

# Project Initiation Document

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## 1. Introduction

The purpose of this project is to produce an Android smartphone application which can identify plants and log the location of each successful plant identification, to provide a helpful and informative service; while producing useful data of plant locations around the world, which can be used to understand which plants grow best in chosen areas.

Currently, plant identification is carried out via a lengthy search within expensive literature which is highly time-consuming, or the use of an existing mobile app; such as PictureThis (for IOS).

These existing apps do not provide the ability for a user to self-identify a plant which is necessary for incorrect identifications, as well as new plant breeds; and differentiate between indoor and outdoor plants, thus providing cluttered data on which plants grow in certain areas.

## 2. Project Objectives

1. To identify uploaded images of plants.
2. To provide information regarding the identified plant.
3. To provide alternatives of the 'identified' plant, in case of a false-positive result.
4. To provide an interactive map, separated into indoor and outdoor plants, populated with images of identified plants at their respective GPS location.
5. To provide further information on each identified plant, when selected from the interactive map.
6. To provide the ability for users to view other user identified plants via a user profile.

### 3. Initial Scope

The core deliverables for the project are:

1. Smart phone application:
  - a. Establish a connection between the application and the database, this base functionality is required for the app to function correctly.
  - b. Develop the android app interface to enable users to log into their profile.
  - c. Develop the android app interface to enable users to upload their own image.
  - d. Identify the plant within the users' image.
  - e. Provide the ability for users to identify their own images.
  - f. Provide the ability for users to post their identified plant on an interactive map, at the image GPS location.
2. Database and backend
  - a. To store the data needed for the user accounts.
  - b. To store the user uploaded images which have been identified.

The desired deliverables for the project are:

1. Smart phone application
  - a. Provide the ability for users to view others user profiles and their identified plant images.
  - b. Provide the ability for the interactive map to discriminate between indoor and outdoor plants.
2. Database and backend
  - a. Ability to associate with Met office weather data to the identified plant GPS location and date/time.
  - b. Provide the ability to manually search for plants, based upon typical characteristics.

### 4. Resources and dependencies

The project is critically dependent upon the following services:

- Google Firebase is to be used for the database. Firebase will be utilized for its dedicated support for mobile platforms, integration with Google maps and due to it being a NoSQL cloud database.

Firebase provides a basic free service which should provide a sufficient framework for this project.

- Google Cloud Vision is to be used to provide image analysis on images provided by the user, it is a REST API and returns the data in JSON format.

Google Cloud Vision provides a free service for the first 1000 units per month, this should be a suitable quantity for this project development.

- Wikipedia API is to be used to return data, (dependent upon key words returned from the Google Cloud Vision API) to provide general information regarding the identified plant.

## 5. Method of Approach

The software development will employ a staged approach using the agile development methodology using 8 stages and user stories.

The approach taken for this project development will enable the base functionality of the app to function before further additions, these are defined within the Initial scope.

The project is being developed as a smart phone application due to the ubiquitous nature of smart phones, as well as the GPS meta-data associated with images taken on smartphones, providing the ability to mark each identified plant location on the interactive map.

GitHub will be used for versioning.

The Android smart phone application will be developed in Android Studio, using Kotlin as the development language due to the integration with Android Studio.

The other technologies used to develop this project are defined within the Resources and dependencies section of this document.

## 6. Initial project plan

Stage	Expected Start Date	Expected Completion Date	Products/Deliverables/Outcomes
1.Project Initiation	10/12/2018	14/12/2018	Project Initiation Document Submission
2.Investigation and research	25/01/2019	01/02/2019	Learning Week
	25/01/2019	02/05/2019	Draft Report
3. Stage 1	04/02/2019	08/02/2019	Stage 1 Completion   Design Architecture, UI, Database, user stories.
	07/02/2019	07/02/2019	Highlight Report 1
4. Stage 2	11/02/2019	15/02/2019	Stage 2 Completion   Implement User account registration and authentication.
	14/02/2019	14/02/2019	Highlight Report 2
		14/02/2019	Data Review
5. Stage 3	18/02/2019	22/02/2019	Stage 3 Completion   Implement the Google Cloud Vision API to identify the users uploaded photo.
	21/02/2019	21/02/2019	Highlight Report 3
6. Stage 4	25/02/2019	01/03/2019	Stage 4 Completion   Implement the Wikipedia API to provide information on the identified plant
	28/02/2019	28/02/2019	Highlight Report 4

7. Stage 5	04/03/2019	08/03/2019	Stage 5 Completion   Implement Google maps within the APP and populate pins with users images.
	07/03/2019	07/03/2019	Highlight Report 5
8. Stage 6	11/03/2019	15/03/2019	Stage 6 Completion   Implement ability for user to view information on each selected pin and view other user profiles.
	14/03/2019	14/03/2019	Highlight Report 6
9. Stage 7	19/03/2019	22/03/2019	Stage 7 Completion   User Testing, implementing fixes for bugs. Add user profiles for other users to view
	21/03/2019	21/03/2019	Highlight Report 7
10. Stage 8	25/03/2019	29/03/2019	Stage 8 Completion   Fix bugs and complete backlog.
		26/03/2019	Code Review
	28/03/2019	28/03/2019	Highlight Report 8
	02/04/2019	04/04/2019	Poster
Easter holiday	08/04/2019	26/04/2019	Easter Break (3 Week Buffer)
		16/05/2019	Final Deliverable

## 6.1 Control Plan

The following control techniques will be employed:

- Highlight reports will be submitted as per the dates provided on SPMS (These are shown in the Initial project plan).
- Weekly review meetings with the project supervisor.
- The data review and code review will provide soft deadlines.
- Risk management, communication plan and quality plan.
- Development control – GitHub

## 6.2 Communication Plan

Weekly review meetings will be held with the supervisor to discuss the progress of the project.

## 7. Initial Risk List

Risk	Management strategy
Schedule Overrun	Refer to Initial project plan, use of Agile methodology allows for variances in schedule
Loss of project	Backing up every save iteration on Google Drive and Versioning on Github

Hardware failure on development machine	Ability to develop on University computers and own Laptop
Google Firebase downtime	If the downtime is show stopping, find another service such as Amazon AWS
Google Vision API downtime	If the downtime is show stopping, find another service such as IBM Watson Visual Recognition
Difficulty learning new software	Review the large amounts of literature online and use these as guidance
Illness & Family emergency	The project supervisor will be contacted immediately and if required, an exceptions report will be completed
Incomplete requirements or changes to design	This project utilizes the Agile design methodology, changes to the design and requirements are expected. Regular testing may result in required changes and will be covered by the schedule overrun
Unable to identify plants automatically	Provide the ability for users to identify their own plants, this still enables interactive map integration as well as user profiles

## 8. Quality Plan

Requirements validation	Requirements will be checked to confirm they are correct and all encompassing.
End of stage verification	Validation at the end of each stage
User Testing	Conducted within stage 7

## 9. Legal, social, ethical and/or professional issues

- The interactive map will only post the users image if the user accepts that the image will be shown publicly and the coordinates of the image will be used, showing the location where the image was taken.

- There is a possibility of nefarious images being uploaded by users, the images will be scanned by the Google Cloud Vision API, if the uploaded image is not plant related it shall be discarded. This still leaves a small possibility of unacceptable images being accepted and posted onto the interactive map, this can be countered by providing a 'Report' button, so action can be taken.
- Users must be given the ability to remove all of their data, including saved images.
- Users must be aware that the app will store their uploaded pictures, name and email address.