Cpt_S 484 Team Project Specification*
Phase I

Requirements Elicitation – Initial Understanding

Due dates: see Course Schedule.

> *The hardest single part of building a software system is deciding precisely what to build. No other part of the conceptual work is as difficult as establishing the detailed technical requirements, including all the interfaces to people, to machines, and to other software systems. No part of the work so cripples the resulting system if done wrong. No other part is more difficult to rectify later.* [Brooks, *No Silver Bullet,* 1987]

I. Summary

Blind and visually impaired people should be able to navigate indoors, from one location in a building to another location in the same building, or a different one. For instance, a blind student or a blind visitor may need to go from one classroom to another, from an office to a lab, then to a classroom, restroom, etc. In order to reach the destination location, a blind person may need to figure out where their current location is, which direction in the hallway they should go, when to turn at the right place, continue for how long, and when to stop when they reach their destination.

Various concerns may need to be addressed during such navigation. First of all, safety would be an important concern, which implies, for example, detecting obstacles and avoiding collisions is necessary. The time it takes to reach the destination might also be a concern, especially when they must reach the next class in another corner of the campus. Familiarity with the route might be taken as another concern.

Your team is going to build a smartphone app aiming to help blind people navigate indoors. For Phase I, the primary task is to come up with requirements models and a specification for the app, accompanied by a prototype implementation. The app has a generic name: Theia – the Greek goddess of vision, but your team can come up with your own.

II. Theia: Preliminary Definition

II.1 Domain, Stakeholders, Functional and Non-Functional Objectives

For this app, the *domain* will be indoors, which can consist of multiple floors, each of which possibly hosts multiple classrooms, offices, bathrooms, lounges, elevators, etc.

The primary stakeholder would be a blind person who needs to navigate indoors. Secondary stakeholders might involve a caretaker (an assistive person) – e.g., a family member – who sets the configuration of the app and comes to aid the blind person in case of emergency (getting lost or injured). Staff member in the accessibility department and the police might also be considered secondary stakeholders. You might also come up with other parties that you consider appropriate.

Functional objectives would include foremost navigating indoors, primarily going from one location to another in the same or different buildings that are connected to each other.

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Non-function objectives would include safe navigation, fast navigation, and comfortable navigation. Since the app is designed for blind people, usability or user-friendliness would also be a top priority objective, since a blind person cannot read the screen, so everything needs to be designed accordingly, such as utilizing the voice recognition capability of smartphones.

For both functional and non-functional objectives, use of as many sensors that are available on an advanced smartphone would make your app more helpful.

II.2 Software System Requirements: Functional Requirements

Your app shall assist blind people by offering multiple features, including:

- Accepting from the user the destination location to go. It might even be able to suggest or confirm a possible destination location, utilizing the user's routine schedule or habit.
- Figuring out the routes to reach the destination, and informing the user of the options (if there are more than one), and accepting user's preference.
- Telling the user to walk a distance (e.g., 2 minutes before turning, or walk for 30 steps, etc.)
- Telling the user to stop at the right place to turn.
- Detecting obstacles and telling the user what to do in order to avoid collision.
- Placing emergency calls and messages, possibly after detecting a fall or when the system has lost its current location.
- Figuring out what the next action(s) would be, based on the user's schedule or habit, and suggesting/accepting the user's choice.
- More that you can think of.

II.3 Software System Requirements: Non-functional Requirements

For blind people, non-functional requirements may be more important to achieve than functional ones. The NFRs would include:

- The system shall help the user safely navigate indoors.
- The system shall lead the user through the fastest route.
- The system shall lead the user through the route that the user would feel the most comfortable with.
- The system shall be usable for blind people.
- The system shall be ubiquitous.
- The system shall be customizable to every user: e.g. volume, the interval of instructions, etc.
- The system shall be easily extensible to accommodate the following typical variations: variations in interface, language, definitive needs of the user, new features, new sensors and hardware, etc.

III. The Deliverables

For Phase I, most of the deliverable is centered on documents that accurately describe your requirements. It should be elegant and comprehensible. You should keep the copies of your documents on your team's EECS gitlab repository page. For submission purpose, follow the instructions given on the course page. You are to use the **WRS template** for your final deliverable.

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At the end of Phase I, your team should prepare for **a presentation** of your system. The presentation should include the **three pairs of AS-IS and TO-BE scenarios (one of which is given), the creeping rate your team can handle (on 2nd-to-last page of your slides, using proper Function Points calculation), and why your team's product is/would-be the best (on the last page)**. The presentation would happen either in-person (if I'm able to visit Pullman) or via video conference, and counts for **(20%)** of the Phase I grades. Details on the presentation will be announced in Canvas.

The remaining 80% are divided as follows:

III.1 Issues (25%)

Read through the informal requirements given in Section II above, and describe any issues (e.g., incompleteness, inconsistency, ambiguity, redundancy, unsoundness) that you encounter in the informal preliminary definition. Also, describe how you have resolved such issues.

Describe what your choice is and the reason for that particular choice – i.e., because said choice is beneficial for some reasons, aka design rationale.

For example, system extensibility can be enhanced by adding a partial category of functional requirements that you team deems reasonable. This is an example of requirements incompleteness.

In order to resolve the issues, you must use your own "creative imagination" based on your teamwork. Due to the nature of this app, it would be great if you could find actual potential users to interview; otherwise, put yourselves in the position of a potential user of the app, and document the AS-IS/TO-BE scenarios by experimenting.

III.2 Improved Understanding (25%)

Prepare a clarified version of the preliminary definition of your system, including as much details as possible, while discovering and resolving any possible defects based on your discussions in **III.1**. Try to clarify both the domain description (**W**orld) and the system description (**R**equirement, **S**pecification), and establish traceability between them.

III.3 A Prototype and User Manual (15%)

Build a prototype of your smartphone app. For this phase, a simple mock-up will do. It could be a concept drawing of the app, or to the GUI demonstration on a phone.

A preliminary user manual should be developed that will become more complete and consistent at the end of Phase II of the project. This manual can be developed as a separate document outside of the WRS document.

III.4 Project Plan and Meeting Records (15%)

You shall also develop a **Project Plan** that covers the duration of Phase I. You may use this template for reference. For the preliminary submission (see Course Schedule for due date), make sure you include the following information: Team Organization, Team Leaders, Team Liaison, Deliverables and Schedule, etc.

The plan shall be maintained and updated until the end of Phase I, then a final version of the project plan shall be submitted. See the samples for reference.

Your teams should have regular meetings to discuss the project, for instance, review this document and the WRS template together. For each meeting, make sure you keep a record on the times, roles, activities and outputs. These records shall be submitted in place of the **Process** section in the WRS template.

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