Project Title

Distributed Systems – Project Proposal

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ABSTRACT

In this document we are describing the initial planning of an app, which purpose it is to serve as a quick and easy way for people in an emergency situation to call for help to people within their vicinity. Our main goal is to provide a reliable service that informs people that are near an emergency as quick as possible.

1. INTRODUCTION

Traditional emergency solutions tend to have one issue making them unsuitable for many modern emergency situations, that is the need for a longer conversation about the problem with an officer and the long response latency. In some situations, much faster help is needed. We try to tackle this problem by providing an application which is very easy and fast to start, issuing an alert to people nearby informing them of the emergency as well as the location, and therefore enabling people helping people where needed, even in situations where an internet connection might not be available.

As good as this sounds, there are a number of challenges to solve for this, particularly concerning fast and reliable multicasts and consistency for proximity-based communication.

First of all, there is the problem of reliability - in an emergency situation, you want to have your alert reaching other people by any means possible. We try to tackle this by using multiple different means of communication and detection: First of all, with a working internet connection, we will pursue a centralized approach, a firebase database to store the locations of people and a server to evaluate the location informations and send push notifications via Google Cloud Messaging (GCM) to notify people in the vicinity of the alert origin. Firebase is a scalable real-time database which was originally developed by an independant company and later got bought by google [3]. We choose this approach for scalability reasons. See section 2.1 for more details. This provides a large range as well as a reliable way of communication.

Secondly, without a working internet connection, we take a P2P approach. There is p2pkit [4], a framework developed by a spinoff of the ETH, Ueppa, which is developed exactly for proximity-detection, and works even without an internet connection. Though this is a nice approach, the current development status of this framework might not be sufficient for our requirements. We started a first series of tests with modest results but we will evaluate our options here further. One consideration is to replace p2pkit with the Android Wifi-P2P framework [1] or use it as a supplement. In case we arrive at the decision that it is insufficient we will focus ourselves on the centralized approach and take P2P as a best effort offline approach. Consult Section 2.2. for more details.

The combination of these approaches should hence provide reliability on the edge whatâĂŹs possible with currently available technology.

2. SYSTEM OVERVIEW

This is the core of the proposal. It is where you spell out your technical plan and explain the project design. Expected evaluation/demonstration issues would also be addressed in this section. Use helpful figures such as Figure 2 and Figure 3, explain the figures in the text where you reference them.

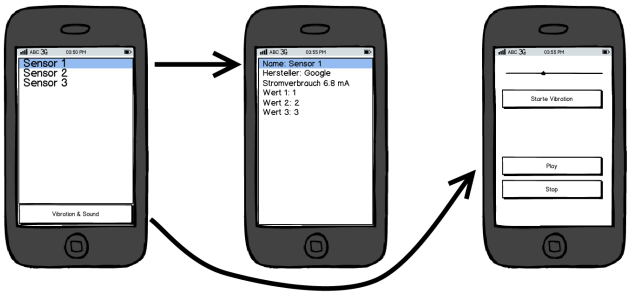

Figure 1: Only include useful figures. Do not simply copy something from a Web.

3. REQUIREMENTS

Describe system setup, components, external libraries, hardware etc.

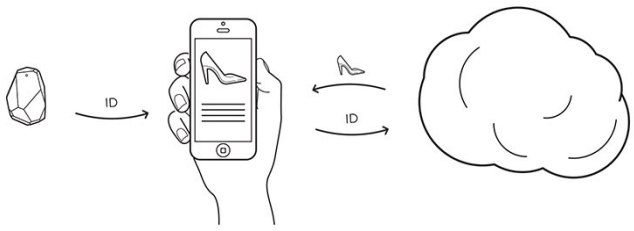

Figure 2: System Overview [2]

4. WORK PACKAGES

Breakdown the work to subtasks to meet the project requirements. Define and describe these tasks.

- **WP1**: XYZ ...
- **WP2**: Set and Configuring Backend Serve ...

- **WP3**: Integration ...
- **WPx**: ...

Stick to a concise, scientific writing style.

5. MILESTONES

The milestones section provides a work plan for carrying out the project. This is your schedule for getting the project done. Clearly state how the work packages will be distributed among the team members.

6. REFERENCES

[1] Android Wifi Peer-to-Peer. `http://developer.android.com/guide/topics/connectivity/wifip2p.html`. Accessed on 12 Nov 2015.

[2] Estimote. `http://estimote.com/`. Accessed on 26 Oct 2015.

[3] Firebase. `https://www.firebase.com/`. Accessed on 12 Nov 2015.

[4] p2pkit by Uepaa. `http://p2pkit.io/`. Accessed on 12 Nov 2015.