are met, build a demonstrator and, maybe, translate the solutions to rural areas.

1.2 Background

Walking home late at night can be a daunting experience. The newspapers write about assaults and harassment, the northern winter climate contribute with shorter days and darker nights. Existing street lights helps with the problem but the feeling of uncertainty and fear persist.

1.3 Goals

How can these smart environments (stretching over Ålidhem), and these individuals' activities be enriched with interactive, intelligent technology for increasing safety?

Some interesting questions to solve also as part of this problem is: How can we increase safety? How can we prototype a smart environment? What possibilities are there to make the campus and surrounding environment smart?

1.4 Delimitations

Our focus is only on the university area of Umeå. We will also limit us to only making a proof of concept.

Fig. 1: Brainstorming session

Solution Proposal

Our way to deal with the problem of safety is to create a more interesting city which will generate more people moving around, which increases the feeling of safety. We don't want to arm the people of the city with tools to increase self defense, rather creating a long term solution where the environment offers safety.

The solution we have come up with is to create a smart lighting system and a display where you can get information about what's going on on the campus area. The place where this would be installed is at the new bicycle road that the municipality will build.

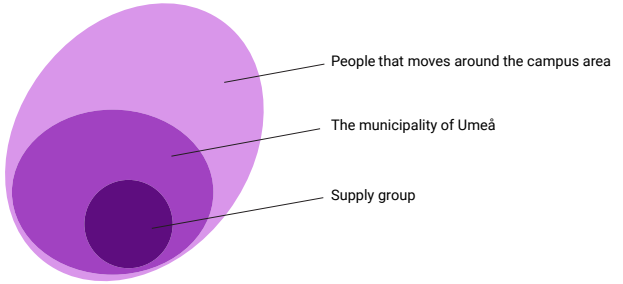
The lighting system will be an addition to the lights that are already there, and the way we will get more people to move around is to enable interaction between the people and the lights, so that something happens when they are moving around. We also want to increase the brightness of the lights when there is few people on the road so that they can see what's going on the sides of the road.

The interactive display will be put out close to the road, or somewhere where many people move around, for instance at a bus stop. The display will show what is happening around campus and will be live updated so you easily can see which lectures is held, which student pubs that are open et cetera.

Stakeholder Analysis

As shown in the image, our core stakeholders is the supply group. They are the ones that has the main interest in completing the project and also has the most influence over the project. Our primary stakeholders is the same as the projects clients, i.e. the municipality of Umeå. Lastly, the secondary stakeholders. Those who will be affected by the project somehow but will not take part in any decision making within the project.

Fig. 2: The stakeholder analysis



Requirement Specification

4.1 Introduction

Walking home late at night can be a daunting experience. The newspapers write about assaults and harassment, the northern winter climate contribute with shorter days and darker nights. Existing street lights helps with the problem but the feeling of uncertainty and fear persist. This project will investigate how a technical solution could be applied to increase safety. It is carried out in collaboration with the municipality of Umeå and Umeå University as part of the courses Interactivity in Smart Environments and Project Management.

Smart environments' purpose is to either improve abilities, control something or reduce/minimise unwanted events. It can therefore be interesting to see if the technology can be applied to the problem of security in urban environments.

In particular smart city technology, wearable computing or sensor networks can perhaps be used to solve the problem of security.

4.2 Aim and Research Questions

How can these smart environments (stretching over Ålidhem), and these individuals' activities be enriched with interactive, intelligent technology for increasing safety?

Some interesting questions to solve also as part of this problem is: How can we increase safety? How can we prototype a smart environment? What possibilities are there to make the campus and surrounding environment smart?

4.3 Methods

We initially conducted a user survey on what the user's wanted to feel more secure as well as figuring out what makes them feel insecure. From the results two ideas were designed that will be presented to the Municipality. Depending on the feedback that is received from the municipality one of the two ideas will be continued and further developed. Mattias and the occupational therapists will be responsible for the design while Marc, Simon and Linus will be responsible for the technical implementation and prototypes. The goal is to develop a testable prototype as early as possible so that it can be evaluated by the design group with the help of users. This process is then repeated until we have a working prototype that fulfills the requirements and goals of the project.

Use Scenarios

Two people move to live in different apartments in the new campus area, and a friend of theirs moves into an apartment at Ålidhem, nearby. They have different routines, and different preferences regarding how and when conducting studies and leisure activities. They have also different views on and strategies for maintaining safety. Some are opposite strategies, such as avoiding crowds of potentially threatening people, or seeing crowds as protection against potentially hostile individuals.

Anticipated Design Solution that will be Demonstrated January 10-11

The demonstration will consist of a prototype and a proof of concept. It will then be presented with a live performance.

Requirements

Fig. 3: The Functional Specification

	Requirement	Significance	Type of Requirement	Level of Significance
Complete in the end of January	O	R	F - Functional	M - Main function
Increase safety	D	M	D - Design Requirement	D - Desired
UI Prototype	F	R	P - Performance	
Concept art	F	R		
Scenario Descriptions	F	R		
Anonymous	D	D		

Material

- Wooden surfaces
- Large paper (A3, A2)
- Motion sensor
- A wifi-enabled microcontroller
- Microphones.
- Projector

4.4 Time Plan

The project needs to be completed for a seminar the 11 of December. There will also be a presentation the 15 of December as well as a presentation the 10 of January.

In December we expect to require access to sensor equipment and arduinos. We might also need wooden surfaces and larger paper (A3, A2) for prototypes in November and December. Alternatively we'll need access to a projector or a big screen (already done since the project has access to HUMlab).

In particular some sort of sensors where the type is depending on what project the Municipality thinks that we should pursue but it varies between microphones and motion sensors. This will be used during the build phase and we expect to need them in the beginning of December in order to be able to complete everything on time.

4.5 Ethical Considerations

A secure smart environment should be safe and also feel safe. The best solution would be if the solution makes the environment more secure from bottom-up (I.E. by empowering or changing the behaviour of the people) rather than a top-down approach, for example an all knowing government like in the book '1984' by George Orwell. Something to also keep in mind when designing a product is the environmental sustainability of the solution.

The solution must also respect the privacy of the user. A big issue today with Internet of Things and Smart environments is the use of data that is gathered from users. Also it's important that all studies conducted are anonymized and moral.

4.6 Expected Results and/or Discussion

At the end of this project we expect to a have a working prototype to test and also to create a discussion regarding how we should view safety in environments.

For instance, is it safer to have a tool to protect yourself, or is it better to make a solution where more people is moving around in the city?

Milestones

Milstone 1
UML - A few UML diagrams that provides a system overview
Lo-Fi prototype - Make sketches and perform user evaluation
Function analysis - Create a function analysis of the system

Milestone 2

Program - Programming the communication between all the parts of the system
3D Model - Building a miniature of the road that we want our project to be implemented on

Profitability Analysis

It is hard to make a PENG-analysis on this project since the product we will make is a prototype, a proof of concept. How do you value that? It will generate interest and can be a valuable idea if it gets realized. If this idea would be a real product, we can at least set some values that the product will generate:

Hard to value: Reduced crime, increased population in the city Indirect values: Increased life quality of inhabitants Direct values: Increased feeling of safety, More interesting campus area

These values are hard to convert to money and whether they exceed the cost of the project is hard to predict, so is the return on investment for the municipality.

Fig. 4: Project cost

Amount of time	$120h$
Project leader	$120h \times 740kr/h = 88800kr$
Project workers	$3 \times 120h \times 517kr/h = 186120kr$
Assistants	$2 \times 120h \times 182kr/h = 43680kr$
Total	318 600 kr

Fig. 5: SWOT analysis

Strengths • Extensive technical knowledge • 'Fresh eyes' on the problem • 2 Occupational therapist project members • USP: Increasing safety by creating a more interesting city
Weaknesses • No budget • Might not make the deadline • Low amount of experience in the specific area
Opportunities • Use of equipment in designated project room • Course supervisors and mentors • An increasing trend of technological infrastructure
Threats • Group member peripheral projects • Required technical equipment might not be available in time

SWOT Analysis

The SWOT analysis enlightens certain pressure points and gaps for the project. The group members' technical knowledge strength can be matched with the technical equipment opportunity. The limited experience in the area can be assisted by the course mentors which should provide a greater chance of success. The lack of budget could be problematic, but for this project all the required material should be provided, however there is a waiting time for materials that need ordering. The fact that the project aims to increase safety by making the city more interesting should be received positively by users and stakeholders in comparison of a surveillance-centered solution.

Work Breakdown Structure (WBS)