Smart Kart (Project Initiation Document)

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Chapter 1

Project Background and Purpose

1.1 Objectives

The usefulness of this project is the safety benefits it may provide. If the Artefact produced can reduce the frequency that a driver needs to check their speedometer, then they will be more aware of road conditions.

This project is motivated by the increasing deployment of average speed check zones throughout the UK, and the potential they have for leading to distracted driving.

1.1.1 Primary Objectives

The Primary Objectives of this project are as follows:

- An app (for a smartphone) that determines when the user is in an average speed check zone, and begins tracking average speed.
- Said app then warns, with an audible warning, if the average speed is above the limit.
- Voice commands may be used to launch the app at the user's request (for example, if there is temporary speed check area).

1.1.2 Secondary Objectives

If time allows, the project may achieve the following objectives:

- The app allows for the user to manually set what the speed limit is (for example if a road has a temporarily reduced speed limit).
- The app allows for setting the audible warning to a custom sound.

1.1.3 Tertiary Objectives

In many territories globally, the use of devices to detect speed cameras is illegal, and apps are either explicitly or potentially illegal. It would be ideal if the app could detect it was in such a territory, and prevent its own usage.

1.2 Scope

There is scope within the project to provide an app that is cross platform, using technologies such as Flutter, UNO, and .NET MAUI (née Xamarin.Forms)[1]. This would allow users of the two major mobile ecosystems to use the app. However, doing so may hamper the ability of the developer to write sufficient code in the time provided. Hence, a cross-platform app is not included in the project at this time.

There is also scope to build an independent database of average speed check areas. This would be a significant undertaking, and there are already public datasets available for use. As such, making such a database is not in the scope of this project. However, allowing for contribution to such datasets from within the app would serve the public good, and may well be within the scope of the project.

1.3 Deliverables

The Project will deliver an Android Application that meets the Primary Objectives (defined in section 1.1.1).

The project will have met its objectives when the app matches provides features defined by the Primary Objectives. It will exceed them if it **also** implements Secondary or Tertiary Objectives.

1.4 Constraints

Testing the application in the most *straightforward* way may be constrained by applicable law, insurance, and ethics. Otherwise, there are no external constraints known at this time.

1.5 Assumptions

There are currently no unknowns for this project; hence, there are no assumptions to be made.

[1] Flutter (citation), UNO (Citation), .NET MAUI (Citation).

Chapter 2

Project Rationale and Operation

2.1 Project Benefits

Successful delivery of this project will most benefit drivers (primarily in the UK, but possibly in other territories), with phones, who often drive in areas with average speed check zones.

By reducing the time spent monitoring their speedometer, they can be more conscious of the road around them, and be more alert to potential incidents.

As well, by providing *advance* warning of exceeding the average speed, they may be able to drive in a smoother manner and avoid the kangaroo-ing" effect; this can reduce congestion and prevent accidents.

2.2 Project Operation

Agile Software Development is a paradigm, commonly defined by the Manifesto (source); within this paradigm are many varied methodologies. For projects where there is only one team member, methodologies such as Kanban, Scrum (as modified by Scrum for One (source)), and Extreme Programming are optimal. (source!!).

Kanban is the most suitable methodology for the software development in this project...

The overall planning and schedule for this project is laid out in the Gantt Chart in section **??**. The intention is to stick with this schedule; however, the agile paradigm requires flexibility, so this may change with time.

2.3 Options

As discussed in the section on Scope (1.2), for developing this project there is certainly one choice to be made: is the app developed using one of various cross-platform frameworks, or using platform-native frameworks.

In that discussion, it was already decided that using a cross-platform framework is not in the scope; however, even within the realm of platform-native, there are more choices to be made:

2.3.1 Which Platform?

The Project's nature requires a mobile platform. However, there is a choice within this; despite Android and iOS' apparent dominance of the market (with (source) claiming combined a 99.19% share, as of September 2021), there are various other mobile platforms, such as Tizen[1], KaiOS, and Sailfish OS; as well as mobile implementations of desktop platforms, such as pureOS.

Despite this variety, Android stands tall as the easiest to develop for and most accessible platform. The Android Open Source Project means that obtaining an image to test on, or examining the source to aid in debugging, is relatively easy. Hence, Android is an ideal platform to develop this project on. Furthermore, using Android Jetpack[2] whenever possible will provide the project with a consistent base to build upon.

2.3.2 Which Language?

Android applications have historically been written in Java, and the foundation of the OS is a JVM (originally Dalvik but later ART). The ecosystem around Java on Android is mature and well-documented.

However, in 2011 JetBrains™ announced Kotlin, a JVM language "having the features so desperately wanted by the developers" (source). Being a JVM language, it was inherently "usable" on Android; but the Android Team announced "first-class support" in 2017 (source) and "Android development will become increasingly Kotlin-first," in 2019 (source).

Hence, this project will develop the app in Kotlin (rather than Java); it is the contemporary language, and Google suggests that "If you're starting a new project, you should write it in Kotlin" (source).

2.4 Risk Analysis

2.5 Resources Required

My android device, android studio, anything else?

[1] Backed by the Linux Foundation, but primarily developed by Samsung.

[2] Android Jetpack (citation)