521027S Advanced practical training 5 ECTS &
521019A Practical training 5 ECTS
Internship Report

Internship information	
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Study program and starting year	International Master's Degree Program in Computer Science and Engineering.
Employer	Center for Ubiquitous Computing, University of Oulu, Finland.
Place of work	Oulu, Finland
Employers address and phone number	Center for Ubiquitous Computing, Erkki Koiso Kanttilan katu 3, door E, P.O Box 4500, FI-90014 University of Oulu, +358 294 482807
Internship time period (start-end)	01.06.2018-31.08.2018
Internship report revision by employer	
Date	Employers signature
Clarification of signature and position	
Acceptance of internship by study program	
Date	Signature
Clarification of signature and position	

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1. Preparation

The advance practical training is compulsory course for 5 ECTS as a part of the International Master's program. The course is based on three months full-time internship; therefore, every student is required to complete internship for three months either in the industry or in the premises of the university.

Looking for Internship

In the beginning, I was not sure whether I shall pursue internship in the industry or inside the university. First of all, I have attended the job fair "Pesti" held in the University. The motive is to look for some opportunity offered by different companies in the Pesti event. I have got one internship offer from a company; however, I prefer working in the university. After a while, I got an opportunity from the Center for Ubiquitous Computing to work under supervision of Dr. Tech. Simo Hosio, a senior researcher in the Ubicomp Department.

Seizing the Internship

As my motive was clear, I contacted Anabela Berenguer our coordinator and Professor Timo Ojala, Director, Center for Ubiquitous Computing. First we discussed about my interest that I want to work with, and want to learn during my internship. Luckily there was a project idea available that was offered by Dr. Simo Hosio. Since, Dr. Simo Hosio was my instructor so I have talked about my interest and, finally we agreed on a summer internship project. I have started on June 1, 2019, and ending August 31, 2019.

2. Employer and internship organization

Employer

Center for Ubiquitous Computing is the employer, whom I was assigned to work as a university intern. *"Center for Ubiquitous Computing is the largest cluster of Ubiquitous Computing and Human-Computer Interaction researchers in Finland with an annual budget of €2.6 million and world-class infrastructure, the center's mission is to conduct research on the next generation of interactive technologies. The scope of the research cuts across Ubiquitous Computing and Human-Computer Interaction, with a distinct focus on application-driven research. In addition, it is also one of the largest research Center for Ubiquitous computing and HCI in the Europe".* [1]

Project motivation

The research project is based on implementing a small web application that will help research about crowdsourcing marketplaces. Online crowdsourcing enables the distribution of work to a global labor force as small and often repetitive tasks. A work "Facilitating Collocated Crowdsourcing on Situated Displays" by Simo Hosio et. al. [2] present a generic crowdsourcing platform that supports situated teamwork and provide experiences from a laboratory study that focused on comparing traditional online crowdsourcing to situated team-based crowdsourcing. They have built a crowdsourcing desk that hosts three networked terminal displays. The displays run in custom team-driven crowdsourcing platform that was used to investigate collocated crowdsourcing in small teams. One of the concept of their work was, market place was situated in this fixed place.

Therefore, my internship work was to develop a web application that shall work similar to a crowdsourcing marketplace. In addition, web application is easily accessible with any mobile or desktop devices compare to a mobile app. Besides that, most of the crowdsourcing marketplaces usually has a web application.

Social activities

I have also enrolled in the UBI Summer School. Each year the Center for Ubiquitous Computing organize a summer school, in which, there is one week of intensive work involved. This year, it has the maximum enrollments of 83 students from different countries involving 4 workshops. It was great experience to be part of summer school, which gave me good opportunity to socialize with different people from different countries and universities. During my internship work I got a personal desk in the lab, I enjoyed interaction with other fellow researcher in the same lab and share knowledge and social life. During the work we had access of free coffee and vending machine for drinks.

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[1] http://ubicomp.oulu.fi/about/

[2] Hosio, S., Goncalves, J., van Berkel, N., Klakegg, S., Konomi, S. I., & Kostakos, V. (2018). Facilitating Collocated Crowdsourcing on Situated Displays. *Human–Computer Interaction*, *33*(5-6), 335-371.

3. Duties and assignments

Internship responsibilities

The main duties which is assigned to me during the internship was to design and develop a web application. Consideration of effortless use case and algorithm also one of the responsibilities. A summary of the tasks, which are performed during internship is highlighted in bullets point below:

- **Research about crowdsourcing:**

Before starting the project, I needed to understand what is crowdsourcing really refers to and how a crowdsourcing marketplace works.   Previously I had a very obscure idea about how a crowdsourcing marketplace works.   One of the feasible ways to understand by reading research papers about similar works and engaging into real life crowdsourcing marketplaces that exist in the internet. I have read several papers about crowdsourcing including "Facilitating Collocated Crowdsourcing on Situated Displays" [3] by Simo Hosio et. al., and "Motivating participation and improving quality of contribution in ubiquitous crowdsourcing" [4] by JorgeGoncalves et. al. Moreover, I have learned functionality and use case from one of the most popular crowdsourcing market place that is called Amazon Mechanical Turk .[5]

- **Use case and system:**

After getting a good idea about real-life existing crowdsourcing marketplaces, my second duties were to develop system that reflect our ideas and must be easy to use by user. My duties were to develop a system that required very small effort to create user account or can be used our system by without creating any user account. Before starting the coding and design of front-end, it was fundamental to have clear map of how each logical action should perform. To find out the possible use case of this web application was also one of the requirements of this project.

- **Design and frontend coding:**

A simple frontend design was required for this web application. Frontend design was meant to be such a way that it should be mobile responsive. Frontend design needed for Task page, admin page, add new task page, user reward page etc.

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[3] Hosio, S., Goncalves, J., van Berkel, N., Klakegg, S., Konomi, S. I., & Kostakos, V. (2018). Facilitating Collocated Crowdsourcing on Situated Displays. *Human–Computer Interaction*, *33*(5-6), 335-371.

[4] Goncalves, J., Hosio, S., Rogstadius, J., Karapanos, E., & Kostakos, V. (2015). Motivating participation and improving quality of contribution in ubiquitous crowdsourcing. *Computer Networks*, *90*, 34-48.

[5] https://www.mturk.com

- **Backend coding:**

My supervisor gave me flexibility about selecting the suitable programming language for this project. However, my assignment was to make sure the web application should run for a long time. Also programming language should selected such a way that future development is possible without much hassle.

4. Fulfilment of plans and personal development

Objectives

My objective for applying the internship is to orientate myself in professional environment, to foster my abilities towards professional web application development so that I can work for related industries.

Fulfilment of plans

After 3 month of internship, I was able to complete all of the task that we have planned during the internship and the duties that was in my shoulder. Below are the list of success:

- Easy to use frontend designed and coded, which is mobile responsive

- User can use the application by creating user account or without any account. If user do not create an account, an automatic random user ID would be generated which should be saved in the browser cookies.

- When user would complete a task, a reward is assigned to the unique user ID.

- A user should not participate a task twice.

- A easy to use dashboard was developed for the admin. Admin can create and delete a task. Admin also can see the list of rewards of each user.

- When admin will create a task, a secrete ID of task completion URL is generated.

- Each task has a single URL that can be shared via social network or email.
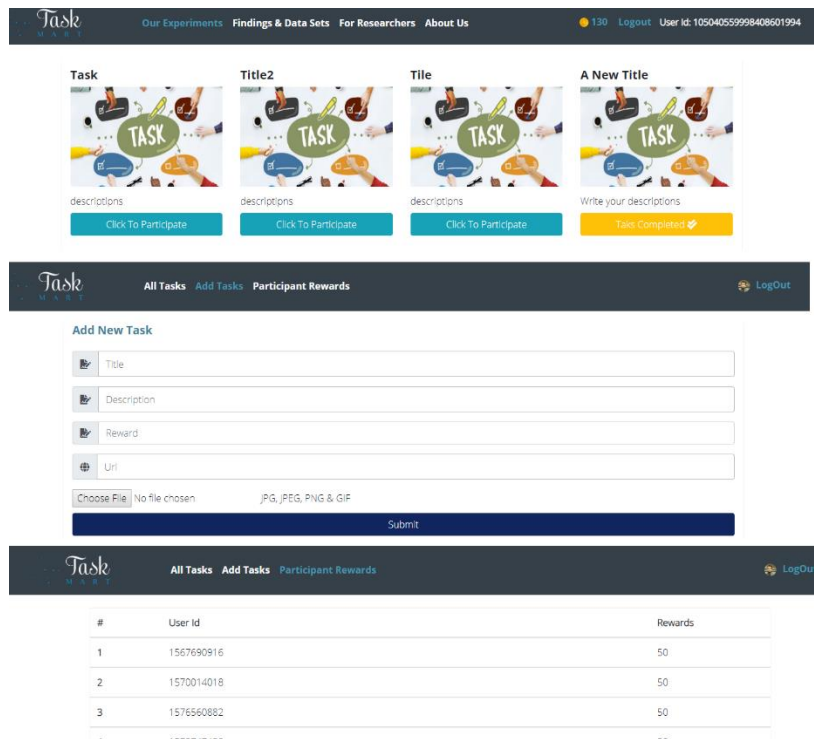
Figure1: Screenshot of the developed application

Personal development

As a part of my personal development, doing internship enhanced and further developed, the knowledge, which I have acquired from the courses (Programmable Web Project, Advance Human Centric Design etc.,) during my Master's studies. Besides that, the internship also aided me in better understanding of professional environment and efficiently working with programing language like php and JavaScript, and developing a complete real-life web-application. This internship tested and taught me how to work professionally and take responsibility alone, alike a developer in a company. During the internship I have learned JavaScript and its framework vue.js extensively which is very popular in modern web development. I have also learned php for website backend development. Learning html, CSS, JavaScript, vue.js and php was one of the best things that I have learned during my internship, which made me capable of seeking a job in a renowned company.

Challenges

Well, I have encountered plenty of challenges during my internship. Few major challenges are highlighted in the point below.

- Learning JavaScript language was challenging in this short time.
- We have used Auth0 for user login system, it was challenging to make it compatible with our ideas.
- Finding flaws and try to come up better user friendly algorithm
- Fixing bug after developing the application

5. Application of skills in future

First of all, I am thankful to the Center for Ubiquitous Computing department and Dr. Simo Hosio for giving me the opportunity to work with the senior researcher during the internship. As a student, my goal is to seek the knowledge, understanding, and augment my skills of different programing languages platforms, software architecture and software system development. Further, my aim is to keep myself up-to-date with the familiarity and usage of latest technologies.

Well, as an employee my goal is to develop my abilities to work as a professional, expand my abilities in the following area:

- Work efficiently in fast pace working environment and team environment.
- Nurture my communication skills.
- Improve my capabilities to work under pressure.
- Develop time management skills, which are efficient and effective.
- Constantly keep myself motivated by attending workshops, taking courses and reading articles on personal development.
- Enhance my research skills.

I shall be looking forward to recommend the students, to grasp the opportunity to work with the Center for Ubiquitous Computing department, in order to improve their skill sets in research and polish their research oriented approach. I have updated my CV and LinkedIn profile, according, to the work implemented and performed during the 3 months of internship. The internship has polished my skill set for conducting independent research with little guidance. I will be endeavoring to be part of Center for Ubiquitous Computing in future, if I will be obliged with the opportunity of pursuing my doctoral studies in the department.