Software Design Document

<Victoria Road Crash Data Software>

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Table of Contents

[1.0 System Vision 3](#_Toc144492826)

[1.1 Problem Background 3](#_Toc144492827)

[1.2 System Overview 3](#_Toc144492828)

[1.3 Potential Benefits 3](#_Toc144492829)

[2.0 Requirements 4](#_Toc144492830)

[2.1 User Requirements 4](#_Toc144492831)

[2.2 Software Requirements 4](#_Toc144492832)

[2.3 Use Cases & Use Case Diagrams 4](#_Toc144492833)

[3.0 Software Design and System Components 5](#_Toc144492834)

[3.1 Software Design 5](#_Toc144492835)

[3.2 System Components 5](#_Toc144492836)

[3.2.1 Functions 5](#_Toc144492837)

[3.2.2 Data Structures / Data Sources 6](#_Toc144492838)

[3.2.3 Detailed Design 7](#_Toc144492839)

[4.0 User Interface Design 8](#_Toc144492840)

[4.1 Structural Design 8](#_Toc144492841)

[4.2 Visual Design 9](#_Toc144492842)

# System Vision

## Problem Background

The software will be developed to provide road safety data based on time, location, condition, type of collision, type of road user, object hit. based on Victoria Road Crash Dataset provided by VicRoads. To reduce traffic accidents and risks in Victoria. In addition, the software analyses the point of occurrence of an accident and provides visualized insight to help users understand.

## System Overview

The system will be developed to make the citizens of Victoria aware of the traffic to reduce the number of accidents. It will be a python programmed software through which people of Victoria can easily trace the time, location, condition, type of collision and road user and object hit. This will also be guided by an information system which allows more in depth analyse of certain parameter. The application itself will be user friendly so that users new or returning will have an ensuring time learning and understanding the application.

## Potential Benefits

The ease of access to the quantity of knowledge offered by this dataset will be one of the software's possible advantages. It will make it simpler to study, comprehend, and create graphs and tables from the dataset. The advantages of the software that our team is entrusted with developing are also closely related to the responsibilities listed. These duties consist of:

- Display the details of all accidents that occurred during the user-selected time period.

- Create a graphic showing the average number of accidents per hour of the day for a user-selected time period.

- For a user-specified time frame, obtain all collisions that were the result of an accident type that contained the user-entered keyword (e.g., pedestrian, collision).

- Enable the user to assess the role that alcohol plays in accidents, including trends over time, the sorts of accidents where alcohol is a factor, etc.

# Requirements

## User Requirements

Users will need software and IDE and csv for data sets to obtain data from the software.

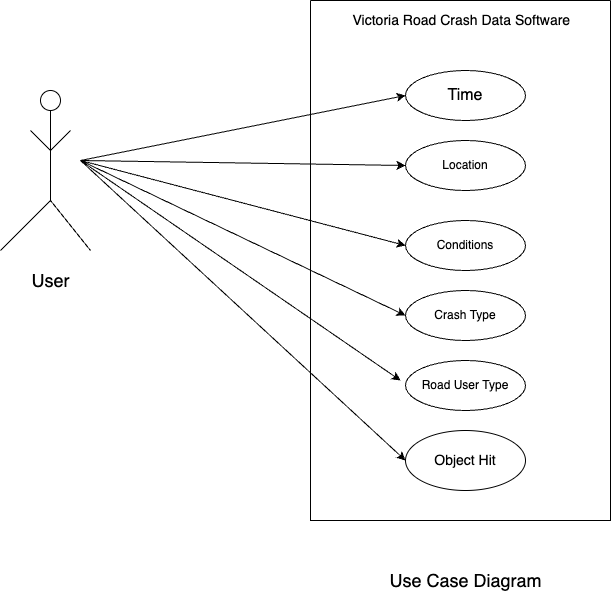
## Software Requirements

The program shall be written in Python Programming language.

The software shall be able to analyse the dataset and it shall be just a software through which the user will be able to see the information stored in the software.

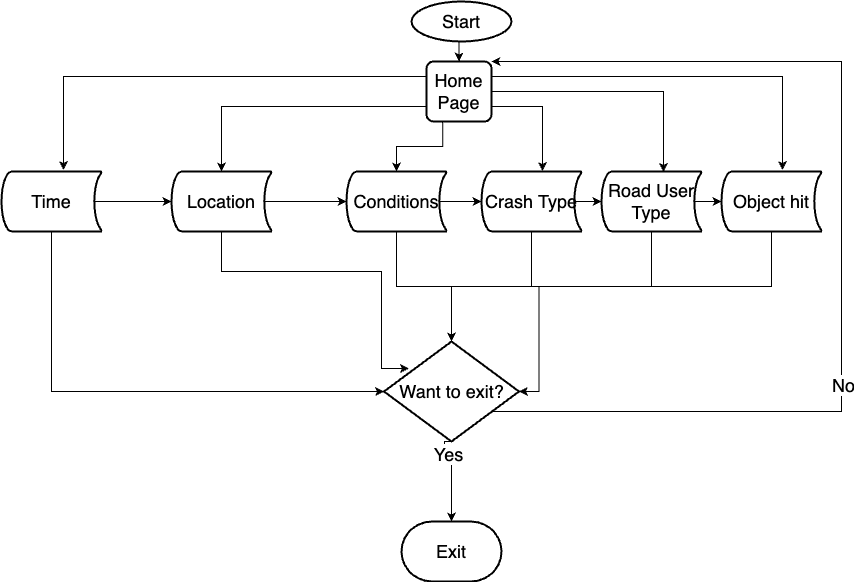
The program shall use python strings as data structure.

## Use Cases & Use Case Diagrams



# Software Design and System Components

## Software Design



## System Components

### Functions

List of all functions which is used to develop the software:

1. Time: This function is used to highlight the time while the road accidents occurred.

Input Parameter: time().

Datatype: Datetime which was imported from Python library

2. Location: It was used to display the location of the accidents and accident prone zones.

Input Parameter: location()

Datatype: Strings.

3. Conditions: It was used to show the conditions of the traffic and road.

Input Parameter: conditions()

Datatype: Strings.

4. Crash Type: Returns the types of crash that occurred.

Input Parameter:crash\_type()

Datatype: Strings.

5. Road User Type: This function was used to print the type of road users.

Input Parameter: road\_user\_type()

Datatype: Strings.

6.Object Hit: That function displays the type of objects hit by the vehicles.

Input Parameter: object\_hit()

Datatype: Strings.

### Data Structures / Data Sources

List was used in this software frequently.

Name of functions that has used list:

1.location()

The location() function's purpose isn't a standard or widely recognized function in Python, so its purpose would depend entirely on how it's implemented in a specific codebase or project.

2.conditions()

In general, conditions() might be expected to handle or evaluate various conditions or criteria, possibly returning a Boolean result or some other information based on those conditions.

3.crash\_type()

The purpose of a crash\_type() function would typically be to determine or categorize the type or nature of a crash, but its exact functionality and purpose would depend on the context in which it's used.

4.road\_user\_type()

The purpose of a road\_user\_type() function would typically be to categorize or classify different types of road users, such as pedestrians, cyclists, motorcyclists, and drivers of various vehicles, based on the input data or context.

5.object\_hit()

The purpose of an object\_hit() function would typically be to identify or record instances where an object has been hit or collided with in a particular context.

### Detailed Design

**Code:** def load\_dataset(self):

df = pd.read\_csv('../path/ Crash Statistics Victoria.csv’)

crash\_dates = sorted(list(set(df.ACCIDENT\_DATE.tolist())))

**Purpose**: The pandas function was used to read the csv file with all the data.

**Code:** def get\_date(self, date):

year, month, day = date.getDate()

self.day\_of\_week = day\_of\_week(date.dayOfWeek())

self.date = f'{year}/{month}/{day}'

**Purpose:** This function lets the end user to select a date on which the user wants to get the analysed data displayed on the user interface.

**Code:** def show\_chart(self, btn\_type):

if self.date is None:

QMessageBox.warning(self, "Alert", "select date first")

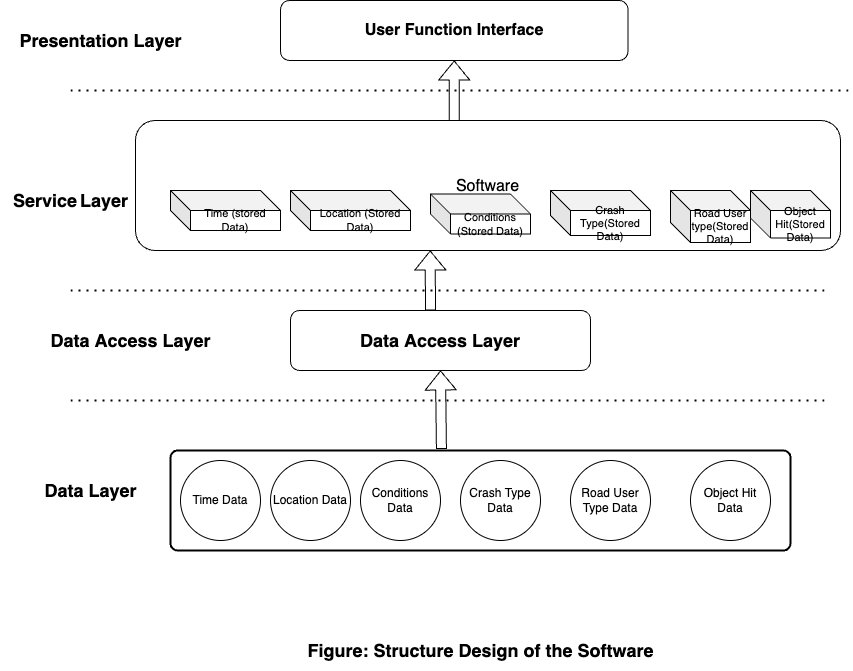
else:

print(btn\_type)

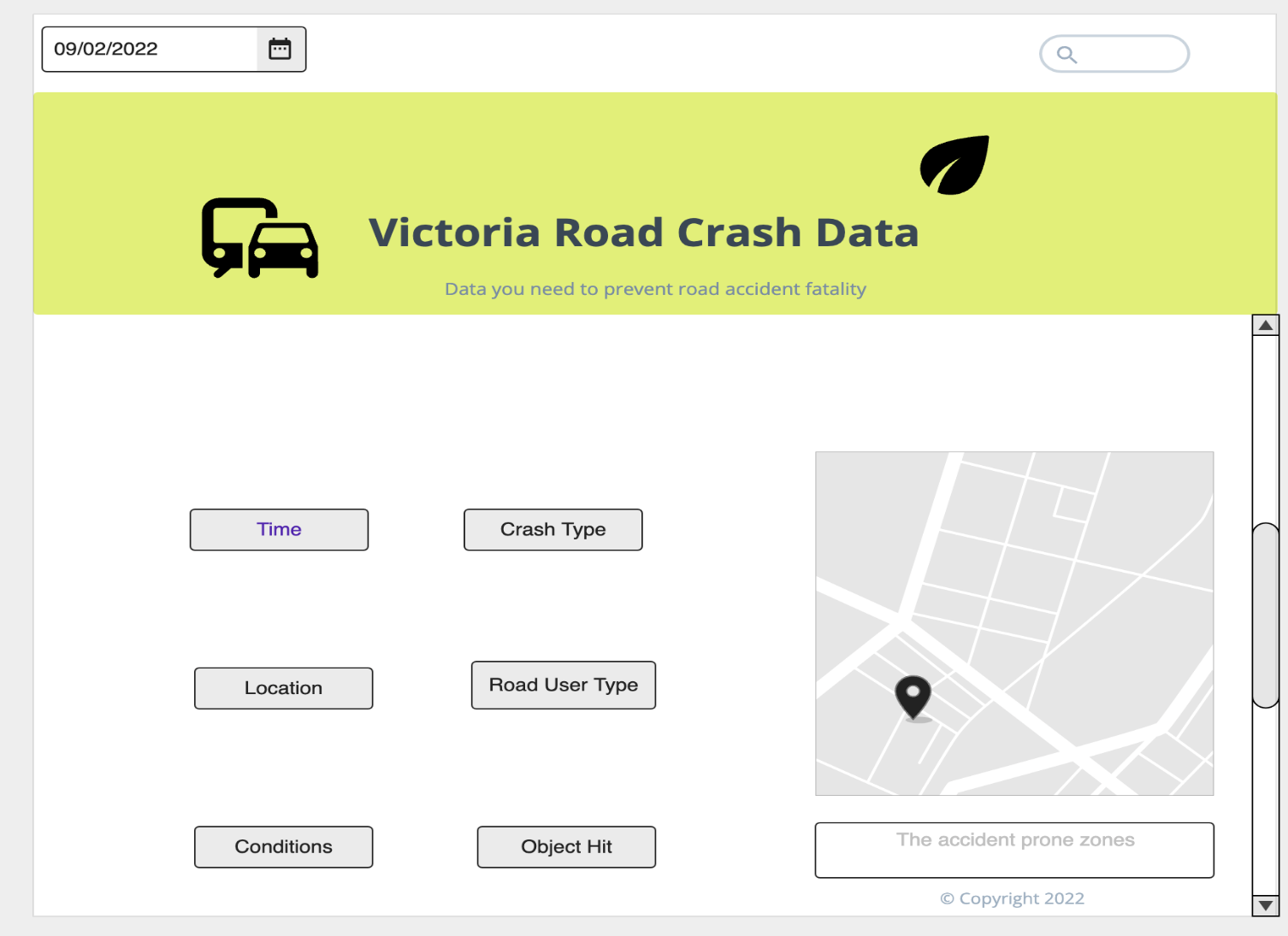
**Purpose:** This part was added for the end user to get the analysed data displayed on the user interface. If the user does not select any date, then the messagebox will retuen a warning message to the end user.

# User Interface Design

## Structural Design

 There will be 4 layers in the software as it is drawn above. The information will be stored in the data layer. The user will access through the data layer and through navigation the user will be able to see the stored data in the service layer. As this is just a simple software, the user will find it amazingly easy and convenient to use it and that is why the design will be also quite simple. This decision choice was chosen as it is remarkably simple but proficient. The interface designing is also simple. At the” Home Page”, there will be navigation buttons which will be created by Button Widgets of Python. There will also be a map where we can display the accident-prone areas of Victoria. User will find this software very convenient to use and can easily access the data stored in it.

## Visual Design



We have used an online visual design development website/tool named app.moqups.com which was used to develop the visual design. This is just an initial design. We have chosen buttons in grey colour as it will be more convenient for the users to read the options of the buttons. This will allow user who are colourblind to also have a clear idea on where the accidents will occur as everything will be a singular colour therefor, they can track where all these accidents happen.

At the very top left corner there will be a date system so users can choose what day or when a certain accident happened on a specific day to help understand road development. On the other side will be a search function which allows user to search a certain location of their choice in case they are traveling or used to search a specific accident regarding pedestrian, car, bike, etc…, this also makes it easier to navigate the map which is located at the bottom right of the screen. Regarding the map, it was purposefully made grey, white, and black to make contrasting colours easy so roads and streets can be seen with out much effort. In some case there will be a marker which indicates were an accident-prone zone is which will be displayed in the text under the map.

The software name is highlighted with large fonts, and it is in black colour with yellowish background as this is to clearly indicate the purpose of the software, it was also place purposefully in the middle. Button widget will be used to create buttons in the software. As shown each widget will go into more detail once pressed so that the user if needed can get a more insightful look on the certain accident that occurred.