Table of Contents

[Executive Summary 0](#_Toc36565614)

[Team Introduction 2](#_Toc36565615)

[Introduction 2](#_Toc36565616)

[Purpose of the project 2](#_Toc36565617)

[Problem/Challenge 2](#_Toc36565618)

[Solution 2](#_Toc36565619)

[Background 2](#_Toc36565620)

[PACT Analysis 3](#_Toc36565621)

[People 3](#_Toc36565622)

[Activities 3](#_Toc36565623)

[Context 3](#_Toc36565624)

[Technologies 3](#_Toc36565625)

[Lean Canvas 3](#_Toc36565626)

[System Architecture 0](#_Toc36565627)

[Considered & Proposed Epics 0](#_Toc36565628)

[Assumptions and Risks 0](#_Toc36565629)

[Security Aspects/Issues to be covered 0](#_Toc36565630)

[Open Data 0](#_Toc36565631)

[Appendix 0](#_Toc36565632)

# Introduction

This report outlines the proposal for project “Know Your Footprint”

## Purpose of the project

The project “Know Your Footprint” focusses on generating environmental and carbon emissions awareness among students and providing them with preventive measures. With the increase in the global carbon footprint, it is essential to educate students about the consequences of their footprint and how they can regulate it. These people are willing to make changes; however, they do not have any means to get hold of such knowledge and support. Hence this project helps to trigger healthy lifestyle and behavioural changes in the lives of students.

## Problem/Challenge

The problem is the lack of carbon emission awareness and preventive methods at the disposal of the students. Majority post graduate students in Victoria lives on their own and normally posses’ good decisions making skillset to make informed and healthy decisions. However, as individuals and future light bearers, they do not have enough resources available to mitigate their carbon footprints. They are not aware how just by adapting to certain economical and lifestyle changes, can provide 37% better chance of keeping temperature rise under 2℃ and an almost 50% better chance of staying below 1.5℃ as specified in the targets of the Paris Climate Change Agreement.

## Solution

A website solution will be developed to create awareness about carbon emissions. The website will also provide inexpensive and easy ways to reduce carbon footprints in day to day lives. The solution is based on two functionalities:

* Lifestyle Changes

Provide carbon calculator for comparing and calculating carbon emissions in economic lifestyle. Provide painless methods to make changes and lead a healthy and environmentally friendly lifestyle.

* Transport

Provide carbon emissions amount generated from different modes of transport thus helping in making smart and environmentally friendly travel decisions

## Background

Carbon footprint is the term coined for carbon emitted by certain activities. These activities emit carbon dioxide in the atmosphere

## PACT Analysis

### People

The target audience is all types of post graduate students in Victoria between the age of 22 – 28

Computer Literacy: Basic knowledge of how to navigate through a website

Language: English

Cognitive Ability: The interface will use easy recognizable icons and buttons to reduce the memory load and increase the cognitive ability of the users

Motivation: To become aware

### Activities

The website provides comparison on amount carbon emissions based on different transport modes to the commuter and also helps them to make wiser choices in lifestyle to reduce carbon footprint.

The activities involved are:

1. User can see different modes to commute between source and destination based on least carbon emissions and choose the best suited mode
2. User can calculate their carbon footprints based on the food and clothes waste
3. User gets notified on “Do You know” tips periodically on easy environmentally friendly changes
4. Users can calculate their footprints based on the energy and fuel consumption

### Context

Physical Environment: Users can open the website on their personal laptops and desktops and even on their phones.

Support for Activities: Users can view the FAQ page to get an understanding of how to get around the website and also how the calculator for carbon footprints works

### Technologies

User can enter details on the website and the output will be displayed in a proper and easy format. The output in terms of carbon emissions will displayed on the screen.

The data provided by the user is not stored on the server and neither is the output.

## 

## Lean Canvas

|  |  |  |  |
| --- | --- | --- | --- |
| **Problem** | **Solution** | **Unique Value proposition** | **Potential Sponsors** |
| Victoria’s total net carbon emissions in 2017 were 110 Mt CO2-e which consisted of emissions from transport, electricity generation, emissions from fuel burning, waste and energy consumption. The government started initiatives such as usage of efficient LED streetlights, installing more solar panels, building efficient community buildings.  Such initiatives however are large scale and expensive and does not assist in regulating individual carbon footprint especially for the students who neither have the budget or time but are willing to make economic changes to contribute towards climate change. | A website that provides a solution to reduce carbon emissions in an interactive and advertising way. It is mainly due to two different modes.  These modes include various solutions to help one be aware of and reduce their carbon footprint:   1. Lifestyle Changes 2. Transportation | 1. Interactive interface and data visualization to improve acceptance level of user 2. Real time data being processed from API 3. Provides contribution to global climate change on individual level 4. Creating awareness of individual carbon footprint | 1. Public transportation provider (PTV, Yarra Trams, Uber Shareride, GoGet) 2. Electric car manufacturers (Tesla) 3. Energy-Saving Home appliance manufacturers (Phillips – LED bulbs) 4. Recycle paper manufacturers 5. Government Support |
| **Existing Alternatives** | **Key Metric** | **Early Adopters** |
| 1. Use regenerating energy (solar / nuclear) OR environment-friendly fuel (sugarcane biofuel) instead of the non-regenerating energy (gas) 2. Increase energy/fuel efficiency (public transportation, LED lighting system) 3. Avoid wasting paper (avoid further deforestation) | 1. Lifestyle: Reduced levels of carbon footprint based on lifestyle changes using carbon emission calculator 2. Transportation: Travel distance from origin to destination based on lower level of carbon emissions | 1. Post Graduate Students 2. Willing to make change to protect the environment effect on zero carbon emission   Minimum Requirements: Good English Skills, can easily navigate through online website, Environmental Awareness |

# 

# System Architecture

The solution towards carbon footprint is approached using multi-tier architecture where the client accesses our web application via browser using the internet. Based on the client’s request from the presentation tier, the business logic will be implemented in the Business tier and gets data from the database tier using data access logic and finally returns the expected response to the client.

A close up of a map

Description automatically generated

# Considered & Proposed Epics

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *Name* | *Age* | *Gender* | *Carbon Footprint priority* | *Physically challenged* | *Transport mode* | *Goals* | *Motivation* |
| Alex | 27 | M | P1 | No | Drives car | goes to university and work on time  invest in organic lifestyle | To have a healthy lifestyle  Helps to create awareness on carbon footprint |
| Alan | 28 | M | P2 | Yes | Cab/public transport | Goes to university and work effortlessly on time  Lead a organic lifestyle | Manage better at work  Manage time  Reduce carbon footprint  Lead a healthy life. |
| Alicia | 24 | F | P3 | No | Public transport | Goes to university and work on time  Invest in organic  Enjoys the life on spending | Like to contribute rational environmentally friendly decisions |
| Jack | 27 | M | P3 | No | CAR | Drops his son to school.  Goes to job and to the university as a student | Drives a lot so concerned over carbon emission |
| Ally | 22 | F | P3 | No | Car | live with old parents and balance the studies and family.  Like to make friends.  Reduce carbon footprint with friends and family | Wants to reduce household energy consumption |

**EPIC 1**

As a health-conscious person, Alan need suggestions on healthy and sustainable life choices so that he can have a wholesome lifestyle and be aware of his carbon footprint.

**User Stories**

As an environmental and health conscious student,

* 1. Alan wants to get tips on organic and healthy food choices so that he can slim down and be more energized.
  2. Alan wants to know his carbon footprint based on average food and drink expenses for a week/month/year so that he can reduce his expenses and contribute to the climate change.
  3. Alan wants to get some insights on the reuse and recycling of available resources so that he can increase his awareness on carbon footprint.

**EPIC 2**

As an environmentally friendly student and stylish person, Alicia is looking for ways to help her in making a sustainable purchase so that she could be eco-fashionable.

**User Stories**

As an environmentally friendly student,

1. Alicia wants to know her carbon footprint based on average apparel and footwear expenses for a week/month/year so that she can reduce her expenses and contribute to the climate change.
2. Alicia wants to get information on fashion products that could be recycled so that she can be financially secure and contribute towards her carbon footprint.
3. As a physically challenged student, Patrick wants to know the carbon footprint of his clothes so that he can have a viable and green lifestyle.

**EPIC 3**

As a student, Patrick wants to know the amount of carbon emissions in his food diet so that he can make eco-friendly food choices and be health conscious.

**User Stories**

As a physically challenged person,

1. Patrick wants to know the carbon footprint based on his vegetarian food expenses for a month/year so that he can have a balanced lifestyle.
2. Patrick wants to know the carbon footprint based on his non-vegetarian food expenses for a month/year so that he can make his lifestyle more ecofriendly.

**EPIC 4**

As a student and a parent, Alex commutes everyday spending more than budgeted amount on daily expenses, so he is looking for alternative ways to be cost effective.

**User Stories**

As an environmentally conscious student and parent,

* 1. Alex wants to know the time taken and calories burnt if he takes bicycle/walk to work so that he can avoid laziness and be physically fit.
  2. Alex wants to know the transport mode with least carbon emissions to commute to work so that he can become aware of his carbon footprint.
  3. Alex wants to know the carbon emissions from the miles covered by his own car in a year so that he can make better decisions on fuel usage.

# Assumptions and Risks

Assumptions

* Calculate the average carbon emissions based on the different modes of transport
* It would be possible for households to recycle 100% of all recyclable materials generated as waste
* Calculating the average carbon footprint based on an amount spent in a specific time period
* Using constant values to calculate the CO2 emissions in fuel and energy consumption

Risks

* Calculations around carbon footprint are based on pre-processed data, so it provides the user with average carbon emissions and there might be slight variations based on assumptions
* There is a low priority risk from using Google API, as it is susceptible to cybersecurity attacks as it might lead to unauthorized access to the users' data

# Security Aspects/Issues to be covered

Security Access and Issues to be covered:

The application should be secured by performing penetration testing to find the vulnerability against our web application. Ensure the application prevents,

* SQL injection attack i.e., the application could be crashed by injecting malicious sql through website url and code behind the browser.
* “Sensitive Data Exposure” i.e., the sensitive information of the application could not be revealed.
* “Cross site scripting” attack i.e., the application could be crashed by inserting malicious scripts on the browser side.

# Open Data

| Name | Format (Access Type) | Description | Link (location) | Copyright |
| --- | --- | --- | --- | --- |
| Victorian Greenhouse Gas Emissions Report 2019 | Xlsx (Excel) |  | <https://www.climatechange.vic.gov.au/information-and-resources/greenhouse-gas-emissions-in-victoria> | [VIC State Government](http://www.vic.gov.au/)  © State Government of Victoria 2020 |
| Google Map | Api | Data of distance between origin and destination would be retrieved from google map, which could be used in calculation carbon emission in the transportation part | <https://console.cloud.google.com/google/maps-apis/new?folder=&organizationId=&project=daring-diode-240508> |  |
| EPA Annual Report 2018-2019 | PDF | EPA report and dataset comprises the information and factors about the energy consumption would affected environment. (Please refer the the appendix 3 for the detailed data) | <https://www.epa.vic.gov.au/about-epa/publications/1792> | © State of Victoria, Sustainability Victoria 2019 |
| EPA Victoria 2016-17 performance data | Xlsx (Excel) | <https://discover.data.vic.gov.au/dataset/epa-victoria-2016-17-performance-data> | © State of Victoria, Sustainability Victoria 2017 |
| EPA Victoria 2017-18 performance data | Xlsx (Excel) | <https://discover.data.vic.gov.au/dataset/epa-victoria-2017-18-performance-data> | © State of Victoria, Sustainability Victoria 2018 |

# Appendix

<https://www.footprintnetwork.org/our-work/climate-change/>

<https://sdg.iisd.org/news/mitigation-update-raising-awareness-of-carbon-footprint-to-trigger-behavioral-changes/>

<https://theconversation.com/climate-explained-what-each-of-us-can-do-to-reduce-our-carbon-footprint-123851>

<https://www.climatechange.vic.gov.au/__data/assets/pdf_file/0016/443014/Victorian-Greenhouse-Gas-Emissions-Report-2019.pdf>