
Software Requirements Specification

Bike+

Version 1.1

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Revision	Date	Authors	Changes
1.0	24.05.2023	Kerim, Cagan	Initial Version
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1.Introduction

1.1 Purpose and Intended Audience

This software will be designed for the advanced bikers. Although even a beginner can use this software. This app can only be used on a specific smartwatch “Bangle.js” . It cannot be used on other devices at this time.

1.2 Usage of Documents

The user of ‘ bike+’ will be referred to as the ‘Biker’. Functional requirements will be rated as a priority level low, medium, and high. Functional requirements may be interrelated.

1.3 Acronyms and Definitions

In this section, some of the terms we use will be explained and abbreviated.

- SRS - System Requirements Specifications
- UCD - Use Case Diagramm,

UCD Defination: A use case diagram is a graphical depiction of a user's possible interactions with a system. A use case diagram shows various use cases and different types of users the system has and will often be accompanied by other types of diagrams as well.

- RPM – Revolutions Per Minute
- GPS - Global Positioning System
- BT – Bluetooth

- BMR – Basal Metabolism Rate
- BLE – Bluetooth Low Energy

BLE Definitions: Bluetooth Low Energy is a protocol aimed at new applications in health, fitness, security and home entertainment.

1.4 SRS Structure

SRS, lists functional and non-functional requirements of 'bike+'. And explain them to 'biker' in a meaningful way.

It also gives comprehensive information about the functionality of the application.

2. General Overview

2.1 Product Perspective

The 'bike+' app has a wide target audience. People of all ages can easily adapt to this application. There is no specific age group targeted by the application. The vision of the application is to provide an optimal user experience to the 'biker'. The user interface is customized in this respect. The aim is to provide the 'biker' with a long-term 'bike assistant'.

2.2 Product Capabilities

The application provides the biker with a lot of data about his/her training or himself/herself. These are parameters such as calorie calculation, heart rate, rpm, distance traveled, speedometer.

The biker can switch between 2 modes within the app according to his/her biking style. These are mountain biking and road biking. About road biking, the

biker can follow the data about the roads from the application interface by means of gps.

In addition, the application has German and English language options.

2.3 Data Protection

The application will not connect to any other database. The most important reason for this is the importance given to data protection. According to the feedback we received from the user, the connections of the application will only be the bluetooth chest belt and RPM sensors on the pedals.

2.4 Operating Environment

The application is a smart watch-specific application. This app can only be used on a specific smartwatch “Bangle.js”. It requests the location information of the biker in order to work optimally. However, the location records are not stored in any database, so the confidentiality of the data is at the forefront for the application.

2.5 Limitations

Our product will be used as a wearable application for a smart watch. And for this it must meet some requirements. These requirements are internet connection, downloadability. For the application to work optimally, the devices running the application must require these specifications.

3.Interface Requirements

3.1 Hardware Interfaces

A hardware interface is required for the smartwatch to communicate with the chest belt. Profiles such as BLE and HRP (Heart Rate Profile) are used for receiving and sending heart rate data. The hardware interface allows the smartwatch app to communicate with the chest belt correctly.

3.2 Software Interfaces

The application needs a user interface to interact with the user. This is used to show information to the user, respond to buttons or touchscreen controls, and navigate within the app. In this interface user can use two different modes. There are road biking and mountain biking.

In addition, it will be possible to switch between interfaces in the application by swiping, and these interfaces can be changed according to the user's request.

3.3 User Interfaces



4. Functional Requirements

4.1 Calorie Deficit Calculation

The application should be able to calculate the amount of calories consumed by the biker while training, through parameters such as speed and distance, basal metabolism, slope and incline.

4.1.1 Speed And Distance

Requirements	Speed and Distance
Explanation	The app needs the distance and speed taken to calculate the calorie deficit.
Priority	High

4.1.2 Basal Metabolism

Requirements	Basa Metabolism
Explanation	Basal metabolic rate varies depending on a person's age, gender, height, weight, and body composition. In general, people with a larger and heavier body are expected to have a higher BMR. Also, individuals

	with more muscle mass usually have higher BMRs. BMR generally decreases with age and as body composition changes.
Priority	High

4.1.3 Slope and Incline

Requirements	Slope and Incline
Explanation	Cycling on a sloping road affects the biker's calorie burn. As the degree of incline and incline increases, the amount of calories expended increases.
Priority	High

4.2 Multiple Language Choice

In order for the biker to use the application more comfortably, two different language options are offered.

Requirements	Multiple Language Choice
Explanation	There are only 2 language options. These are German and English
Priority	Medium

4.3 Voice Assistant

The voice assistant provides the biker with a better experience while driving.

Requirements	Voice Assistant
Explanation	During the riding, biker can ask informations about the ride.(Map,Speed,Hearbeat,etc)
Priority	Low

4.4 Multiple Road Choice

There are 2 different modes that can be selected according to the driving style within the application. These are mountain biking and road biking.

4.4.1 Mountain Biking

If mountain mode is selected during use, a suitable interface and precautions to be taken by the biker are provided to the user.

Requirements	Mountain Biking
Explanation	Possible hazards arising from the road (such as bumps, pits) are provided to the biker.
Priority	High

4.4.2 Road Biking

If road biking mode is selected during use, a suitable interface and precautions to be taken by the biker are provided to the user.

Requirements	Road Biking
Explanation	The user is provided with the safest and fastest possible route.
Priority	High

4.5 Connectable Devices

There are 2 different compatible devices with application. These are BT chest belt and RPM sensor on pedals.

4.5.1 BT Chest Belt

Chest belt is fully compatible with the application. It gives the user instant heart rate data.

Requirements	BT Chest Belt
Explanation	Biker can see the number of heart beats per minute via the BT chest belt.
Priority	High

4.5.2 RPM of Pedals

The biker can see the speed and distance information and the RPM number.

Requirements	RPM of Pedals
Explanation	Biker can see RPM via the sensors on the pedal.
Priority	High

5. Nonfunctional Requirements

5.1 Interface Quality

The application interface will be simple and understandable according to the user's wishes.

5.1.1 Simplicity

A very simple interface will be presented to the user, taking into account the wishes of the user.

Requirements	Simplicity
Explanation	There will be no redundant informations on the interface.
Priority	High

5.1.2 Understandability

In this application there will be no software term and that will help user to understand the application easily.

Requirements	Understandability
Explanation	Software jargon will be avoided as much as possible in the application so that the user does not experience difficulties while using the application.

Priority	High

5.2 Performance Requirements

Application performance will be kept at the highest level so that the application can run as fast and error-free as possible.

5.2.1 Fast Processing time

Requirements	Fast Processing time
Explanation	The application should run as fast as possible. Because we want the user to get the fastest response in possible situations that he/she may encounter while using the application.
Priority	medium

5.2.2: Error-freeability

Since the user usually uses the application during training, this topic is important as any error encountered in the application may effect the driving experience.

Requirements	Error-freeability
Explanation	The application should run as error-free as possible. It is not desired for users to encounter a negative situation.

Priority	high
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5.3 Sustainability

In order for the application to be used for many years, easy maintenance and updates are required. These are essential for sustainability.

5.3.1 Energy Efficiency

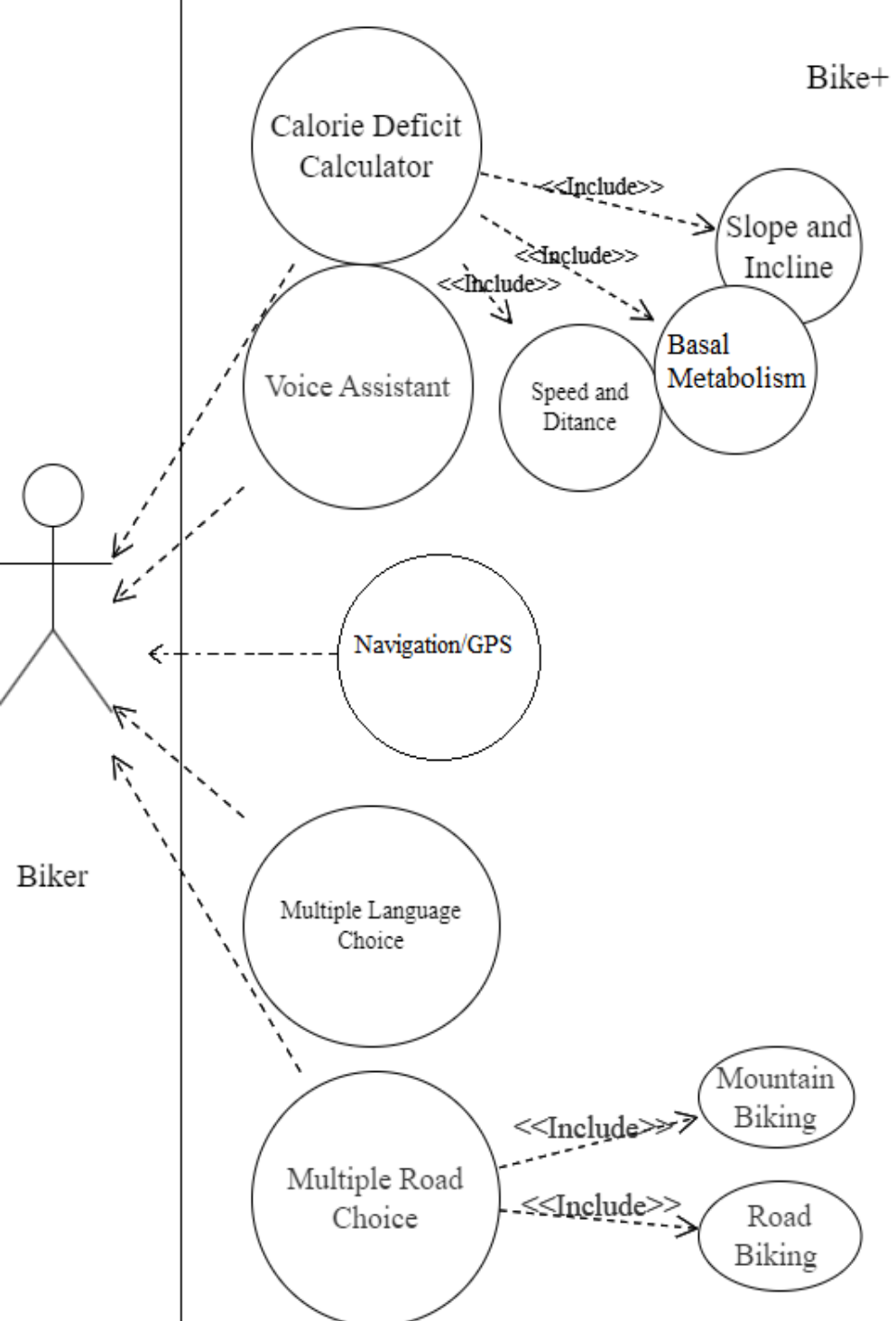
The energy-efficient operation of the application ensures that the battery life is extended and energy consumption is reduced.

Requirements	Energy Efficiency
Explanation	Optimizing the processes running in the background prevents the device from wasting energy unnecessarily.
Priority	high

6. Use Cases

This Chapter provides a summary of all use cases of Bike+.

6.1 Use Case Diagramm



6.2 Use Case Description

Detailed description of the individual Use Cases:

Name	Calorie Deficit Calculation
ID	UC1
Aim	The goal is to calculate the calorie deficit of the biker.
Precondition	Application needs to know Speed and Distance, Slope and Incline, basal metabolism to calculate calorie deficit consistent.
Postcondition	Calculates the calorie deficit.
Postcondition in case of exception	Calorie deficit is calculated incorrectly.
Actors	Biker.
Normal Process	<ol style="list-style-type: none">1. User enters his/her weight.2. App calculates speed and distance traveled.3. App calculates slope and incline.4. Using this information, the calorie deficit is calculated.
Exceptions	<ol style="list-style-type: none">1a If the user enters a value less than 0 for the weight, it will give an error.

Name	Multiple Language Choice
ID	UC2
Aim	The application works in different languages.
Precondition	-
Postcondition	The application works in 2 different languages, English and German.
Postcondition in case of exception	-
Actors	Biker.
Normal Process	<ol style="list-style-type: none"> 1. The biker opens the application. 2. The biker selects one of the two language options.
Exceptions	-

Name	Voice Assistant
ID	UC3
Aim	Provides a voice assistant to assist the cyclist while riding
Precondition	User must allow a voice assistant
Postcondition	Voice assistant will work.
Postcondition in case of exception	The voice assistant will not work if the Input and Output devices are not allowed to work.
Actors	Biker.
Normal Process	<ol style="list-style-type: none"> 1. Biker allows the Input and Output (Microfon access, Speaker access) devices. 2. Biker gives command to voice assistant to work. 3. The biker asks the voice assistant about the subject she/he wants to be helped.
Exceptions	<ol style="list-style-type: none"> 1a The voice assistant will not work if the user does not accept the required permissions 2a Voice assistant will not work if English and non-german language are used

Name	Multiple Road Choice
ID	UC4
Aim	The user chooses one of two different road options.
Precondition	-
Postcondition	One of two different interfaces opens in the application.
Postcondition in case of exception	-
Actors	Biker.
Normal Process	-
Exceptions	-

Name	Mountain Biking
ID	UC4.1
Aim	It includes biking in mountains safely. .It is intended to provide an interface to assist the biker during mountain riding.
Precondition	The user needs to select the mountain biking mode.
Postcondition	The app adapts to mountain biking.
Postcondition in case of exception	-
Actors	Biker.
Normal Process	1. User selects mountain biking interface. 2. It uses an interface suitable for mountain driving.
Exceptions	1a If the user selects the roads biking mode, they cannot access the mountain biking mode.

Name	Road Biking
ID	UC4.2
Aim	It includes biking in roads safely .It is intended to provide an interface to assist the biker during road riding.
Precondition	The user needs to select them road biking mode.
Postcondition	The app adapts to road biking.
Postcondition in case of exception	-
Actors	Biker.
Normal Process	<ol style="list-style-type: none"> 1. User selects road biking interface. 2. It uses an interface suitable for road driving.
Exceptions	1a If the user selects the mountain biking mode, they cannot access the road biking mode.

Name	Navigation/GPS
ID	UC5
Aim	It is aimed to determine the most suitable route for the user. It allows the user to see the road to go while cycling.
Precondition	User must allow the GPS.
Postcondition	User sees his/her way.
Postcondition in case of exception	-
Actors	Biker.
Normal Process	<ol style="list-style-type: none"> 1. User sets the target location. 2. The most accurate route is determined.
Exceptions	1a Users selected location does not exist

