NAVUP
Software Requirements Specification
University of Pretoria

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1   Introduction

1.1   Purpose

This document serves the purpose of providing an intensive description for the NavUP system(product). It will also identify the possible requirements and restrictions for the NavUP system(product). This document will help the developer to gain insight on what the system(product) should do, to better understand how the system should be implemented in the implementation phase.

1.2   Scope

The system(product) to be developed is called NavUP. NavUP will serve as a navigation application. NavUP intends to provide different users with optimal routes to destinations across the University of Pretoria campus.
Furthermore NavUP provides a way saving and searching locations, both indoors and outdoors. NavUP will also facilitate search-ability of POIs and events. The Wi-Fi infrastructure within campus will be used for administering location and navigation services.

1.3   Definitions, Acronyms and Abbreviations

Term	Definition
POI	Point of Interest
Wi-Fi	Wireless network infrastructure
Developer	Person/s developing the system. COS301 Software Engineers
GPS	Global Positioning System used by devices to determine current locations
Heat Maps	Graphical representation of data in the form of colours on a map.

1.4   Overview

In this document, an Overall Description will be provided for the NavUP system(product). In the Overall Description, the Product Perspective, Product Functions, User Characteristics and Constraints will be discussed. Following the Overall Description, will be an elaboration on the Specific Requirements for the NavUP system(product). For the Specific Requirements, External Interface Requirements, Functional Requirements, Performance Requirements, Design Constrants, Software Sytem Attributes and Other Requirements will be identified and discussed. Thereafter, any relevant appendixes and indexes needed by this document will be provided.

2 Overall Description

This section provides an overview of the system as a whole. We will explain how the system works, as well as how it interacts with other systems.

2.1 Product Perspective

NavUP is a mobile application used by students at the University of Pretoria. NavUP provides navigation of campus, providing traffic congestion and location services. NavUP will rely on other NavUP devices for real-time statistics and will interact with a primary server for pre-determined locations, events, POIs and venues. Both NavUP server and NavUP mobile will be present on the same network.

2.1.1 System Interfaces

Todo: Identifying interacting subsystems first needs to be done.

2.1.2 User Interfaces

Interaction between user and system will be achieved through the use of a GUI.

2.1.3 Hardware Interfaces

2.1.4 Software Interfaces

2.1.5 Communication Interfaces

2.1.6 Memory

2.1.7 Operations

2.1.8 Site Adaptation Requirements

2.2 Product Functions

General functions for the NavUP system(product) include:

- The ability to use several Wi-Fi connection points as navigation tools

- The ability to calculate optimal routes from one destination to another, bases on the user's needs (i.e it must cater for routes for those with disabilities etc.).

- The ability to provide accurate information about pedestrain traffic based on how many devices are connected to certain Wi-Fi connection points.

- The ability to reroute the user based on certain preferences.

- The ability to calculate the user's current location while indoors and while outdoors.

- The ability to search for locations, save locations, and providing directions to a location.

2.3 User Characteristics

Students, Lecturers and Guests will interact with the system.
Students will interact for venues used for classes for modules, social events and places of interest. Guests will interact for navigation to locations unknown to them. Lecturers will use the system for efficient traffic-free routing.

2.4 Constraints

NavUP will be constrained by the wireless network infrastructure present around campus. Since the application requires connection to the database hosted over the same network as the Wi-Fi broadcasts, it is crucial for our application to function. Wi-Fi will also be needed to determine the location of the user.

Our next constraint is the our system interface to the GPS navigation system present within mobile devices. Given that NavUP will interface with multiple GPS systems, our interfaces will deviate from manufacturer-to-manufacturer. Quality and features of each GPS system may differ as well.

NavUP mobile will be constrained by the capacity of the database. Given that many devices will be using the same database, it could cause queueing of requests and data transfers.

2.5 Assumptions and Dependencies

We assume that NavUP will be used on mobile devices with sufficient processing power and memory to facilitate optimal operation.

We also assume that the basic operation of a GPS unit within every mobile device operates functionally the same. Adjustments need to be made to architecturally different GPS units within mobile devices using NavUP so as to operate the same.

3 Specific Requirements

This section gives a detailed description of the system and its features.

3.1 External Interface Requirements

- System Interfaces

- User Interfaces

  Firt-time users of the mobile application will be presented with a log-in page upon application launch. Registration can be navigated to from the log-in page.

  Returning users of the mobile application will be presented with a search-page. This page facilitate the searching of venues,events,POIs and locations.

  Once a user has found an event,venue,POI or location, a navigation-page will be presented to the user.

  Registered users will be given an option to CRUD their profile using the personalization-page.

- Hardware Interfaces

  NavUP mobile does not have designated hardware thus no direct hardware interfaces are present. The GPS unit is managed by the mobile phone's GPS application. The hardware connection to the database is made through the mobile phone's operating system.

- Software Interfaces

  NavUP communicates with the GPS application to retrieve geographical information of where the user is located.

  NavUP also communicates with the database to retrieve locations,events,venues and POIs. Personal profiles and bookmarked locations is also interfaced this way.

- Communication Interfaces

  NavUP will use existing techniques used within mobile phones to facilitate communication. These techniques will he handled implicitly by the mobile devices operating system.

3.2   Functional Requirements

3.3   Requirement 1

3.3.1   Description

NavUP shall provide the user with navigation functions to navigate the user around campus

- R1.1 NavUP shall provide the user with their current location.

- R1.2 NavUP shall provide the user with directions from the current location to their desired location around campus.

  - R1.2.1 NavUP will notify the user of any traffic congestion along the route according to the number of users connected to the Wi-Fi in that location.

- R1.3 NavUP shall allow the user to save their current location.

- R1.4 NavUP shall allow the user to share their location on the NavUP server, for other users to find them.

3.3.2 Use case diagram

3.4 Requirement 2

3.4.1 Description

NavUP shall provide the user with a user interface to allow users to enter information

- R2.1 NavUP will allow user to enter information such as their desired location, places of interests and their personal details.

- R2.2 NavUP wil allow user to recall saved their location on the UI.

- R2.3 The NavUP UI will allow users to check-in at specific locations.

- R2.4 The NavUP will have a find me functionality on the UI.

3.4.2 Use case diagram

3.5 Requirement 3

3.5.1 Description

NavUP shall push new information to the users according to their preference

- R3.1 NavUP will notify user of close places of interests around campus.

  - R3.1.1 NavUP will use the records of checked-in locations to guess the places that the user likes and suggest similar places.

3.5.2 Use case diagram

3.6 Requirement 4

3.6.1 Description

NavUP shall keep record of steps taken by the user around campus.

3.6.2 Use case diagram

3.7 Actor-System Interaction Models

3.8 Traceability Matrix

Requirements	Navigation	Heat Maps	Saved and Current Locations	Push Notifications	Activities
R1					
R1.1			X		
R1.2					
R1.2.1		X			
R1.3			X		
R1.4	X				
R2					
R2.1				X	
R2.2			X		
R2.3			X		
R2.4	X				
R3					
R3.1					
R3.1.1				X	
R4					X

3.9 Performance Requirements

3.10 Design Constraints

3.11 System Software Attributes

3.12 Other Requirements

Appendixes

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