

# **INTELLIGENT VEHICLE DAMAGE ASSESSMENT AND COST ESTIMATOR FOR INSURANCE COMPANIES**

**A MINI-PROJECT REPORT**

***SUBMITTED BY***

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# **INTELLIGENT VEHICLE DAMAGE ASSESSMENT AND COST ESTIMATOR FOR INSURANCE COMPANIES**

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# **INTELLIGENT VEHICLE DAMAGE ASSESSMENT AND COST ESTIMATOR FOR INSURANCE COMPANIES**

## **ABSTRACT**

The motor insurance sector loses a lot of money as a result of leakage claims. The gap between the amount actually paid for claims and the amount that would have been paid had all of the best practises in the industry been followed is known as underwriting leakage. These results have been reached using both testing and visual assessment. However, they do delay the processing of claims. By reducing loss adjustment costs, improvements in the First Notice of Loss and the speed with which claims are examined and evaluated might save a lot of money in the automobile insurance claims process. Car damage is automatically identified and classified using advanced picture analysis and pattern recognition technology, a method for automatically locating the damaged area by comparing photos of the automobile from before and after an accident. This project's proposed a CNN model that can recognise a car's damage area. If users upload images, the model can evaluate damage (be it a dent or scratch from an object), and it can also estimate the extent of damage. Insurance firms can handle claims more efficiently as a result. When accepting a car loan, particularly one for a used vehicle, lenders may also consider this model.

# **CHAPTER 1**

## **1. INTRODUCTION**

### **1.1 PROJECT OVERVIEW**

Vehicles are significantly rising in today's globe. Because there are more cars on the road, accidents happen more frequently because individuals are driving them at high speeds. When an accident occurs, the people file a claim with their auto insurance for the necessary funds to repair the car, because to inaccurate claims, the corporation behaves improperly and doesn't make payments now. This occurs as a result of claims leakage, which is the discrepancy between the sums secured by the firm and the sums that it should have secured in accordance with the claims. Even if the car's damage is easily seen, the claim procedure will take longer than usual in accordance with company policy. Despite the company's best efforts, there is a delay in the claims procedure. Differentiate the suggested approach to perhaps speed up the process of assessing automotive damage. Instead of taking hours to accomplish automotive damage detection if it were visually inspected, a system may perform it in a minute by just providing a picture of a damaged vehicle. The system can determine the analysis of the damage, the position of the damage, and the degree of the damage using machine learning and computer vision.

### **1.2 PURPOSE**

Today's world is seeing a substantial increase in automobiles. Because there are more automobiles on the road and more people are driving them at high speeds, accidents happen more frequently. When an accident happens, the parties involved submit a claim with their auto insurance to obtain the money needed to repair the vehicle since, according to false claims, the company acts inappropriately and withholds payments.

## CHAPTER 2

### 2. LITERATURE REVIEW

| S. No | TITLE   | PAPER WORK   | TOOLS USED/ALGORITHM   | TECHNOLOGY   | DISADVANTAGES   |
|-------|---|--|--|--|---|
| 1     | Methodology of repair cost estimation in vehicles based on the deformation measurements in real world accidents.<br><br><b>Author - Francisco Javier Paez</b><br><b>Year- 2016</b><br><b>(BASE PAPER)</b> | The main objective of this study is to analyses the relationship between the reconstruction variables based on the deformation measures in real world accidents  | <ul style="list-style-type: none"> <li>Audaplus</li> </ul>   | <ul style="list-style-type: none"> <li>Artificial Intelligence.</li> <li>Data Science</li> </ul> | A retrospective methodology to estimate hardly repair costs of vehicles involved in road accidents with the front zone involved.            |
| 2     | Crash analysis and reconstruction.<br><br><b>Author - Dario Vangi</b><br><b>Year - 2020</b>   | The procedures to apply impulsive models, based on the conservation of momentum and angular momentum, and to apply models, based on the relationships between force and deformation of vehicles, are analyzed. | <ul style="list-style-type: none"> <li>Simulation Model of Automobile Collisions-SMAC</li> <li>Calspan Reconstruction of Accident Speeds on the Highway-CRASH</li> </ul> | <ul style="list-style-type: none"> <li>Deep Learning.</li> <li>Data Science.</li> </ul>          | The models can be used for manual reconstruction and acts as the basis of the software for the reconstruction of traffic accident dynamics. |



|   |   |  |  |   |  |
|---|---|--|--|---|--|
| 3 | <p>The comparison of 3D and 2D measurement techniques used for the analysis of vehicle deformation.</p> <p><b>Author – Stanimir Karapetkov</b></p> <p><b>Lubomir Dimitrov</b></p> <p><b>Year - 2020</b></p> | <p>Vehicle damage analysis has been one of the main assumptions and inputs for the subsequent accident analysis calculation, determination of impact configuration</p> | <ul style="list-style-type: none"> <li>• Geomagic Control</li> </ul>                                 | <ul style="list-style-type: none"> <li>• Artificial Intelligence.</li> <li>• Machine learning.</li> </ul> | <p>It is necessary to improve methods for crash documentation and analysis.</p>  |
| 4 | <p>Let it crash! Energy equivalent speed Determination.</p> <p><b>Author – Pavilina Moravcova</b></p> <p><b>Katerina Bucsuhazy</b></p> <p><b>Year - 2021</b></p>  | <p>The crash analysis includes the impact speed determination &amp; related determination of vehicle energy loss during impact or deformation energy</p>               | <ul style="list-style-type: none"> <li>• CRASH 3</li> <li>• FEM – Finite Elements Method.</li> </ul> | <ul style="list-style-type: none"> <li>• Data Science</li> <li>• Machine Learning.</li> </ul>             | <p>The time pressure during accident documentation may subsequently resulted to the insufficient documentation of the accident site and vehicles as well as the overall data quality</p> |

## 2.1 EXCISTING PROBLEM

- In this project, by default we have some existing solutions which has three processes within it.
  - To Select cars
  - To select repairs
  - Get Estimate
- Once the process gets completed, the user can claim the insurance through the insurance companies.

## 2.2 REFERENCES:

1. Francisco Javier Paez, Coral Sevillano – November 2016 - Methodology of repair cost estimation in vehicles based on the deformation measurements in real world accidents.
2. Dario Vangi – January 2020 - Crash analysis and reconstruction.
3. Pavlina Moravcova, Katerina Bucsuhaży, Robert Zuvala, Martin Bilik – May 2020 - The comparison of 3D and 2D measurement techniques used for the analysis of vehicle deformation. Conference : VEHITS 2020.
4. Pavlina Moravcova, Katerina Bucsuhaży, Robert Zuvala, Martin Bilik – January 2021 - Let it crash! Energy equivalent speed Determination. Conference : 7<sup>th</sup> International Conference on vehicle Technology and Intelligent Transport System.

## 2.3 PROBLEM STATEMENT DEFINITION

In existing system, the procedure of making an insurance claim for an automobile is laborious, and there is a delay before the first reimbursement is authorised. Insurance firms lose millions of dollars each year due to claim leakage as a result of the expansion of the vehicle sector and the daily rise in the number of accidents. The discrepancy between the company's actual spending and what they should have really spent is known as claim leakage. Ineffective claim processing, erroneous payments, human error such as a lack of quality control or poor customer service or even claim fraud may be to blame for this. Auditing closed claim files is the only way to find claim leakage.

Mr. Suresh is a 50 years old man. He had a own Car and he worked at basic salary for past 30 Years, In this 30 Years he Faced a problem in Choosing Car Damage and Insurance claim.

- Vimal Rajesh wants to know the better recommendation for insurance claiming.
- He has faced huge losses for a long time.
- This problem is usually faced by lot of Customers.

Mr. Vimal Rajesh needs to know the result immediately for Insurance claim.

|                              |  |
|------------------------------|--|
| Who does the problem affect? | Persons was claiming the assessment amount |
|------------------------------|--|

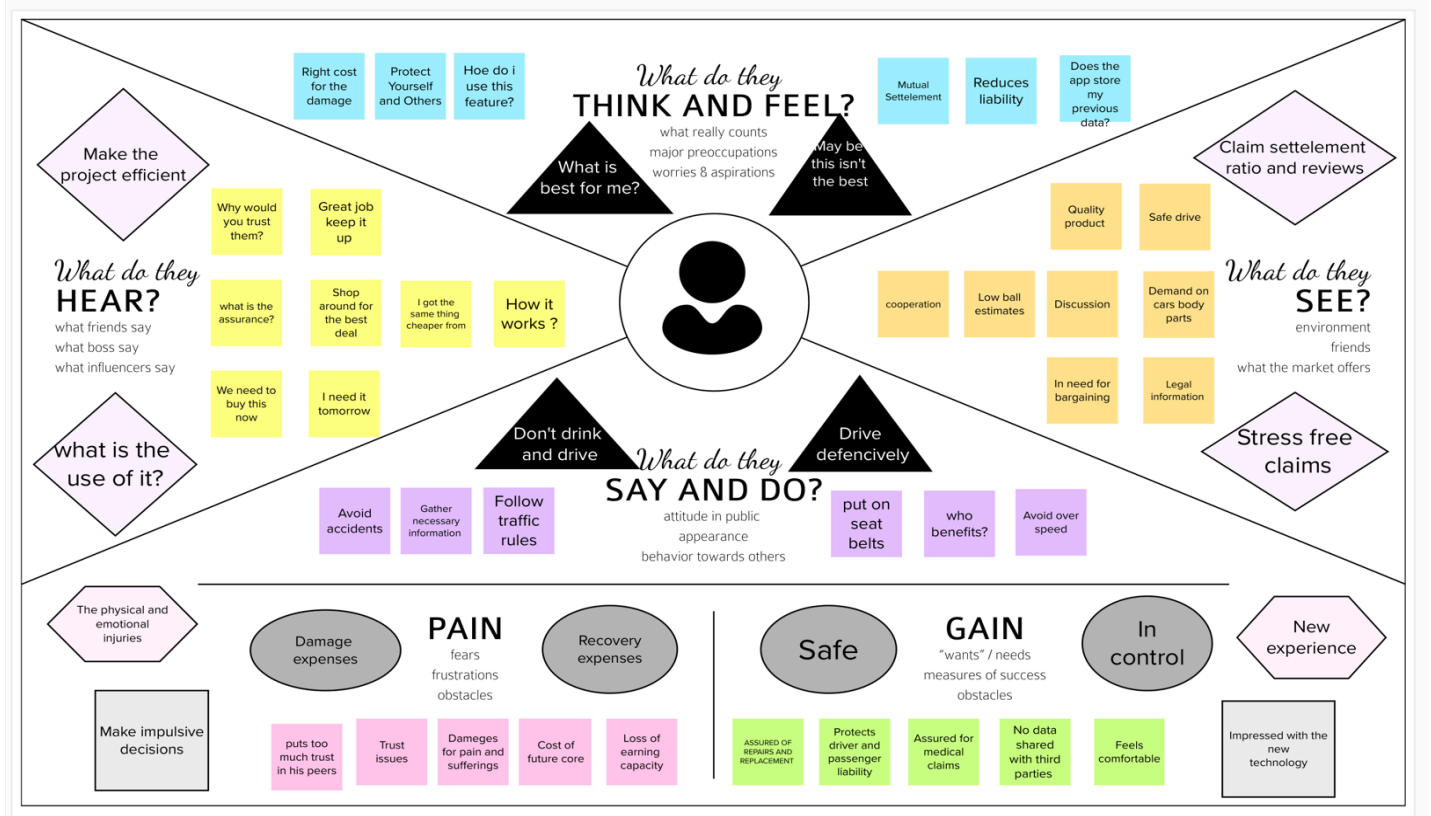
|  |   |
|--|---|
| What are the boundaries of the problem?      | People who vehicle and facing Issues of Insurance claiming  |
| What is the issue?                           | The vehicle is damaged, then the next step is that the user has already insured the car with the insurance company, then the customer compares the calculated amount, and then getting a lower amount, so the valuation process cannot be seen.   |
| When does the issue occur?                   | The issues occurred in damage part not fully estimation interior part not estimated so issues occur in company side   |
| Where does the issue occur?                  | The issue occurs in Automobile industry interior part damage not fully estimated so issues occur in company side, particularly City side  |
| Why is it important that we fix the problem? | The required for Automobile industry day by developing so the opposite side accident count also increase accident car owner has claim the actual amount of damage so they consider to fix problem and also customer can see the each and every part repairing cost that problem also ratified in this process |

|   |   |
|---|---|
| What solution to solve this issue?        | An automated system is introduced to identify different diseases on plants by checking the symptoms shown on the leaves of the plant. |
| What methodology used to solve the issue? | Deep learning techniques are used to identify the specific part of damage repair cost and suggest modify cost rate                    |

## CHAPTER 3

### 3.IDEATION & PROPOSED SOLUTION

#### 3.1EMPATHY MAP CANVAS



## 3.2 IDEATION & BRAINSTORMING

### Brainstorm & idea prioritization

Use the template to generate and prioritize ideas for your project. The template is designed to help you generate ideas and prioritize them based on their potential impact and feasibility.

1. Generate ideas  
2. Prioritize ideas

**Brainstorming**

Generate ideas for your project. The template is designed to help you generate ideas and prioritize them based on their potential impact and feasibility.

**Idea prioritization**

Prioritize ideas based on their potential impact and feasibility. The template is designed to help you generate ideas and prioritize them based on their potential impact and feasibility.

**Brainstorming**

Generate ideas for your project. The template is designed to help you generate ideas and prioritize them based on their potential impact and feasibility.

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**Idea prioritization**

Prioritize ideas based on their potential impact and feasibility. The template is designed to help you generate ideas and prioritize them based on their potential impact and feasibility.

### 3.3 PROPOSED SOLUTION

The proposed approach collects photographs of a person's damaged automobile, then utilises those images as input for a deep learning model that use image processing to recognise the elements of the image and determine the percentage of the vehicles'' damage. After then, the images are separated into two groups: replace and repair. When the damage percentage is less than 80, the damaged part must be replaced; however, in the other case, the compensation amount is set depending on the damage percentage. Finally, it generates a comprehensive analysis report on the vehicle that is used to ask the insurance company for payment.

| S. No. | Parameter                                | Description   |
|--------|--|---|
| 1.     | Problem Statement (Problem to be solved) | <ul style="list-style-type: none"><li>● One of the major problems faced by the customers or the insurance companies are not having idea about the cost of repair for the damage.</li><li>● Insurance companies are failing to provide right amount for the car damage and the customers not able to claim for the damage.</li></ul> |
| 2.     | Idea / Solution description              | Developing a solution, which can able to identify the right cost for the damage would be beneficial for many customers  |
| 3.     | Novelty / Uniqueness                     | <ul style="list-style-type: none"><li>● It can detect the area of damage on a car &amp; estimate the right amount.</li><li>● It can also used by lenders if they are underwriting a car loan, especially for a used car.</li></ul>  |
| 4.     | Social Impact / Customer Satisfaction    | This helps in loss of money for the customer and balancing the right economy for the country.   |
| 5.     | Business Model (Revenue Model)           | <ul style="list-style-type: none"><li>● Can collaborate with insurance companies.</li><li>● Can collaborate with car companies</li><li>● Can post the advertisements on to the website.</li></ul>   |
| 6.     | Scalability of the Solution              | User's way of interaction with the application gets increased.  |

### 3.4 PROBLEM SOLUTION FIT

There is no systematic approach to receive a rapid answer from an insurance company. A week of waiting is required. The proposed solution should enable consumers to contact with the insurance provider and receive payments both online and offline. After uploading the damaged image and determining the extent of the damage, the user may obtain insurance only if the company approves the damaged image and the condition is more than 80%.

|  |   |   |  |  |
|--|---|---|--|--|
| Define CS, fit into CC                   | <b>1. CUSTOMER SEGMENT(S)</b> <span>CS</span> <ul style="list-style-type: none"> <li>✓ Insurance companies</li> <li>✓ Vehicle owner</li> <li>✓ Car companies</li> <li>✓ General Public</li> </ul>   | <b>6. CUSTOMER CONSTRAINTS</b> <span>C</span> <ul style="list-style-type: none"> <li>✓ Anxiety: <ul style="list-style-type: none"> <li>Customer concern about the level of the damaged parts.</li> <li>customer concern also about the fixing of the damaged parts.</li> </ul> </li> <li>✓ Trust Problem: <ul style="list-style-type: none"> <li>Trust issues about insurance companies, give the fake information about the estimation cost.</li> <li>modify damage part for ensuring profit for the company from user.</li> </ul> </li> </ul> | <b>5. AVAILABLE SOLUTIONS</b> <span>AS</span> <ul style="list-style-type: none"> <li>✓ Collecting the information about the damage from customer side and providing a damage assessment for the vehicle companies to understand the level of damage and cost estimation.</li> <li>✓ Searching and get the knowledge through online website to get the insight about the damage.</li> </ul> | Explore AS, differentiate                |
|  | <b>2. JOBS-TO-BE-DONE / PROBLEMS</b> <span>TR</span> <ul style="list-style-type: none"> <li>✓ Deliver a good prediction system to predict the level of damage.</li> <li>✓ Analyze the damage part and giving good cost estimation for customer satisfaction and support system.</li> </ul>  | <b>9. PROBLEM ROOT CAUSE</b> <span>RC</span> <ul style="list-style-type: none"> <li>✓ Not proper maintenance and records related to the vehicle and accident.</li> <li>✓ Lack of Proper knowledge about the estimation cost.</li> <li>✓ Not have the knowledge of the level of damage in the vehicle.</li> </ul>  | <b>7. BEHAVIOUR</b> <span>BE</span> <ul style="list-style-type: none"> <li>✓ Inefficient to predict the level of damage and analysis the cost for the damage.</li> <li>✓ The user does not know or unaware about the process to deal with the damage parts of the vehicle.</li> </ul>  |  |
| Focus on J&P, tap into BE, understand RC |   |   |  | Focus on J&P, tap into BE, understand RC |
|  | <b>3. TRIGGERS</b> <span>TR</span> <ul style="list-style-type: none"> <li>✓ Well known way to get good prediction and analysis the level, cost for the damaged part of the vehicle.</li> <li>✓ Getting help of closest people to identify the</li> </ul>  | <b>10. YOUR SOLUTION</b> <span>SL</span> <ul style="list-style-type: none"> <li>✓ First step is to collect the images of the damaged parts of the vehicle and the preprocessing the images to identify the severity and the location of damage.</li> </ul>  | <b>8. CHANNELS of BEHAVIOUR</b> <span>CH</span> <ul style="list-style-type: none"> <li>✓ <b>ONLINE</b> <ul style="list-style-type: none"> <li>Online Websites</li> </ul> </li> </ul>   |  |
|  | level of the damaged part.<br><br><b>4. EMOTIONS: BEFORE / AFTER</b> <span>EM</span> <ul style="list-style-type: none"> <li>✓ <b>Before:</b> <ul style="list-style-type: none"> <li>Not having the proper knowledge, Improper maintenance.</li> <li>Unawareness about the level of damage and difficulty in estimating the cost for damages.</li> </ul> </li> <li>✓ <b>After:</b> <ul style="list-style-type: none"> <li>Good knowledge about the vehicle parts.</li> <li>Efficient prediction system giving the correct level of damage</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>✓ Second step the prediction system will predict the level of damage.</li> <li>✓ VGG16 model estimate the cost for the damage in the vehicle.</li> </ul>   | <ul style="list-style-type: none"> <li>• Social Media Platforms</li> <li>• Mobile Application</li> </ul> <ul style="list-style-type: none"> <li>✓ <b>OFFLINE</b> <ul style="list-style-type: none"> <li>Customer throw Words</li> <li>Anxiety and Unawareness</li> <li>Trust issues</li> </ul> </li> </ul>   |  |



## **CHAPTER 4**

### **4. REQUIREMENT ANALYSIS**

#### **4.1 FUNCTIONAL REQUIREMENT**

##### **Framework Creation:**

This approach provides a way for evaluating vehicle damage that insurance companies may utilise when processing claims. This module offered a framework for submitting a vehicle's damaged parts and requesting insurance from an organisation. The dataset needed to train the Damage Detection and it has prepared by an admin. In order to make the images useful for training, they were manually annotated; damages were categorised into 7 distinct types such as Door Dent, Bumper Dent, Body Scratch, Broken Windshield, Broken Glass, Broken Lights and Smash By modifying its settings and loading the learned dataset, the model was set up to train on user data.

##### **Object Detection :**

Employ a specially trained CNN model utilising transfer learning on to identify the object. This model takes different forms of damage into account validation sets such as Bumper Dent, Bumper Scratch, Door Dent, Door Scratch, Glass Shattered, Head Lamp, Tail Lamp, Undamaged, etc. The classification of car damage severity is as follows: Minor Damage which typically involves slight damage to the vehicle that does not impede the vehicle to cause severe injuries. It includes the headlight scratches, dents and digs in the hood or windshield, from gravel or debris, scratches in the paint. Moderate Damage which deals with any kind of damage that impairs the functionality of the vehicle in any way is moderate damage. It involves large dents in hood, fender or door of a car. Even if the airbags are deployed during collision, then it comes under moderate damage. Severe Damage – Structural damages such as bent or twisted frames, broken/bent axels, and missing pieces of the vehicles and in some cases even the destruction of airbags. These types of damages are a big threat to the human life.

##### **Damage Detection:**

To locate damaged areas in a picture and create a bounding box around each object found, object localization is used which combines object localisation and classification to provide a

bounding box and a class for each item for object detection. Use CNN to generate a convolutional features map from an image to forecast the class and bounding box of an item. If the car is undamaged then it simply detects it and if it's a damaged one, then there are further localizations made models. The model shows accuracy on the validation set. To automate such a system, the easiest method would be to build a Convolution Neural Network model capable of accepting images from the user and determining the location and severity of the damage. The model is required to pass through multiple checks would first ensure that given image is that of a car and then to ensure that it is in fact damaged. These are the gate checks before the analysis begins. Once all the gate checks have been validated, the damage check will commence. The model will predict the location of the damage as in front, side or rear, and the severity of such damage as in minor, moderate or severe.

## **Claim Insurance**

The procedure of claiming insurance is done by persons who are in need. For access to the company's insurance, the user must register and authenticate. After that, users may access their insurance information and submit an insurance claim request. The request for an insurance claim can be viewed and approved by the insurance company. Once the damaged image has been uploaded and the degree of the damage has been determined, the user may receive insurance only if the firm accepts the damaged image and the condition is greater than 80%.

## **4.2 NON-FUNCTIONAL REQUIREMENTS**

### **Usability**

The system shall allow the users to access the system with pc using web application. The system uses a web application as an interface. The system is user friendly which makes the system easy

### **Availability**

The system is available 100% for the user and is used 24 hrs a day and 365 days a year. The system shall be operational 24 hours a day and 7 days a week.

## **Scalability**

Scalability is the measure of a system's ability to increase or decrease in performance and cost in response to changes in application and system processing demands.

## **Security**

A security requirement is a statement of needed security functionality that ensures one of many different security properties of software is being satisfied.

## **Performance**

The information is refreshed depending upon whether some updates have occurred or not in the application. The system shall respond to the member in not less than two seconds from the time of the request submittal. The system shall be allowed to take more time when doing large processing jobs. Responses to view information shall take no longer than 5 seconds to appear on the screen.

## **Reliability**

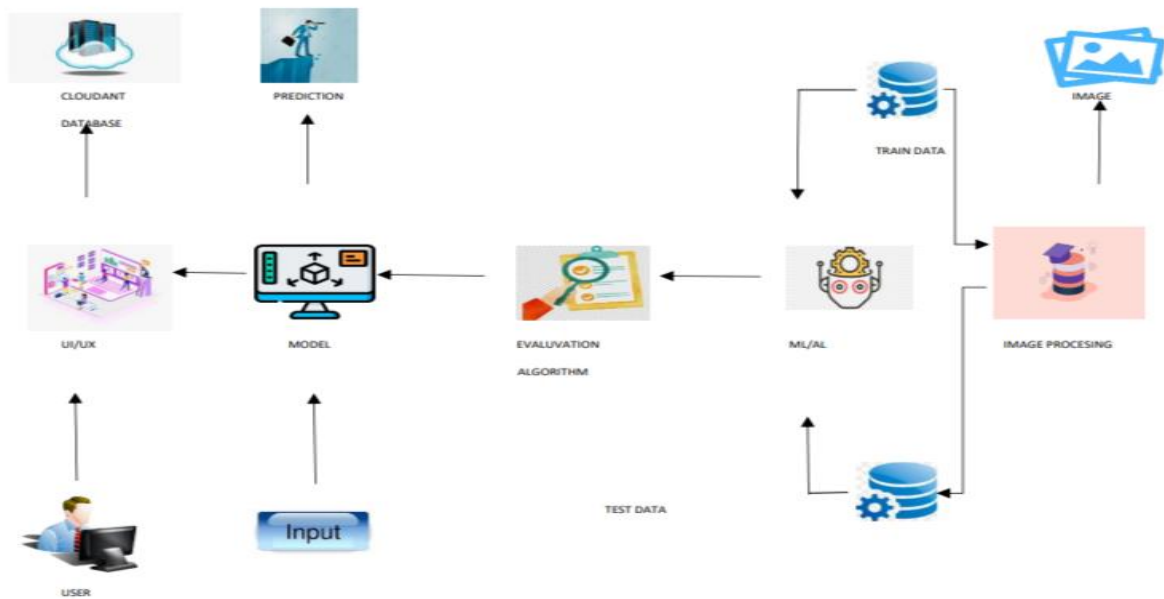
The system has to be 100% reliable due to the importance of data and the damages that can be caused by incorrect or incomplete data. The system will run 7 days a week. 24 hours a day.

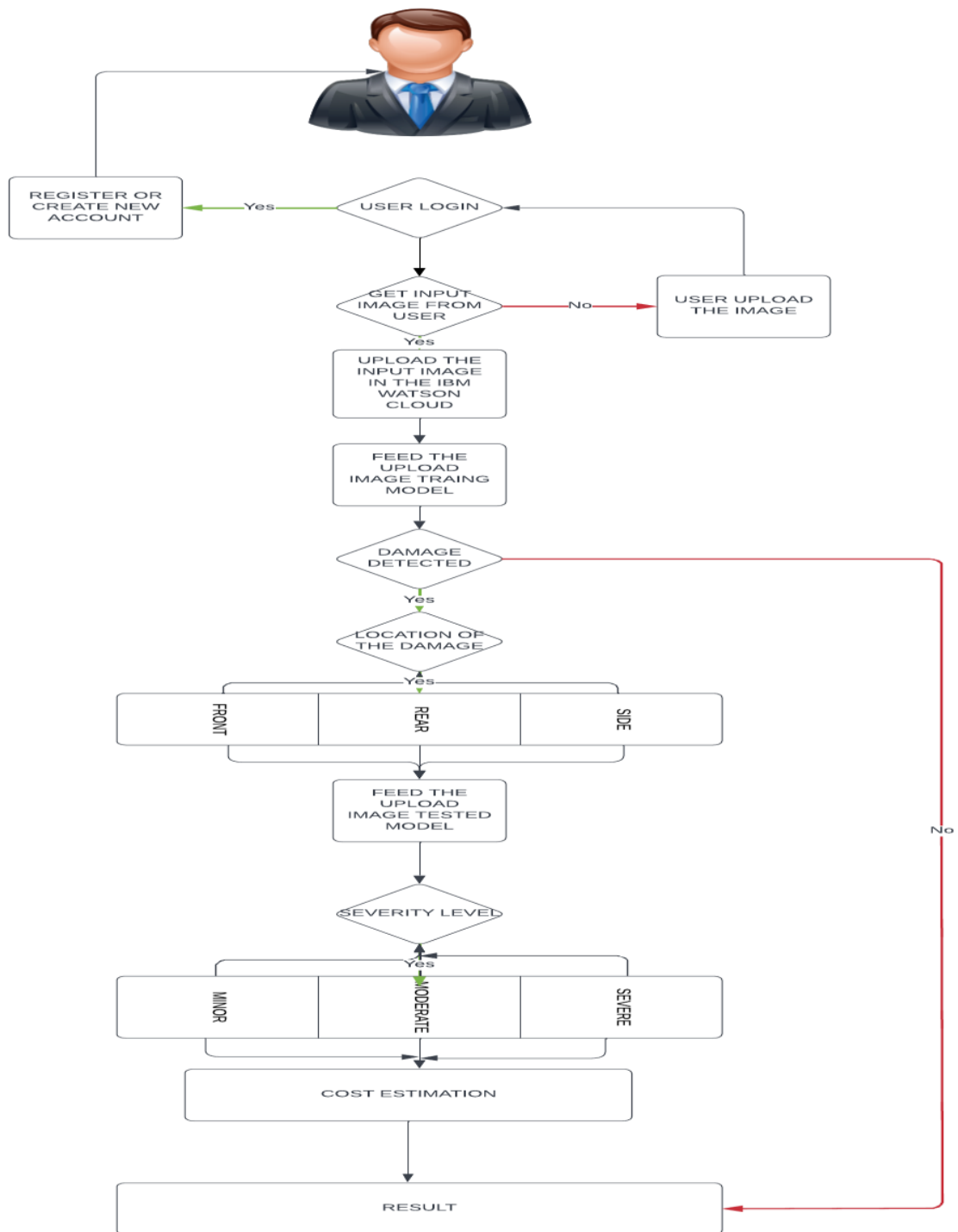
## CHAPTER 5

### 5. PROJECT DESIGN

#### 5.1 DATA FLOW DIAGRAMS

A two-dimensional diagram explains how data is processed and transferred in a system. The graphical depiction identifies each source of data and how it interacts with other data sources to reach a common output. Individuals seeking to draft a data flow diagram must identify external inputs and outputs, determine how the inputs and outputs relate to each other, and explain with graphics how these connections relate and what they result in. This type of diagram helps business development and design teams visualize how data is processed and identify or improve certain aspects.

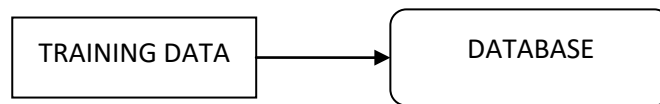




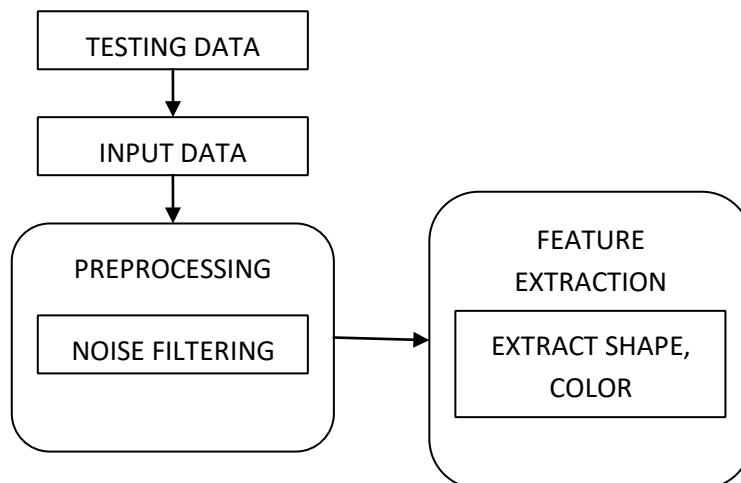
**FLOWCHART**

## LEVEL 0

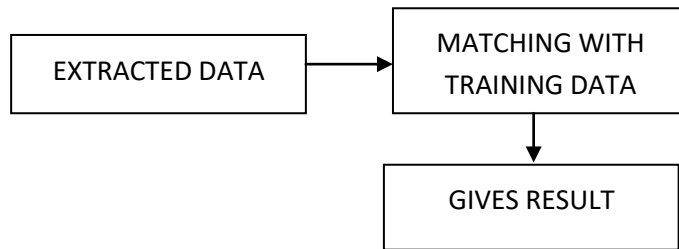
The Level 0 DFD shows how the system is divided into 'sub-systems' (processes), each of which deals with one or more of the data flows to or from an external agent, and which together provide all of the functionality of the system as a whole. It also identifies internal data stores that must be present in order for the system to do its job, and shows the flow of data between the various parts of the system.



The next stage is to create the Level 1 Data Flow Diagram. This highlights the main functions carried out by the system. As a rule, to describe the system was using between two and seven functions - two being a simple system and seven being a complicated system. This enables us to keep the model manageable on screen or paper.

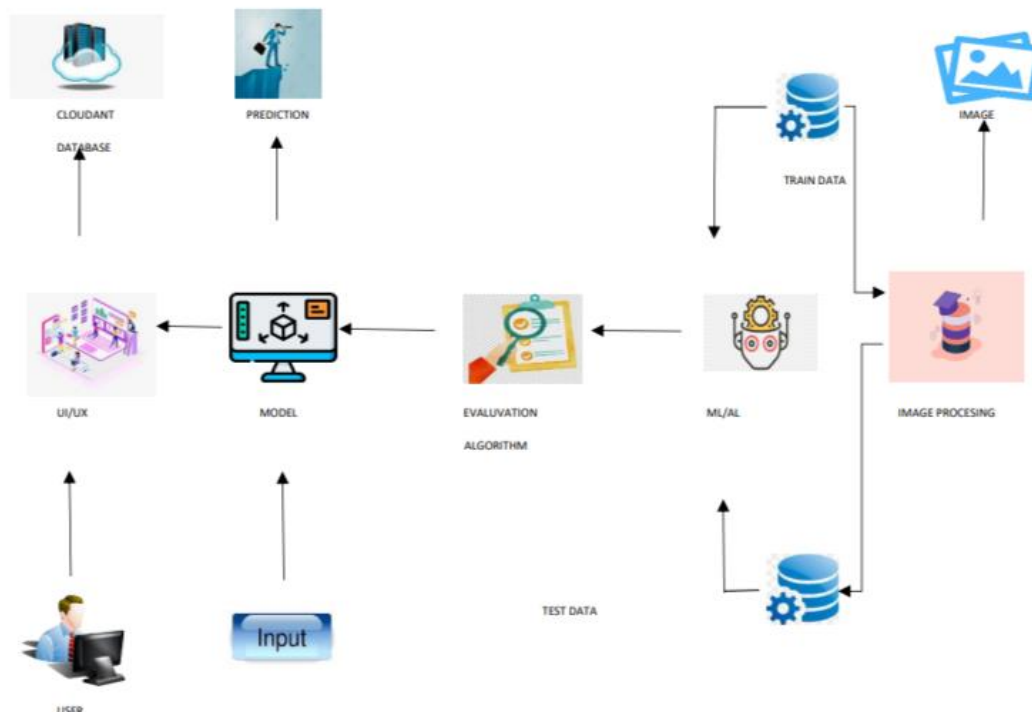


A Data Flow Diagram (DFD) tracks processes and their data paths within the business or system boundary under investigation. A DFD defines each domain boundary and illustrates the logical movement and transformation of data within the defined boundary. The diagram shows 'what' input data enters the domain, 'what' logical processes the domain applies to that data, and 'what' output data leaves the domain. Essentially, a DFD is a tool for process modelling and one of the oldest.



## 5.2 SOLUTION & TECHNICAL ARCHITECTURE

A system architecture or systems architecture is the conceptual model that defines the structure, behaviour, and more views of a system. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviours of the system. System architecture can comprise system components, the externally visible properties of those components, the relationships (e. g. the behaviour) between them. It can provide a plan from which products can be procured, and systems developed, that will work together to implement the overall system. There have been efforts to formalize languages to describe system architecture, collectively these are called architecture description languages (ADLs).



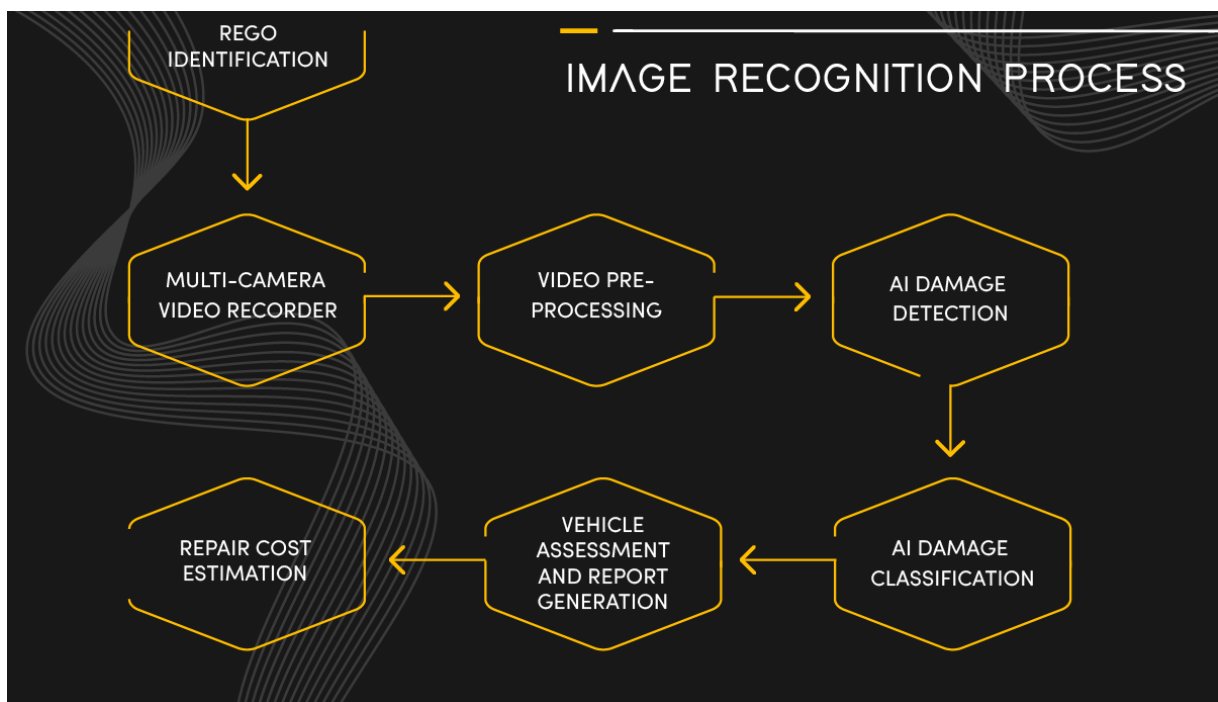
Technologies used for Intelligent Vehicle Damage Assessment and Cost Estimator for Insurance Companies:

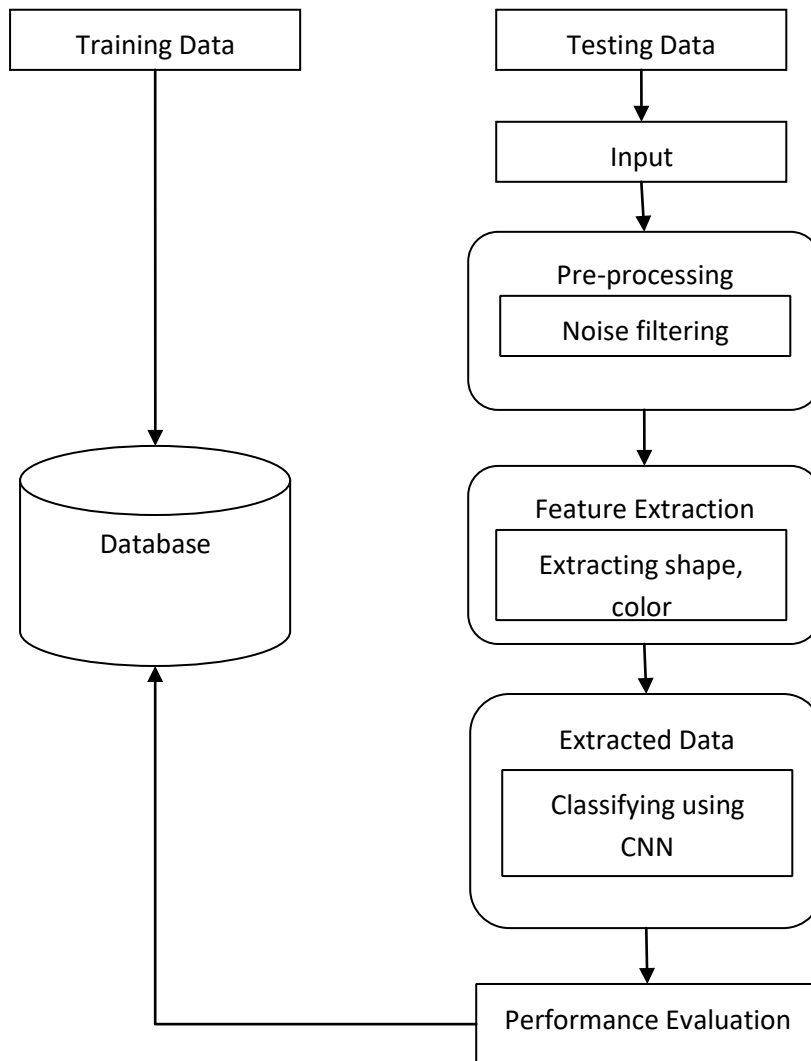


- Working with Image processing technique
- Working in Trained CNN model
- Working in Deep Learning
- Using Python Programming
- Build web application using Python Flask

## Platform

- Git & GitHub - Project Management
- IBM Cloud - Hosting
- IBM Watson - Training the Deep Learning Model





### 5.3 User Stories:

Use the below template to list all the user stories for the product.

| User Type              | Functional Requirement (Epic)     | User Story Number | User Story / Task   | Acceptance criteria   | Priority | Release  |
|------------------------|-----------------------------------|-------------------|---|---|----------|----------|
| Customer (Mobile user) | Registration                      | USN-1             | As a user, I can register for the application by entering my email, password, and confirming my password. | I can access my account / dashboard by entering valid credentials | High     | Sprint-1 |
| Customer Details       | Login                             | USN-2             | As a user, I will receive confirmation email once I have registered for the application                   | I can receive confirmation email & click confirm                  | High     | Sprint-1 |
| Customer Uses          | Dashboard                         | USN-3             | As a user, I can register for the application through Facebook  | I can register & access the dashboard with Facebook Login         | Low      | Sprint-4 |
| Customer Options       | Details about insurance companies | USN-4             | As a user, I can register for the application through Gmail   | I can register & access the dashboard with Facebook Gmail         | Medium   | Sprint-1 |
| Customer usage         | Login                             | USN-5             | As a user, I can log into the application by entering email & password                                    | I can log in and view my dashboard at my demand on any time       | High     | Sprint-1 |

|                         |  |       |   |  |        |          |
|-------------------------|--|-------|---|--|--------|----------|
| Customer needs to do    | Dashboard                                    | USN-6 | As a user I must capture images of my vehicle and upload it into the web portal                         | I can capture the entire vehicle and upload                            | High   | Sprint-2 |
| Customer (Web user)     | Details about estimated cost based on damage | USN-7 | As a user I must receive a detailed report of the damages present in the vehicle and the cost estimated | I can get the estimated insurance cost                                 | High   | Sprint-3 |
| Customer Care Executive | Details about Estimated cost Based on damage | USN-8 | As a user, I need to get support from developers in case of queries and failure of service provided     | I can have smooth user experiences and all the issues raised is sorted | Medium | Sprint-4 |
| Administrator           | Details about Estimated cost Based on damage | USN-9 | We need to satisfy the customer needs in an efficient way and make sure any sort of errors are fixed    | I can finish the work without any problems                             | High   | Sprint-4 |

## CHAPTER 6

### 6.PROJECT PLANNING & SCHEDULING

#### 6.1 SPRINT PLANING AND ESTIMATION

##### Product Backlog, Sprint Schedule, and Estimation

| <b>Sprint</b> | <b>Functional Requirement (Epic)</b> | <b>User Story Number</b> | <b>User Story / Task</b>  | <b>Story Points</b> | <b>Priority</b> | <b>Team Members</b>   |
|---------------|--------------------------------------|--------------------------|---|---------------------|-----------------|---|
| Sprint-1      | Registration                         | USN-1                    | As a user, I can resister for the application by entering my email, password, and confirming my password. | 2                   | High            | Suresh Babu M, Karthick M, Niranjan U, Nishanth S, Ramprasath M |
| Sprint-1      | Registration                         | USN-2                    | As a user, I will receive confirmation email once I have Registered for the Application                   | 1                   | High            | Suresh Babu M, Karthick M, Niranjan U, Nishanth S, Ramprasath M |
| Sprint-1      | Registration                         | USN-3                    | As a user, I can register for the application Gmail.  | 2                   | Low             | Suresh Babu M, Karthick M, Niranjan U, Nishanth S, Ramprasath M |
| Sprint-1      | Login                                | USN-4                    | As a user, I can Login to the application by entering email & password.                                   | 1                   | Medium          | Suresh Babu M, Karthick M, Niranjan U, Nishanth S, Ramprasath M |

|          |           |       |  |   |        |  |
|----------|-----------|-------|--|---|--------|--|
| Sprint-2 | Dashboard | USN-5 | As a user, I can view all the plans and methods in the Dashboard.                  | 1 | High   | Suresh Babu M, Karthick M,<br>Niranjan U, Nishanth S, Ramprasath M |
| Sprint-3 | Storage   | USN-1 | As a user, I can Register for claim my insurance.                                  | 2 | High   | Suresh Babu M, Karthick M,<br>Niranjan U, Nishanth S, Ramprasath M |
| Sprint-3 |           | USN-2 | As a user, I can make a call to support line to get help with a product or service | 2 | High   | Suresh Babu M, Karthick M,<br>Niranjan U, Nishanth S, Ramprasath M |
| Sprint-4 |           | USN-3 | As a user, I can claim my insurance After getting from the administrator           | 1 | Medium | Suresh Babu M, Karthick M,<br>Niranjan U, Nishanth S, Ramprasath M |

## 6.2 SPRINT DELIVERY SCHEDULE

### Project Tracker, Velocity & Burndown Chart (4 Marks)

| Sprint   | Total Story Points | Duration | Sprint Start Date | Sprint End Date (Planned) | Story Points Completed (as on Planned End Date) | Sprint Release Date (Actual) |
|----------|--------------------|----------|-------------------|---------------------------|---|------------------------------|
| Sprint-1 | 20                 | 3 Days   | 3 Nov 2022        | 6 Nov 2022                | 20  | 6 Nov 2022                   |
| Sprint-2 | 20                 | 3 Days   | 6 Nov 2022        | 9 Nov 2022                | 20  | 9 Nov 2022                   |
| Sprint-3 | 20                 | 3 Days   | 9 Nov 2022        | 12 Nov 2022               | 20  | 12 Nov 2022                  |
| Sprint-4 | 20                 | 3 Days   | 12 Nov 2022       | 15 Nov 2022               | 20  | 15 Nov 2022                  |

#### Velocity:

Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

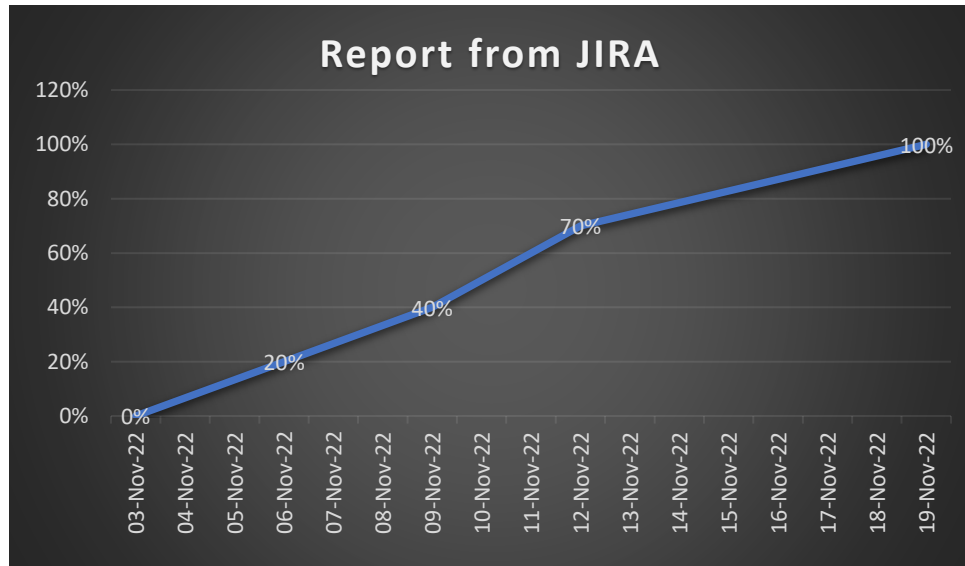
$$AV = \frac{\text{sprint duration}}{\text{velocity}} = \frac{20}{10} = 2$$

#### Burndown Chart:

A burn down chart is a graphical representation of work left to do versus time. It is often used in agile software development methodologies such as Scrum. However, burn down charts can be applied to any project containing measurable progress over time.



## 6.3 REPORTS FROM JIRA





## CHAPTER 7

### 7. CODING & SOLUTIONING

#### 7.1 FEATURE 1

##### INDEX

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <title> INDEX | IBM </title>
    <meta charset="utf-8">
    <meta name="viewport" content="width=device-width, initial-scale=1">
    <link                                rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/css/bootstrap.min.css">
    <link            rel="stylesheet"            href="https://cdnjs.cloudflare.com/ajax/libs/font-
awesome/4.7.0/css/font-awesome.min.css">
    <script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.0/jquery.min.js"></script>
    <script
src="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/js/bootstrap.min.js"></script>
    <style>
      body{
        margin: 0;
        padding: 0;
        font-family:Arial, Helvetica, sans-serif
        width: 100%;
        background:linear-gradient(to                                top,
rgba(0,0,0,0.5)50%,rgba(0,0,0,0.5)50%),url("/static/images/2.jpg");
        background-position: center;
        background-size: cover;
        height: 100vh;
      }
```

```
nav{  
    position:relative;  
    top: 0;  
    left: 0;  
    width: 100%;  
    height: 70px;  
    padding: 10px 100px;  
    box-sizing:border-box;  
    background:#161616;  
}
```

```
nav .logo{  
    padding: 15px;  
    height: 30px;  
    float: left;  
    font-size: 15px;  
    font-weight: bold;  
    color: #fff;  
}
```

```
nav ul {  
    list-style:none;  
    float: right;  
    margin: 0;  
    padding: 0;  
    display: flex;  
}
```

```
nav ul li a{  
    float: right;  
    display: block;  
    color: #f2f2f2;  
    text-align: center;  
    padding: 15px;
```

```

        text-decoration: none;
        font-size: 17px;

    }
    nav ul li a:hover{
        background: rgb(200, 212, 200);
        border-radius: 6px;
        color: rgb(70, 27, 13);
    }
    nav ul li a.active{
        background: #e2472f;
        border-radius: 6px;

    }
    .end {
        overflow: hidden;
        background-color: rgb(63, 63, 63);
        position: fixed;
        bottom: 0;
        height: 55px;
        width: 100%;
    }
    .container {
        align-self:auto;
    }

</style>
</head>
<body style="background-image:static\images\2.jpg;">
    <div class="wrap">
        <nav>

```

<div class="logo" >Intelligent Vehicle Damage Assessment and Cost Estimator for Insurance Companies</div>

<ul>

<li><a href="index.html">Home</a></li>

<li><a href="login.html">Login </a></li>

<li><a href="register.html">Register </a></li>

<li><a href="prediction.html">Prediction </a></li>

</ul>

</div>

</nav><br><br><br><br><br>

<div class="container">

<center>

<h2 style="font-family:'Franklin Gothic Medium', 'Arial Narrow', Arial, sans-serif; color:#ff7200; weight:10000;">ABOUT PROJECT </h2>

<br>

<p style="font-size:20px;font-family: 'Times New Roman', Times, serif;color:white;">Vehicle Damage Detection is used to reduce claims leakage during insurance processing.Vechile Inspectin and validation are usually done.As it takes a long time,because a person need to come and Inspect Damage.Here we are trying to Automate the procedure .Using this Automation we can avoid time consumption for Insurance claim procedure</p><br>

<br>

<a style="color:white;

padding: 22px;

background-color: black;

opacity: 85%;

border-radius: 12px;

margin-left: 25px;

margin-bottom: -20px;" href="https://www.facebook.com" class="fa fa-facebook"></a>

```
<a style="color:white;
padding: 20px;
background-color: black;
opacity: 85%;
border-radius: 12px;
margin-left: 25px;
margin-bottom: -20px;" href="https://www.twitter.com" class="fa fa-
twitter"></a>
```

```
<a style="color:white;
padding: 20px;
background-color: black;
opacity: 85%;
border-radius: 12px;
margin-left: 25px;
margin-bottom: -20px;" href="https://www.linkedin.com" class="fa fa-
linkedin"></a>
```

```
<a style="color:white;
padding: 20px;
background-color: black;
opacity: 85%;
border-radius: 12px;
margin-left: 25px;
margin-bottom: -20px;" href="https://www.instagram.com" class="fa fa-
instagram"></a>
```

```
</center>
```

```
</div>
```

```
<div class="end">
```

```
<p style="color:rgb(255, 246, 246);
margin-top: 20px;
text-align: center;">
```

<b> Copyright © 2021. All Rights Reserved</b>

</p>

</div>

</body>

</html>

## DASHBOARD:

<!DOCTYPE html>

<html lang="en">

<head>

<title>DASHBOARD</title>

<link rel="stylesheet" href="style.css">

<meta charset="utf-8">

<meta name="viewport" content="width=device-width, initial-scale=1">

<link rel="stylesheet"

href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/css/bootstrap.min.css">

<link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/4.7.0/css/font-awesome.min.css">

<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.0/jquery.min.js"></script>

<script

src="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/js/bootstrap.min.js"></script>

<style>

\*{

margin: 0;

padding: 0;

}

.main{

width: 100%;

```
        background:linear-gradient(to top, rgba(0,0,0,0.5)50%,rgba(0,0,0,0.5)50%),
url("/static/images/2.jpg");
        background-position: center;
        background-size: cover;
        height: 100vh;
    }
```

```
.navbar{
    width: 1200px;
    height: 75px;
    margin: auto;
}
```

```
.icon{
    width: 200px;
    float: left;
    height: 70px;
}
```

```
.logo{
    color: #ff7200;
    font-size: 35px;
    font-family: Arial;
    padding-left: 20px;
    float: left;
    padding-top: 2px;
    margin-top: 5px
}
```

```
.menu{
    width: 700px;
```

```
float: right;
height: 70px;

}

ul{
float: right;
display: flex;
justify-content: center;
align-items: center;
}

ul li{
list-style: none;
margin-left: 62px;
margin-top: 27px;
font-size: 14px;
}

ul li a{
text-decoration: none;
color: #fff;
font-family: Arial;
font-weight: bold;
transition: 0.4s ease-in-out;
}

ul li a:hover{
color: #ff7200;
}
```



```
.search{  
    width: 330px;  
    float: left;  
    margin-left: 270px;  
}
```

```
.srch{  
    font-family: 'Times New Roman';  
    width: 200px;  
    height: 40px;  
    background: transparent;  
    border: 1px solid #ff7200;  
    margin-top: 13px;  
    color: #fff;  
    border-right: none;  
    font-size: 16px;  
    float: left;  
    padding: 10px;  
    border-bottom-left-radius: 5px;  
    border-top-left-radius: 5px;  
}
```

```
.btn{  
    width: 100px;  
    height: 40px;  
    background: #ff7200;  
    border: 2px solid #ff7200;  
    margin-top: 13px;  
    color: #fff;  
    font-size: 15px;  
    border-bottom-right-radius: 5px;
```

```
border-bottom-right-radius: 5px;
transition: 0.2s ease;
cursor: pointer;
}
.btn:hover{
    color: #000;
}
```

```
.btn:focus{
    outline: none;
}
```

```
.srch:focus{
    outline: none;
}
```

```
.content{
    width: 1200px;
    height: auto;
    margin: auto;
    color: #fff;
    position: relative;
}
```

```
.content .par{
    padding-left: 20px;
    padding-bottom: 25px;
    font-family: Arial;
    letter-spacing: 1.2px;
    line-height: 30px;
}
```

```
.content h1{  
    font-family: 'Times New Roman';  
    font-size: 50px;  
    padding-left: 20px;  
    margin-top: 9%;  
    letter-spacing: 2px;  
}
```

```
.content .cn{  
    width: 160px;  
    height: 40px;  
    background: #ff7200;  
    border: none;  
    margin-bottom: 10px;  
    margin-left: 20px;  
    font-size: 18px;  
    border-radius: 10px;  
    cursor: pointer;  
    transition: .4s ease;  
  
}
```

```
.content .cn a{  
    text-decoration: none;  
    color: #000;  
    transition: .3s ease;  
}
```

```
.cn:hover{  
    background-color: #fff;
```

```
}
```

```
.content span{  
  color: #ff7200;  
  font-size: 65px  
}
```

```
.form{  
  width: 300px;  
  height: 340px;  
  background: linear-gradient(to top, rgba(0,0,0,0.8)50%,rgba(0,0,0,0.8)50%);  
  position: absolute;  
  top: -20px;  
  left: 870px;  
  transform: translate(0%,-5%);  
  border-radius: 10px;  
  padding: 25px;  
}
```

```
.form h2{  
  width: 220px;  
  font-family: sans-serif;  
  text-align: center;  
  color: #ff7200;  
  font-size: 22px;  
  background-color: #fff;  
  border-radius: 10px;  
  margin: 2px;  
  padding: 8px;  
}
```

```
.form input{
  width: 240px;
  height: 35px;
  background: transparent;
  border-bottom: 1px solid #ff7200;
  border-top: none;
  border-right: none;
  border-left: none;
  color: #fff;
  font-size: 15px;
  letter-spacing: 1px;
  margin-top: 30px;
  font-family: sans-serif;
}
```

```
.form input:focus{
  outline: none;
}
```

```
::placeholder{
  color: #fff;
  font-family: Arial;
}
```

```
.btnn{
  width: 240px;
  height: 40px;
  background: #ff7200;
  border: none;
  margin-top: 30px;
  font-size: 18px;
```

```
border-radius: 10px;
cursor: pointer;
color: #fff;
transition: 0.4s ease;
}
.btnn:hover{
background: #fff;
color: #ff7200;
}
.btnn a{
text-decoration: none;
color: #000;
font-weight: bold;
}
.form .link{
font-family: Arial, Helvetica, sans-serif;
font-size: 17px;
padding-top: 20px;
text-align: center;
}
.form .link a{
text-decoration: none;
color: #ff7200;
}
.liw{
padding-top: 15px;
padding-bottom: 10px;
text-align: center;
}
.icons a{
text-decoration: none;
```

```
        color: #fff;
    }
    .icons ion-icon{
        color: #fff;
        font-size: 30px;
        padding-left: 14px;
        padding-top: 5px;
        transition: 0.3s ease;
    }
    .icons ion-icon:hover{
        color: #ff7200;
    }
    .end {
        overflow: hidden;
        background-color: rgb(63, 63, 63);
        position: auto;
        bottom: 0;
        height: 55px;
        width: 100%;
    }
</style>
```

</head>

<body = onload="flashMessage()">

<script>

```
function flashMessage(){
    if("{{flash_message}}" == "True"){
        alert("account created successfully")
    }
    if("{{flash_message}}" == "Fals"){
```

```

        alert("invalid credentials")
    }
    if("{{flash_message}}" == "Fal"){
        alert("Logged in successfully")
    }
}
</script>
<body style="background-image:static\images\2.jpg;">
<div class="main">
    <div class="navbar">
        <div class="icon">
            <h6 class="logo"></h6>
        </div>

        <div class="menu">
            <ul>
                <li><a href="{{ url_for('dashboard') }}">HOME</a></li>
                <!--<li><a href="{{ url_for('login') }}">LOGIN</a></li>-->
                <!--<li><a href="{{ url_for('register') }}">REGISTER</a></li>-->
                <li><a href="{{ url_for('prediction') }}">PREDICTION</a></li>
                <li><a href="{{ url_for('logout') }}">LOGOUT</a></li>
                <li><a href="#section - 1">ABOUT</a></li>
            </ul>
        </div>

    </div>

    <div class="content">

        <h1>Intelligent Vehicle <br><span>Damage Assessment &<br>Cost Estimator for
</span><br>Insurance Companies</h1>

```



```

        <br><br><br>
        <button class="cn"><a href="{ { url_for('prediction')
}}">PREDICTION</a></button>
    <!--form action="dashboard" method="POST">
    <div class="form">
        <input type="email" name="email" id="email" placeholder="Enter Your Email
Id">
        <input type="password" name="password" id="password" placeholder="Enter
Your Password ">
        <button class="btnn"><a href="">Login</a></button>

        <p class="link">Don't have an account<br>
        <a href="#">Sign up </a> here</a></p>

    </div>
    </form!-->
    </div>
    </div>
    </div>
    </div>
    <br><br><br><center>
        <div id= "section -1"> <h2 style:font-family:'Times New Roman', Times,
serif;"><center>ABOUT PROJECT</center></h2></div>
    <br><br>
    <p style:"font-size:50px;font-family: 'Times New Roman', Times, serif;">Vehicle
Damage Detection is used to reduce claims leakage during insurance processing.Vechile
Inspectin and validation are usually done.As it takes a long time,because a person need to come
and Inspect Damage.Here we are trying to Automate the procedure .Using this Automation we
can avoid time consumption for Insurance claim procedure</p>
    <br><br><br><br>
    <a style:"color:white;

```

```
padding: 22px;
background-color: black;
opacity: 85%;
border-radius: 12px;
margin-left: 25px;
margin-bottom: -20px;" href="https://www.facebook.com" class="fa fa-
facebook"></a>
```

```
<a style:"color:white;
padding: 20px;
background-color: black;
opacity: 85%;
border-radius: 12px;
margin-left: 25px;
margin-bottom: -20px;" href="https://www.twitter.com" class="fa fa-
twitter"></a>
```

```
<a style:"color:white;
padding: 20px;
background-color: black;
opacity: 85%;
border-radius: 12px;
margin-left: 25px;
margin-bottom: -20px;" href="https://www.linkedin.com" class="fa fa-
linkedin"></a>
```

```
<a style:"color:white;
padding: 20px;
background-color: black;
opacity: 85%;
border-radius: 12px;
margin-left: 25px;
margin-bottom: -20px;" href="https://www.instagram.com" class="fa fa-
instagram"></a>
```

```

</center>

</div><br><br><br>
<div class="end">
  <p style="color:rgb(255, 246, 246);
    margin-top: 20px;
    text-align: center;">
    <b> Copyright &#169; 2022. All Rights Reserved</b>
  </p>
<script src="https://unpkg.com/ionicons@5.4.0/dist/ionicons.js"></script>
</body>
</html>

```

## LOGIN:

```

<!DOCTYPE html>
<html lang="en">
  <head>
    <title> LOGIN </title>
    <meta charset="utf-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <link          rel="stylesheet"          href="https://cdnjs.cloudflare.com/ajax/libs/font-
awesome/4.7.0/css/font-awesome.min.css">
    <script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.0/jquery.min.js"></script>
    <script
src="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/js/bootstrap.min.js"></script>
    <style>
      body {
        margin: 0;
        padding: 0;
        font-family:Arial, Helvetica, sans-serif
      }

```

```
nav{  
    position:relative;  
    top: 0;  
    left: 0;  
    width: 100%;  
    height: 70px;  
    padding: 10px 100px;  
    box-sizing:border-box;  
}
```

```
nav .logo{  
    padding: 25px;  
    height: 30px;  
    float: left;  
    font-size: 25px;  
    font-weight: bold;  
    color:#f2f2f2;
```

```
}
```

```
nav ul {  
    list-style:none;  
    float: right;  
    margin: 0;  
    padding: 0;  
    display: flex;  
    font-weight: 600;  
}
```

```
nav ul li a{  
    float: right;  
    display: block;  
    color: #f2f2f2;
```

```

        text-align: center;
        padding: 15px;
        text-decoration: none;
        font-size: 20px;

    }
    nav ul li a:hover{
        background: rgb(200, 212, 200);
        border-radius: 6px;
        color: rgb(70, 27, 13);
    }
html {
    height: 100%;
}
body {
    margin:0;
    padding:0;
    font-family: sans-serif;
    background: linear-gradient(to top,
    rgba(0,0,0,0.5)50%,rgba(0,0,0,0.5)50%),url("/static/images/2.jpg");
    background-position: center;
    background-size: cover;
    height: 100vh;
}

.login-box {
    position: absolute;
    top: 50%;
    left: 50%;
    width: 500px;

```

```
padding: 40px;
transform: translate(-50%, -50%);
background: rgba(0,0,0,.5);
box-sizing: border-box;
box-shadow: 0 15px 25px rgba(0,0,0,.6);
border-radius: 10px;
}
```

```
.login-box h2 {
margin: 0 0 30px;
padding: 0;
color: #ff7200;
text-align: center;
}
```

```
.login-box .user-box {
position: relative;
}
```

```
.login-box .user-box input {
width: 100%;
padding: 10px 0;
font-size: 16px;
color: #fff;
margin-bottom: 30px;
border: none;
border-bottom: 1px solid #fff;
outline: none;
background: transparent;
}
```

```
.login-box .user-box label {
```

```
position: absolute;
top:0;
left: 0;
padding: 10px 0;
font-size: 16px;
color: #fff;
pointer-events: none;
transition: .5s;
}
```

```
.login-box .user-box input:focus ~ label,
.login-box .user-box input:valid ~ label {
  top: -20px;
  left: 0;
  color: #fff;
  font-size: 12px;
}
```

```
.login-box form a {
  position: relative;
  display: inline-block;
  padding: 10px 20px;
  color: #03e9f4;
  font-size: 16px;
  text-decoration: none;
  text-transform: uppercase;
  overflow: hidden;
  transition: .5s;
  margin-top: 40px;
  letter-spacing: 4px
}
```

```
.login-box a:hover {  
  background: #03e9f4;  
  color: #fff;  
  border-radius: 5px;  
  box-shadow: 0 0 5px #03e9f4,  
             0 0 25px #03e9f4,  
             0 0 50px #03e9f4,  
             0 0 100px #03e9f4;  
}
```

```
.login-box a span {  
  position: absolute;  
  display: block;  
}
```

```
.login-box a span:nth-child(1) {  
  top: 0;  
  left: -100%;  
  width: 100%;  
  height: 2px;  
  background: linear-gradient(90deg, transparent, #03e9f4);  
  animation: btn-anim1 1s linear infinite;  
}
```

```
@keyframes btn-anim1 {  
  0% {  
    left: -100%;  
  }  
  50%,100% {  
    le...
```



## LOGOUT:

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <title> LOGOUT </title>
    <meta charset="utf-8">
    <meta name="viewport" content="width=device-width, initial-scale=1">
    <link          rel="stylesheet"          href="https://cdnjs.cloudflare.com/ajax/libs/font-
awesome/4.7.0/css/font-awesome.min.css">
    <script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.0/jquery.min.js"></script>
    <script
src="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/js/bootstrap.min.js"></script>
    <style>
      body{
        margin: 0;
        padding: 0;
        font-family:Arial, Helvetica, sans-serif

      }
      nav{
        position:relative;
        top: 0;
        left: 0;
        width: 100%;
        height: 70px;
        padding: 10px 100px;
        box-sizing:border-box;
      }

      nav .logo{
        padding: 20px;
```

```
height: 40px;
float: left;
font-size: 20px;
font-weight: bold;
color: #fff;
}
nav ul {
list-style:none;
float: right;
margin: 0;
padding: 0;
display: flex;
font-weight: 600;
}
nav ul li a{
float: right;
display: block;
color: #f2f2f2;
text-align: center;
padding: 15px;
text-decoration: none;
font-size: 17px;
}
nav ul li a:hover{
background: rgb(200, 212, 200);
border-radius: 6px;
color: rgb(51, 48, 47);
}
nav ul li a.active{
background: #e2472f;
border-radius: 6px;
```

```
}
```

```
body {  
    margin:0;  
    padding:0;  
    font-family: sans-serif;  
    background: linear-gradient(to top, rgba(0,0,0,0.5)50%,rgba(0,0,0,0.5)50%),  
url("/static/images/2.jpg");  
    background-position: center;  
    background-size: cover;  
    height: 100vh;  
}
```

```
.end {  
    overflow: hidden;  
    background-color: rgb(63, 63, 63);  
    position: fixed;  
    bottom: 0;  
    height: 55px;  
    width: 100%;  
}
```

```
</style>
```

```
</head>
```

```
<body style="background-image: 2.jpg;">
```

```
<div class="wrap">
```

```
<nav>
```

```
<div class="logo"> LOGOUT PAGE</div>
```

```
<ul>
```

```
<li><a href="{ { url_for('login') } }">Login </a></li>
```

```
<li><a href="{ { url_for('register') } }">Register </a></li>
```

```

        <!--<li><a href="prediction.html">Prediction </a></li>-->
    </ul>
</div>
</nav><br><br>

<div style="margin-top: 80px;" class="container">
    <center><br>
        <form action="">
            <h3 style="font-size: 42px;font-family: 'Franklin Gothic Medium', 'Arial Narrow',
Arial, sans-serif; color: #ff7200;">Successfully Logged Out !</h3><br>
            <b style="font-size:25px; color: #ff7200;">Thanks For Visting Our
Website</b><br><br><br><br>
            <!--<button><a style="color:rgb(#9AFEFF);" href="login.html"
value="login">LOGIN</a></button>-->
        </center>
    </div>

</div>
</body>
</html>

```

## PREDICTION:

```

<!DOCTYPE html>
<html lang="en">
    <head>
        <title> PREDICTION </title>
        <meta charset="utf-8">
        <meta name="viewport" content="width=device-width, initial-scale=1">
        <link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/font-
awesome/4.7.0/css/font-awesome.min.css">
        <script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.0/jquery.min.js"></script>

```

```
<script
src="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/js/bootstrap.min.js"></script>
<style>
  body{
    margin: 0;
    padding: 0;
    font-family:Arial, Helvetica, sans-serif
  }
  nav{
    position:relative;
    top: 0;
    left: 0;
    width: 100%;
    height: 70px;
    padding: 10px 100px;
    box-sizing:border-box;
  }

  nav .logo{
    padding: 15px;
    height: 30px;
    float: left;
    font-size: 25px;
    font-weight: bold;
    color: #fff;
  }
  nav ul {
    list-style:none;
    float: right;
    margin: 0;
    padding: 0;
```

```

        display: flex;
        font-weight: 600;
    }
    nav ul li a{
        float: right;
        display: block;
        color: #f2f2f2;
        text-align: center;
        padding: 15px;
        text-decoration: none;
        font-size: 17px;
    }
    nav ul li a:hover{
        background: rgb(200, 212, 200);
        border-radius: 6px;
        color: rgb(51, 48, 47);
    }
    nav ul li a.active{
        background: #e2472f;
        border-radius: 6px;
    }
}
body {
    margin:0;
    padding:0;
    font-family: sans-serif;
    background: linear-gradient(to top,
    rgba(0,0,0,0.5)50%,rgba(0,0,0,0.5)50%),url("/static/images/2.jpg");
    background-position: center;
    background-size: cover;
    height: 100vh;

```

```

}

    .end {
        overflow: hidden;
        background-color: rgb(63, 63, 63);
        position: fixed;
        bottom: 0;
        height: 55px;
        width: 100%;
    }
button{
    background-color:black;
    opacity: 78%;
    color: rgb(255, 255, 255);
    font-size: 20px;
    border-radius: 50px;
    width: 150px;"

}
input{
    background-color:black;
    opacity: 78%;
    color: white;
    font-size: 15px;
    width: 250px;

}
</style>
</head>
<body style="background image=/static/images/2.jpg;">
    <div class="wrap">
        <nav>
            <div class="logo">PREDICTION PAGE</div>
            <ul>

```

```

        <li><a href="{{ url_for('dashboard') }}">Home</a></li>
        <li><a href="{{ url_for('logout') }}">Logout </a></li>
    </ul>
</div>
</nav><br><br><br><br><br><br><br><br><br>

<div style="margin-top: -45px;" class="container">
    <center>
        <h2 style="font-family:'Franklin Gothic Medium', 'Arial Narrow', Arial, sans-serif; color:
#ff7200;"><b>UPLOAD IMAGE TO PREDICT</b></h2><br>
        <form action="{{ url_for('prediction') }}" method="POST" enctype="multipart/form-
data">
            <div class="input">
                <input type="file" class="myFile" id="myFile" name="myFile">
            </div>
            <br><br><br>

            <div class="button">
                <button input type="submit" >Submit</button></div>
        </form>
<br>
<!-- <script>
function flashMessage(){
    if("{{ flash_message }}"=="True"){
        const im = document.createElement('img');
        im.src = "{{ url_for('static', filename='imagedata/save.png') }}";
        im.height = "200px";
        im.width = '200px';
        im.alt = 'hello world'
    }
}

```



```

</script> -->
<!--  -->
<br>
<h2 style="font-family:Arial, Helvetica, sans-serif; color: #ff7200;" > <b> The
Estimated cost for the Damage is = {{prediction_text}}</b></h2>
</h3>
</center>
</div>
</body>
</html>

```

## 7.2 FEATURE 2

```

from flask import Flask, app, request, render_template
import os
import flask
import re
import flask_login
import base64
from PIL import Image
from io import BytesIO
import datetime
import cv2

```

```
import numpy as np
from tensorflow.keras.models import load_model
from cloudant.client import Cloudant
from cloudant.error import CloudantException
from cloudant.result import Result, ResultByKey
```

```
model1 = load_model('Model/level.h5')
model2 = load_model('Model/body.h5')
```

```
def detect(frame,model1,f):
    img = cv2.resize(frame,(244,244))
    img = cv2.cvtColor(img,cv2.COLOR_BGR2RGB)
    if(np.max(img)>1):
        img=img/255.0
    img = np.array([img])

    prediction = model1.predict(img)
    if(f):
        label= ['front','rear','side']
    else:
        label =['minor','moderate','severe']
    preds = label[np.argmax(prediction)]
    return preds
```

```
client = Cloudant.iam('862d725c-4fb3-4619-bfcb-083c11c6a979-  
bluemix','QM5pS9ePdxMpe6Lh-  
8yIvNYoZ3SXtoIdQQKnyIRYlwFb',connect=True)  
name = 'name'  
email = 'a@b.c'  
password = '123'
```

```
user_database = client.create_database('user_database')  
user_image_database = client.create_database('user_image_database')
```

```
def image_database_updation(name,email,imagestr):  
    global user_image_database  
    now = datetime.datetime.now()  
    json_image_document={  
        'name':name,  
        'email':email,  
        'image':imagestr,  
        'datetime':now.strftime("%m/%d/%Y, %H:%M:%S")  
    }  
    new_image_document =  
    user_image_database.create_document(json_image_document)  
    if(new_image_document.exists()):  
        print('database updated')  
    else:  
        print('database couldn\'t be edited')  
    return
```

```
def image_database_retrieval():
```

```

global user_image_database
image_result_retrieved =
Result(user_image_database.all_docs,include_docs=True)
image_result ={ }
for i in image_result_retrieved:
    if(i['doc']['email'] in image_result.keys()):
        # like current date> rx date('str')
        n = datetime.datetime.strptime(i['doc']['datetime'],'%m/%d/%Y,
%H:%M:%S')
        o =
datetime.datetime.strptime(image_result[i['doc']['email']]['date'],'%m/%d/%Y,
%H:%M:%S')
        if(n>o):

            image_result[i['doc']['email']] =
{'name':i['doc']['name'],'image':i['doc']['image'],'date':i['doc']['datetime']}
        else:
            image_result[i['doc']['email']] =
{'name':i['doc']['name'],'image':i['doc']['image'],'date':i['doc']['datetime']}
    return(image_result)

```

```

def database_updation(name,email,password):
    global user_database
    jsonDocument = {
        'name':name,
        'email':email,
        'password':password
    }
    newDocument = user_database.create_document(jsonDocument)

```

```

    if(newDocument.exists()):
        print('database updated')
    else:
        print('database couldn\'t be edited')
    return
#database_update(name,email,password)

def database_retrieval():
    global user_database
    result_retrieved = Result(user_database.all_docs,include_docs=True)
    #print(list(result_retrieved))
    result = { }
    for i in list(result_retrieved):

result[i['doc']]['email']={ 'name':i['doc']['name'],'password':i['doc']['password']}
    return result
#print(database_retrieval())
app = Flask(__name__)
app.secret_key = 'apple'
login_manager = flask_login.LoginManager()

login_manager.init_app(app)
users = {'a@b.c': {'password': '123'}}
class User(flask_login.UserMixin):
    pass

@login_manager.user_loader

```

```
def user_loader(email):  
    data = database_retrieval()  
    if email not in data:  
        return  
  
    user = User()  
    user.id = email  
    user.name = data[email]['name']  
    return user
```

```
@login_manager.request_loader  
def request_loader(request):  
    email = request.form.get('email')  
    data = database_retrieval()  
    if email not in data:  
        return  
  
    user = User()  
    user.id = email  
    user.name = data[email]['name']  
    return user
```

```
@app.route('/')  
def index():  
    if(flask_login.current_user.is_authenticated):  
        return render_template('dashboard.html')  
    else:  
        return flask.redirect(flask.url_for('login'))
```

```

@app.route('/register',methods = ['GET','POST'])
def register():
    data = database_retrieval()
    if(flask.request.method == 'GET'):
        return render_template('register.html')
    email = flask.request.form['email']
    if(email in data):
        return render_template('register.html',flash_message='True')
    else:

database_updation(flask.request.form['name'],email,flask.request.form['password'])

    #users[email]={ 'password':flask.request.form['password']}
    user = User()
    user.id = email
    user.name = flask.request.form['name']
    flask_login.login_user(user)
    return render_template('dashboard.html',flash_message='True')


@app.route('/login',methods =['GET','POST'])
def login():
    data = database_retrieval()
    if(flask.request.method == 'GET'):

        return render_template('login.html',flash_message='False')

```

```

email = flask.request.form['email']
if(email in data and flask.request.form['password']==data[email]['password']):
    user = User()
    user.id = email
    flask_login.login_user(user)
    return render_template('dashboard.html',flash_message='Fal')
#flask.flash('invalid credentials !!!')
return render_template('login.html',flash_message="True")
#error = 'inavlid credentials')

```

```

@app.route('/dashboard',methods = ['GET','POST'])
@flask_login.login_required
def dashboard():
    if(flask.request.method == 'GET'):
        return render_template('dashboard.html',flash_message='False')
    email = flask.request.form['email']
    if(email in users and
flask.request.form['password']==users[email]['password']):
        user = User()
        user.id = email
        flask_login.login_user(user)
        return render_template('dashboard.html',flash_message="Fal")
    return render_template('dashboard.html',flash_message="Fals")

```

```

@app.route('/logout')
@flask_login.login_required

```



```

def logout():
    flask_login.logout_user()
    return render_template('logout.html')


@app.route('/prediction',methods = ['GET','POST'])
@flask_login.login_required
def prediction():
    from tensorflow.keras.models import load_model

    model1 = load_model('Model/level.h5')
    model2 = load_model('Model/body.h5')

    if(flask.request.method=='POST'):
        img = flask.request.files['myFile']
        try:
            os.remove('static\imagedata\save.png')
        except:
            pass
        imgstr = base64.b64encode(img.read()).decode('utf-8')

    image_database_updation(flask_login.current_user.name,flask_login.current_us
er.id,imgstr)

    data = image_database_retrieval()
    print(flask_login.current_user.id)

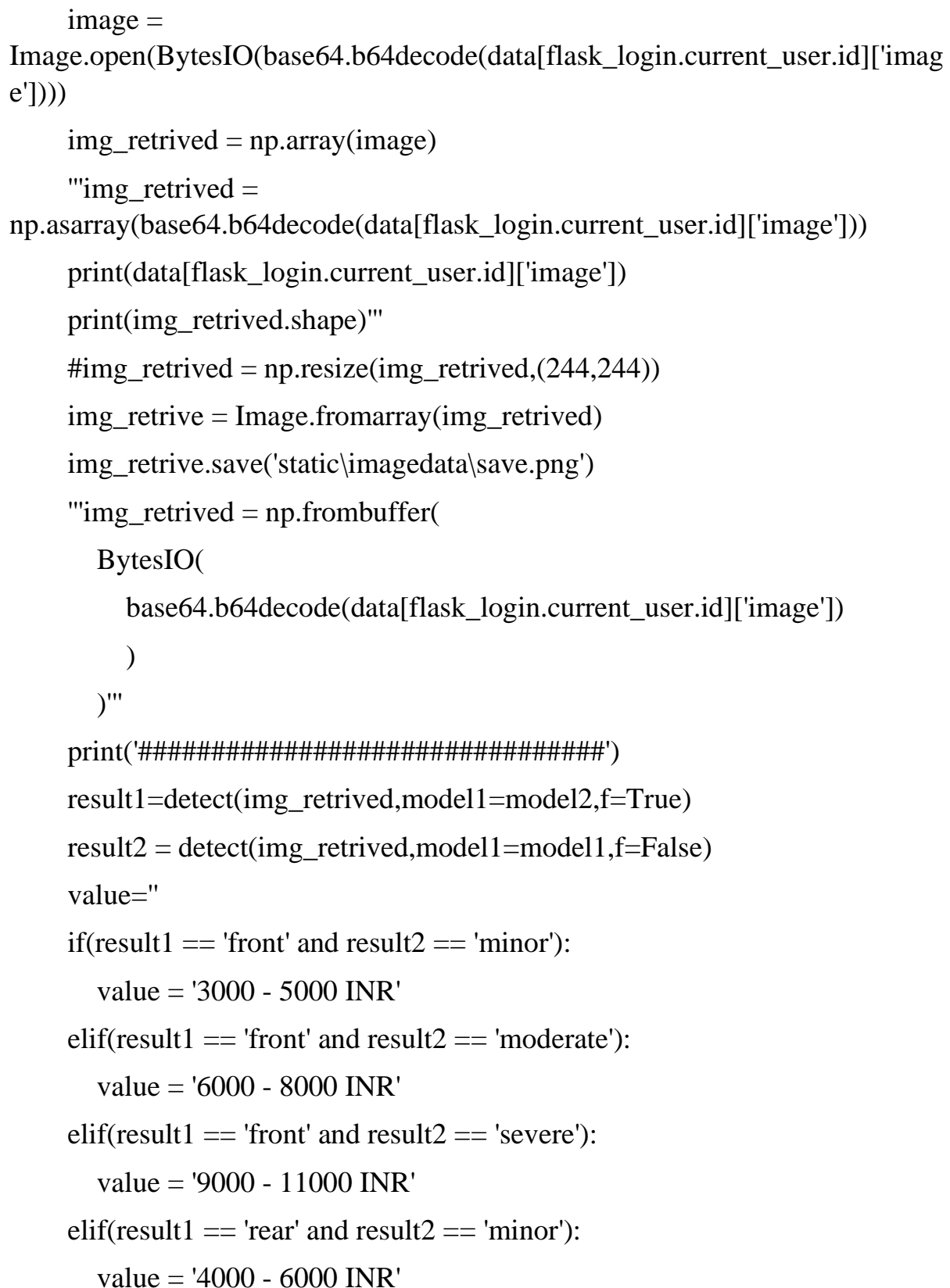
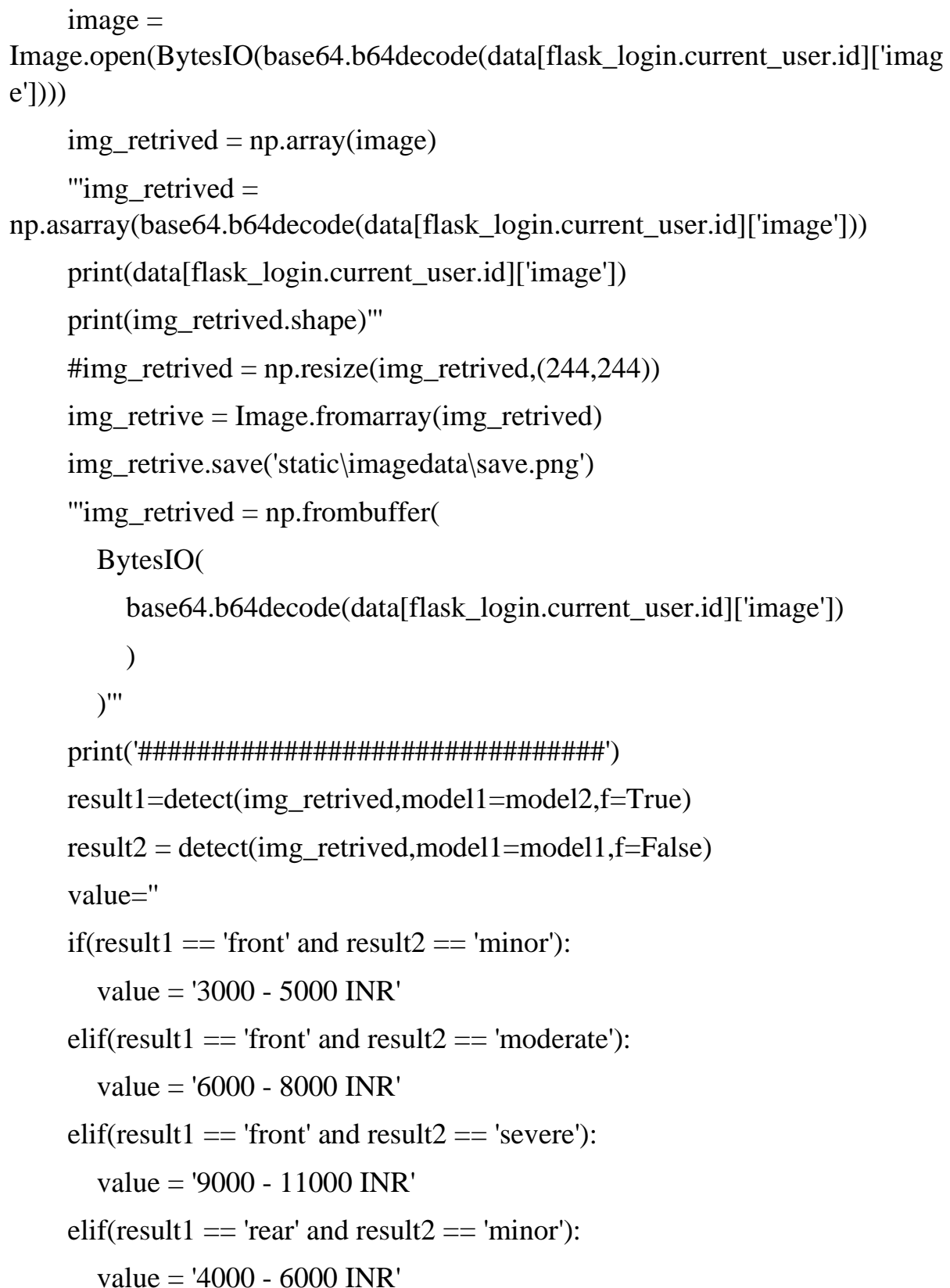
#print(len(base64.b64decode(data[flask_login.current_user.id]['image']).strip()))

```

```

        image =
Image.open(BytesIO(base64.b64decode(data[flask_login.current_user.id]['image'])))

img_retrived = np.array(image)


"""img_retrived =
np.asarray(base64.b64decode(data[flask_login.current_user.id]['image']))
print(data[flask_login.current_user.id]['image'])
print(img_retrived.shape)"""
#img_retrived = np.resize(img_retrived,(244,244))
img_retrieve = Image.fromarray(img_retrived)
img_retrieve.save('static\imagedata\save.png')

"""img_retrived = np.frombuffer(
    BytesIO(
        base64.b64decode(data[flask_login.current_user.id]['image'])
    )
)"""
print('#####')
result1=detect(img_retrived,model1=model2,f=True)
result2 = detect(img_retrived,model1=model1,f=False)
value=""
if(result1 == 'front' and result2 == 'minor'):
    value = '3000 - 5000 INR'
elif(result1 == 'front' and result2 == 'moderate'):
    value = '6000 - 8000 INR'
elif(result1 == 'front' and result2 == 'severe'):
    value = '9000 - 11000 INR'
elif(result1 == 'rear' and result2 == 'minor'):
    value = '4000 - 6000 INR'

```

```

elif(result1 == 'rear' and result2 == 'moderate'):
    value = '7000 - 9000 INR'
elif(result1 == 'rear' and result2 == 'severe'):
    value = '11000 - 13000 INR'
elif(result1 == 'side' and result2 == 'minor'):
    value = '6000 - 8000 INR'
elif(result1 == 'side' and result2 == 'moderate'):
    value = '900 - 11000 INR'
elif(result1 == 'side' and result2 == 'severe'):
    value = '12000 - 15000 INR'
else:
    value = '16000 - 50000 INR'
print(result1,result2,value)
print('#####')
img_retrived = Image.fromarray(img_retrived)
img_retrived.save('static\imagedata\save.png')
print('image uploaded and retrieved')
return
render_template('prediction.html',prediction_text='{}'.format(value),flash_message='False')

return render_template('prediction.html',flash_message='True')

if __name__ == '__main__':
    app.run(debug=True)

```

## CHAPTER 8

### 8. TESTING

#### TEST CASES

A test case has components that describe input, action and an expected response, in order to determine if a feature of an application is working correctly. A test case is a set of instructions on “HOW” to validate a particular test objective/target, which when followed will tell us if the expected behaviour of the system is satisfied or not.

Characteristics of a good test case:

- Accurate: Exacts the purpose.
- Economical: No unnecessary steps or words.
- Traceable: Capable of being traced to requirements.
- Repeatable: Can be used to perform the test over and over.
- Reusable: Can be reused if necessary.

| S.NO | Scenario     | Input                                   | Excepted output                                  | Actual output                     |
|------|--------------|---|--|-----------------------------------|
| 1    | User login   | User name and password                  | Login  | Login success.                    |
| 2    | Upload Image | Upload damaged vehicle image as a input | Detecting object and analyze for claim insurance | Details are stored in a database. |

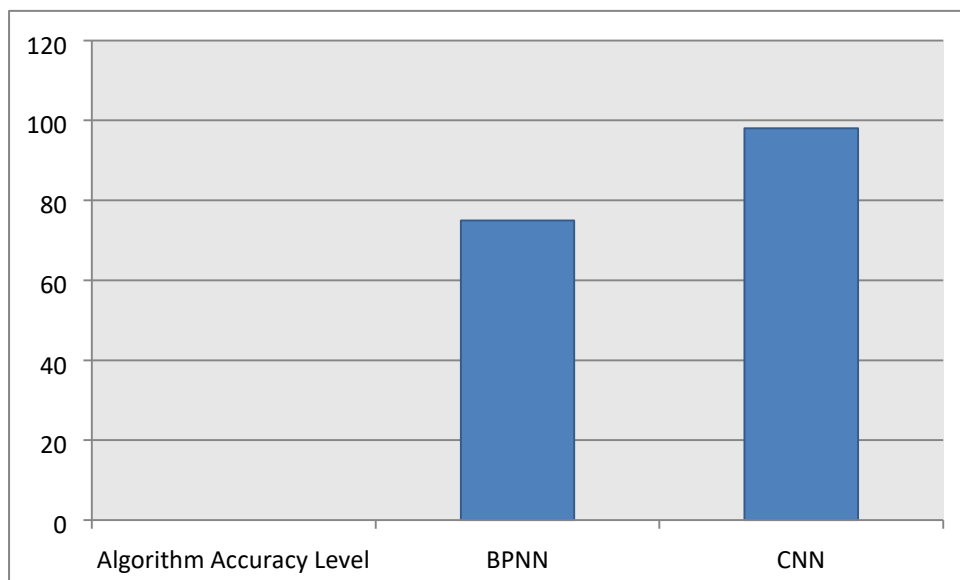
## 8.2 USER ACCEPTANCE TESTING

This sort of testing is carried out by users, clients, or other authorised bodies to identify the requirements and operational procedures of an application or piece of software. The most crucial stage of testing is acceptance testing since it determines whether or not the customer will accept the application or programme. It could entail the application's U.I., performance, usability, and usefulness. It is also referred to as end-user testing, operational acceptance testing, and user acceptance testing (UAT).

## CHAPTER 9

### 9. RESULTS

#### 9.1 PERFORMANCE METRICS



## **CHAPTER 10**

### **10. ADVANTAGES & DISADVANTAGES**

#### **ADVANTAGE**

- Digitalized claim process makes easy to use
- Give the accurate result of the damaged vehicle
- Helps the insurance company to analyse the damaged vehicle and also payment process.

#### **DISADVANTAGE**

- It will take more time to claim the insurance in manual process
- Because of incorrect claims, the company behaves badly and doesn't make payments currently.
- Poor customer support

## **CHAPTER 11**

### **11. CONCLUSION**

In this research proposal, a neural network-based solution for automobile detection will be used to address the issues of automotive damage analysis and position and severity prediction. This project does several tasks in one bundle. The method will unquestionably assist the insurance firms in conducting far more thorough and systematic analyses of the vehicle damage. Simply sending the system a photograph of the vehicle, it will evaluate it and determine whether there is damage of any type, where it is located, and how severe it is.

## **CHAPTER 12**

### **12. FUTURE SCOPE**

In future work, need to use several regularisation methods with a big dataset in our next work. Anticipate the cost of a car damaged component more accurately and reliably if we have higher quality datasets that include the attributes of a car (make, model, and year of production), location data, kind of damaged part, and repair cost. This study makes it possible to work together on picture recognition projects in the future, with a focus on the auto insurance industry. The study was able to accurately validate the presence of damage, its location, and its degree while eliminating human bias. These can be further enhanced by adding the on-the-fly data augmentation approaches.

## **CHAPTER 13**

### **13. APPENDIX**

#### **SOURCE CODE:**

<https://github.com/IBM-EPBL/IBM-Project-11391-1659325419/tree/main/APPLICATION%20BUILDING>

#### **GITHUB LINK:**

<https://github.com/IBM-EPBL/IBM-Project-11391-1659325419>