

Product document

Team Huwalir



KEEP GREENING

Product document

FIT5120 Industry Experience

Team E17 - Huwalir

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1. INTRODUCTION

This report contains the details about the product KeepGreening which is a web application. This product was developed to help environment caring Victorians to fight against climate change by making their garden climate resilient. This document contains the details of the product such as the core functionalities, benefits of the product, system architecture and requirements, system implementation, data sources, summary of the testing and the possible future enhancements of the product.

2. BACKGROUND

Climate change and global warming is now considered as a serious global issue. According to NASA (2020), global temperature has risen 1.9 °F since 1880, arctic ice minimum has dropped 12.85% per decade, and earth polar sheets are losing 426 gigatons per year, the sea level has upraised 3.3 millimetres per year. The major cause for the global warming and climate change is the Greenhouse Effect due to human activities.

In Australia, according to Annika Blau (2020), 72% of Australian rate climate change as a problem, 60% of these Australians who consider climate change as a problem think that immediate action is necessary. Among those people, many of them have decided to raise some plants in their own garden or indoor/outdoor space to use green covered land to absorb greenhouse gases to against climate change. However, they have no clear guidance for planting and knowledge on which plant will survive in their garden given the climate conditions, soil type and sun requirement. Further, different types of plants have different carbon absorption efficiency, they want to know which plants can contribute more for fighting climate change

3. FUNDAMENTALS

Keep Greening is a web application designed for providing effective assistance to those Victorian residents who wants to act for combating climate change and wants to make their garden climate resilient.

To be more specific, the functions of KeepGreening including:

Search:

- Provides users with a list of plants suitable for their area (based on postcode).
- Provides filters to users including season, type of plant, sub requirement, water requirement.
- Provides information about carbon potentially the selected plants can absorb.
- Provides basic plant information including name, sunlight/water/soil requirement, blooming seasons.
- Provides option for users to receive an e-mail of selected plants in search results.

Calculator:

- Allows user to calculate how much carbon has been absorbed by existing plants in their garden.
- Provides visualizations about carbon have been absorbed by the users' garden.

- Provides visualizations about carbon can be absorbed by the plants selected in the search function.
- Do the calculation based on plant types (evergreen/deciduous/shrub/grass).
- Provide a comparison between the carbon absorbed by the garden and the carbon emissions of daily activities.

Gardening tips:

- Provides gardening tips for both beginning gardeners and expert gardeners.

Website link: <https://www.keepgreening.me/>

Password: keepGreeningE17

Product video link: <https://www.youtube.com/watch?v=rwDgVchvTG0&t=28s>

4. TARGET AUDIENCE

- The people who saw climate change as a serious issue and want to start to grow plants to reduce the amount of carbon in the atmosphere.
- The environment friendly gardener who are enthusiastic about plant and always seeking to grow new plants in their garden.

5. PRODUCT FUNCTIONALITY:

The application KeepGreening was developed to help environment caring Victorians to support them in their fight against climate change by bringing the change right from their homes by making their garden climate resilient. This application suggests the best plants suitable for the user's garden based on their soil pH which is taken from the Victorian soil data. Thus, making it easy for the user to find the best plants. Additionally, the user can choose the plants based on different requirements such as water, sun as each house will have different amount of sun rays. The next carbon absorption calculator evaluates the possible carbon absorbed by the user's garden by allowing the user to enter the quantity of evergreen or deciduous trees or different sizes of shrubs and area of grass covered land. This evaluation is based on the result of the research done in Arizona, US for different types of trees and shrubs to evaluate the carbon sequestration amount. This also accounts the amount of carbon released in the atmosphere by the trees. For grass, the calculation also considers the amount of carbon that is released in the atmosphere when the lawn is mowed.

6. PROJECT BENEFITS

This project aims to benefit the audience with the following:

- Many a little make a mickle. Know about the carbon emission by daily activities and know how much has been eliminated by the garden and realize that much more can be done.
- Build an efficient climate resilient garden by having a clear understanding of which type of plants can absorb more carbon dioxide.
- By choosing suitable plants and following gardening tips to improve the survival rate, garden survival rates can increase, interest in gardening increasing accordingly.

As a conclusion, promote environmental sustainability, take action against climate change, increase environmental consciousness and become a responsible human being.

7. TECHNOLOGY USED:

Front End	Programming Language	JavaScript
	Framework	React
	Website Style	CSS
	External Libraries	jQuery, Bootstrap
Back End	Programming Language	Python 3.6
	Framework	Flask
	Database	MySQL
Version Control	GitHub	

8. SYSTEM ADMINISTRATION

The system administrator needs to be familiar with HTML language and having professional knowledge about developing websites on ASP.NET.

Additionally, the front-end which is UI designed by mockingbot and developed by using CSS, JavaScript, Bootstrap. Hence, front-end UI must be managed by web interface designers.

Also, the web application contains visualizations of the gathered raw data and open dataset. So, data scientists need to work with the data collection and data visualizations. It normally takes experienced data scientists 3-4 hours to complete this task.

9. SECURITY ASPECTS

The security related information will be introduced in the maintenance document. And the backup details for dataset and web application are in the support document.

10. RISKS

There might be some risks that may limit the usage of the web application. Below are the risks and their mitigation plan.

Risk	Mitigation Strategy
The web application being hacked by hackers.	Reinforce the security of the web application.
The dataset being outdated.	Frequently check and update the data.

11. OPEN DATA DETAILS

Names	Physical access used	Frequency of source updates	Frequency of Iteration System updates	Copyright Details
https://apsvic.org.au/australian-native-plants-guide/ Usage: <ul style="list-style-type: none"> ● This contains the complete list plant information such as dimensions, seasons, soil PH requirement, climate conditions for different types of plants. ● This will be used to recommend the plants to the user based on the options such as type of plant, season, and postal code. 	Download	Every year	Every year	Australian Plant Society Victoria
https://apsvic.org.au/drought-tolerant-native-plants/ Usage: <ul style="list-style-type: none"> ● This contains the list of plant names that can survive in drought areas. ● This will be used to recommend to users who are from drought locations. 	Download	Every year	Every year	Australian Plant Society Victoria
https://apsvic.org.au/how-to-select-the-right-plant/ Usage: <ul style="list-style-type: none"> ● This contains the map of Victoria where it is split into three climate zones namely Inlands, Highlands and coastal regions. ● This reference is used to classify the locations in Victoria and put in these 3 categories. <p>So, when the user enters the post code, the data is matched to the corresponding climate areas.</p>	Reference	Once	Once	Australian Plant Society Victoria
http://vro.agriculture.vic.gov.au/dpi/vro/vrosite.nsf/pages/vic-soil_surface-soil-ph_map Usage: <ul style="list-style-type: none"> ● This contains the Victorian map differentiated with colour based on different soil PH values. 	Download	Every 6 months	Every 6 months	Agriculture Victoria

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<ul style="list-style-type: none"> This is used for extracting the PH value for different locations in Victoria. 				
https://postcodes-australia.com/state-postcodes/vic Usage: <ul style="list-style-type: none"> This contains the list of postal codes of Victoria. This is used to extract the location and post codes of Victoria so that when user enters their post code the plants specific for their location is recommended. 	Download	Once	Once	Postcodes Australia
https://www.northsydney.nsw.gov.au/carbon/carbon.html Usage: <ul style="list-style-type: none"> This contains the carbon calculator for different types of trees and shrubs. This will be used to provide the carbon calculation for the plants existing in the user's garden. 	Reference	Once	Once	North Sydney Council
http://highfrontier.com/forum/showthread.php?tid=20 Usage: <ul style="list-style-type: none"> This contains the carbon calculation for the grass. This will be used to provide the carbon absorption calculation for plants existing in the user's garden. 	Reference	Once	Once	High Frontier
https://books.google.com.au/books?hl=en&lr=&id=PW5jsq_D9hgC&oi=fnd&pg=PP7&dq=reduce+carbon+emission+by+more+trees&ots=zCakF7YjaQ&sig=V_5_UglHaT_FBJe9q3bkMRJSuMQ#v=onepage&q&f=false Usage: <ul style="list-style-type: none"> This contains the calculation for carbon absorbed by different types of trees. This will be used to provide the carbon absorption calculation for plants existing in the user's garden. 	Reference	Once	Once	Book on Carbon dioxide reduction through urban forestry by E. Gregory McPherson

12. TESTING DETAILS

The following tests were conducted on the product to ensure the quality of the deliverable. The category and description of each test are listed in the table below to have a high-level overview of each test and ensure that the website performs as intended.

Test	Description
Usability Testing	This test was conducted by inviting several externals to use the website and gathered their feedback on the usability aspects of the website.
Unit Testing	Testing conducted by the developers upon finishing each functionality.
Integration Testing	This test was conducted by the studio mentor. After integrated all deliverables into the system, this test was conducted as an instruction for testing all the functions.

13. FUTURE OPPORTUNITY

Based on our researches and feedback from externals, the future opportunities can be concluded as follow:

- Current searching functions are only limited in VIC. Only Victoria's postcode is a valid input for the search bar. If there is an opportunity, the service range can be extended to the whole of Australia.
- Current calculation method is oversimplified and are only based on the type of the plants. Thus, the accuracy of the carbon absorption data is limited. In the future, to provide more reliable information, the calculation of carbon absorption needs to be optimized, more aspects need to be considered. Further, the type of plants can be refined to be more specific.
- As in current stage, the team were not allowed to gather user's information, only general gardening tips can be provided. In the future, if the system can create account for each user, the gardening tips part can be improved. If the database of user's information can be built, it will be feasible to provide customized tips for every user. For example, the tips can be based on the size of the user's garden, the gardening skills level, time can be spent on gardening and etc.

14. APPENDICES

12.1 Document links

Support Documentation is provided to get an insight of process, procedures and

information of details regarding the product development. It contains information such as

Hardware and Software environments, Security and Privacy concerns of the product, Backup

details and testing information of the product.

Link for support document:
<https://mahara.infotech.monash.edu.au/mahara/artefact/artefact.php?artefact=248564&view=45408>

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The maintenance document is developed to provide maintenance with adequate information on managing the product that has been developed.

Link for maintenance document:
<https://mahara.infotech.monash.edu.au/mahara/artefact/artefact.php?artefact=248562&view=45408>

12.2 Contact details

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