Rector's Challenge 2014

We are a group of four students studying Computer Science: Design, use and interaction at the University. This means that we do not need external help to create high-resolution prototypes, and we have a project where we work closely with a local care buildings, which we will use new technology to improve the lives of seniors. We feel that this puts us in a unique position to implement the idea.

We envision that many seniors have difficulty finding indoors, especially in large and complex buildings such as shopping centers or major care buildings. We assume that this may be related to cognitive decline, as typical challenges for older people with the condition are orientation and memory. Our solution is an indoor navigation system based on Bluetooth low energy. The goal of the system is to make indoor navigation simple and intuitive, as well as create a good user experience, a sense of empowerment and confidence, which in turn leads to increased self-esteem and quality of life.

The idea is to use new technology in "Estimote Beacons". This is technically very small computers that includes 2.4 GHz Bluetooth 4.0 smart radio, also known as "Bluetooth Low Energy". Each "Beacon" has a life span of an average of three years, but can live up to 5 + years with only one battery, so it's really "low energy". Battery life will naturally vary and are affected by the signal strength and how often they send out the signal and interact with other devices. All "Beacons" sends out its unique signal to all Bluetooth devices within range. A device can be anywhere from 0 to 70 meters away. The maximum distance will also vary due to environment. "Beacons" uses the same radio frequency as 2.4GHz Wi-Fi routers, and as you probably know, is not the signal strength always good if there is a wall or similar in the way. To determine the user's position, we will use the transmitter signal strength (RSSI). The closer you are a "Beacon", the stronger the signal.

The user will have a tablet attached to wheelchair / walker, which reads and interprets the signals from the transmitters. So this is a solution that will be integrated into existing equipment, as they are familiar with from before and feel confident. A tablet can pick up and read multiple signals simultaneously. It is in this way we can find the user's position. By measuring the signal strength of all signals tablet picks up the system can tell the user where they are and where they are going. This is called triangulation and will work on all transmitters know where the other transmitters are located in relation to itself.

The user interface will be very simple. Exactly how it should look like we are not sure yet, but it is something we will reach through user testing. There will be an application that contains few options, so that users with little technical skill should easily be able to use the system. It should not require more than a push to get started. It will also be possible to store destinations, so that you simply can press eg "pharmacy", if that's your man should.

We believe that our solution can help enhance the quality of life for the elderly, especially for those with cognitive impairment, creating peace of mind when they travel in familiar and unfamiliar

buildings. They get a security of knowing that they can not get away when they go alone. In addition, it will provide a greater sense of freedom and independence, as they previously dependent on help to find, now you do it on your own.

Because of our partnership with a local care buildings we have good access to the user, and thus good opportunities for user testing and development. This means that we can easily find out which solutions work, especially in terms of interface. We will also have the opportunity to make use of professionals in the health sector for consultation, so that the system will best suit the user's needs. The prototype will initially only be implemented at the local caring built, and will therefore be limited to their premises. Nevertheless, we believe that our solution has a good scaling potential and it will be easy to implement in several buildings. This is not a solution that is locked for indoor use. It will also work for homemakers, eg to and from the store by synchronizing our solution with existing GPS technology.

Later, we also create a web-based solution, which allows multiple people can use the system without having to download software.

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