

# **Intelligent Vehicle Damage Assessment and Cost Estimator for Insurance Companies**

**TEAM ID: PNT2022TMID25776**

## **1. INTRODUCTION:**

### **1.1 Project overview:**

Today's world is seeing a substantial increase in automobiles. Because there are more cars on the road and more people are driving them at high speeds, accidents happen more frequently. When an accident occurs, the parties involved file 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. Claims leakage, or the gap between the amounts the firm has secured and the amounts it should have secured in line with the claims, is the cause of this. The claim process will take longer than usual in accordance with business policy, even though the car's damage is clearly visible. Despite the company's best efforts, the claim's processing is taking longer than expected. Differentiate the suggested strategy to maybe expedite the evaluation of car damage. When given a picture of a damaged vehicle, a system may be able to complete automobile damage detection in a matter of seconds rather than taking hours to do so if it were visually evaluated. The technology is able to ascertain the analysis of utilising computer vision and machine learning to determine the extent of the damage, its location, and its size.

### **1.2 purpose:**

In the modern world, the number of automobiles has significantly increased. Accidents occur more frequently because there are more cars on the road and more individuals are driving them fast. When an accident occurs, the parties involved file a claim with their auto insurance to get the money needed to fix the car because, based on false claims, the insurance provider behaves improperly and withholds payments.

## **2. LITERATURE SURVEY:**

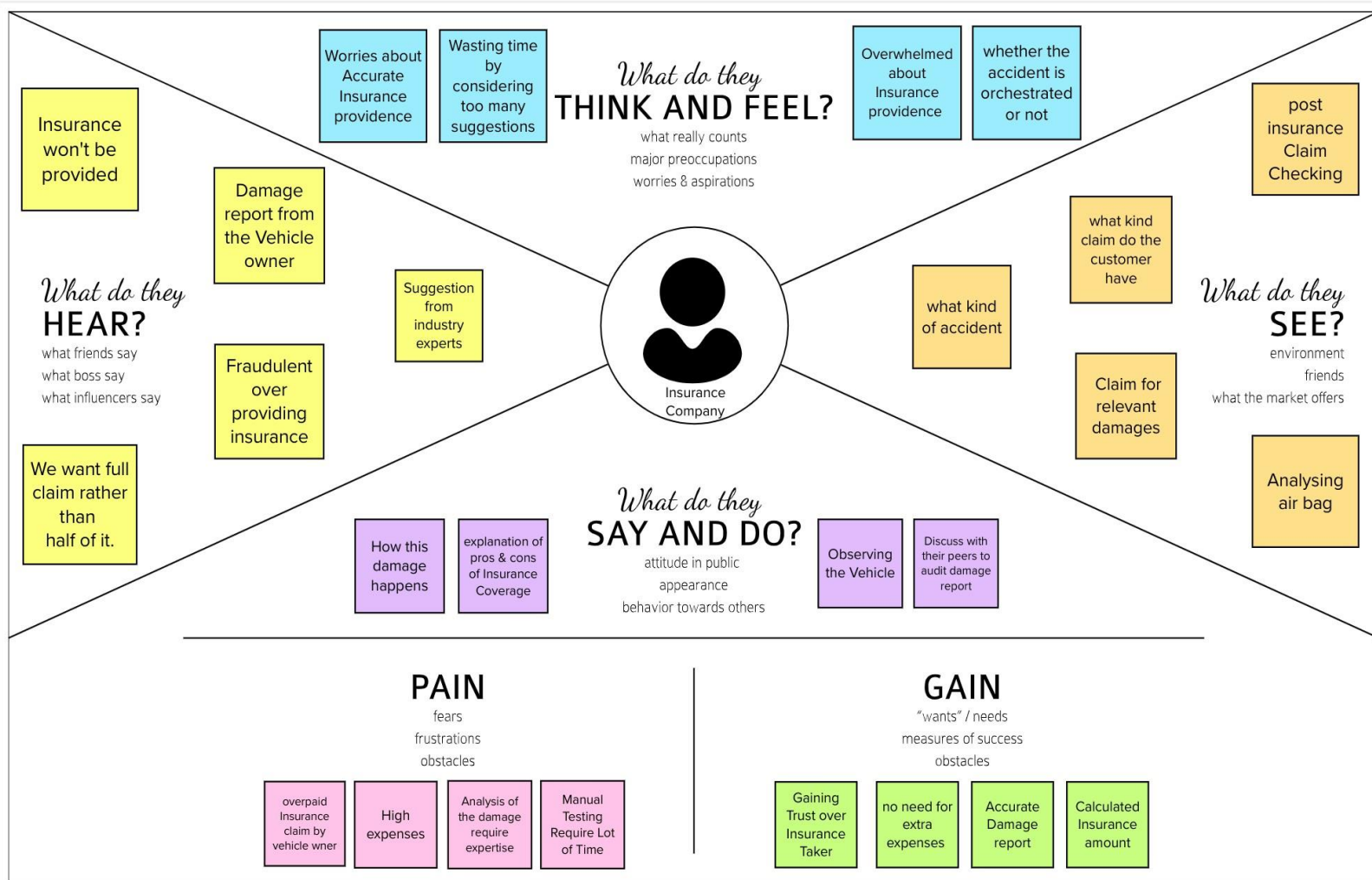
S NO.	TITLE	AUTHORS	ABSTRACT	DRAWBACKS
1.	Research on Intelligent Vehicle Damage Assessment System Based on Computer Vision	Zhu Qianqian ,Guo Weiming ,ShenYing and ZhaoZihao	In this paper, based on the demand of automobile insurance claims for intelligent transportation, combined with abundant basic data and advanced machine vision algorithms, an intelligent damage determination system of 'Artificial Intelligence Vehicle Insurance' is constructed. This paper first introduces the functions of the intelligent damage assessment system. Secondly, it discusses the realization path of each functional module in detail, and finally puts forward the vision for the future.	The drawback is to explore the innovation of insurance technology of 'AI + Vehicle Insurance'.

2.	Damage Assessment of a vehicle and Insurance Reclaim.	Vaibhav Agarwal ,Utsav Khandelwal, Shivam Kumar, Raja Kumar, Shilpa M	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 technique that compares before-and after-accident car images to automatically detect the damaged location.	The major Drawback of the Proposed model is that it only Identifies the Physical visible Damage and not Of the internal or the interior damage.
3.	Assessing Car Damage with Convolutional Neural Networks	Harit Bandi,Suyash Joshi,Siddhant Bhagat,Amol Deshpande	Manual estimation of damages in fields like construction, vehicular accidents has been the mainstay of the insurance business. However, such methods are replete with biases and inaccurate estimations. This paper deals with estimating car damage, primarily with auto insurers as our key potential customers. For this purpose, three distinct Transfer Learning approaches are used which detect the presence of damage, location, and severity of the damage.	The drawback here is Driver behavior monitoring.Machine learning enhanced solutions help in monitoring driver's behavior.

4.	Car Damage Assessment for Insurance Companies	Mandara G and Prashant Ankalkoti	The data contains three classes namely train, test and validation. Trained image is compared with the test image. Car has to be trained for many times by using epochs which means how many times the algorithm can work between the whole training dataset. In this graph they can take only two times of running the algorithm. Finally the comparison is completed lastly print the graph containing accuracy, validation accuracy, loss and validation loss.	Need for human involvement. Although the process could be absolutely automated, it still needs human involvement to detect and avoid fraudulent insurance cases.
5.	Digital Transformation in Car Insurance Industry: Streamline Recognition of Car Damage Assessment	Max Galaktionov	Digital transformation and Machine Learning technologies enable automation which is actively been used in the car insurance industry. It enables quick vehicle damage detection, improves management, cuts employee expenses, and allows to improve the overall quality of service.	The challenge is Processing of big volumes of data. The insurers need to be able to quickly assess and analyze data from various sources and provide exact estimations.

### 3. IDEATION & PROPOSED SOLUTION:

#### 3.1 Empathy Map:



### 3.2 Ideation and Brainstorming:

## Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

- 10 minutes to prepare
- 1 hour to collaborate
- 10 pages recommended

### Before you collaborate

A little bit of preparation goes a long way with the session. Here's what you need to do to get going.

- 10 minutes

- 1. **Join platform**  
Define who should participate in the session and what tools they should have before a group session.
- 2. **Set the goal**  
Try to find the problem you're looking to solving in the brainstorming session.
- 3. **Learn how to use the facilitation tools**  
Go to the facilitation page to learn how to use the platform's tools.

Open session

### Define your problem statement

What problem are you trying to solve? Frame your problem as a clear, specific, and measurable statement. This will be the focus of your brainstorm.

- 10 minutes

How do you want your problem statement?

Key rules of brainstorming

- Focus on the problem, not the solution.
- Be specific and clear.
- Be creative and think outside the box.
- Be open to others.
- Be flexible and adaptable.

### Brainstorm

Write down any ideas that come to mind that address your problem statement.

- 10 minutes

T Adhavan

- Understand the problem
- Data collection process
- Create train and test folders
- Select and test the model

P John sam daniel

- Image preprocessing
- Import model building libraries
- Save the model
- Test the model

MM Balaji

- Study the problem
- Select the model
- Construct SP-CNN database
- Test the application

KR Aravind

- Analyze the problem
- Train and save the model
- Build test pages
- Run the application

### Group ideas

Take turns sharing your ideas while discussing similar or related ideas as you go. Once all sticky notes have been proposed, give each cluster a sentence like "This is a cluster is bigger than an sticky notes, try and see if you can break it up into smaller sub-groups."

- 10 minutes

Best of proposed ideas in Order

- Study the problem
- Image preprocessing
- Select and test the model
- Test the application

### Prioritize

Your team should all be on the same page about which is important, meaningful, and feasible. Then you discuss on the grid to determine which ideas are important and which are feasible.

- 20 minutes

Importance

Feasibility

Study the problem

Image preprocessing

Select and test the model

Test the application

### After you collaborate

You can export the board as an image or pdf to share with members of your company who might find it helpful.

- 10 minutes

Quick add-ons

- 1. **Share the board**  
Share the board with your team or stakeholders to keep them in the loop about the outcomes of the session.
- 2. **Export the board**  
Export the board as an image or pdf to share with members of your company who might find it helpful.

Keep moving forward

- 1. **Bring the board**  
Bring the board to your team or stakeholders to keep them in the loop about the outcomes of the session.
- 2. **Export the board**  
Export the board as an image or pdf to share with members of your company who might find it helpful.

Export the board as an image or pdf to share with members of your company who might find it helpful.

Need some inspiration?

See other boards in the gallery

Get inspired

### 3.3 Proposed Solution:

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Intelligent vehicle damage assessment and cost estimator for insurance companies.
2.	Idea / Solution description	To perceive and determine the precise degree of automotive damage, we are building an AI model.
3.	Novelty / Uniqueness	Calculator for filing an insurance claim that is automated.
4.	Social Impact / Customer Satisfaction	Estimating the degree of car damage and providing insurance in accordance.
5.	Business Model (Revenue Model)	The primary sources of income for insurers are underwriting and investment income. The majority of an insurance company's assets are financial investments, such as listed shares, government bonds, commercial real estate, and corporate bonds. They are able to save more money and reinvest it in their own businesses by estimating the extent of car damage using our AI model and giving insurance in accordance.
6.	Scalability of the Solution	Our artificial intelligence (AI) can function at the scale, speed, and complexity necessary to achieve the goal. As our model is tested and trained using additional real-time data, its accuracy will rise.

### 3.4 PROBLEM SOLUTION FIT

Project Title: Intelligent Vehicle Damage  
Assessment and Cost Estimator  
for Insurance Companies

Project Design Phase-I - Solution Fit Template

Team ID: PNT2022TMID27220

Define CS, fit into CC	<b>1. CUSTOMER SEGMENT(S)</b> <b>CS</b> Who is your customer? i.e. working parents of 0-5 y.o. kids  I. A commercial worker moving from one location to another. II. People belonging over the age of 18 III. Person whose vehicle was involved in an accident or sustained damage IV. An insured consumer who can make a claim	<b>6. CUSTOMER CONSTRAINTS</b> <b>CC</b> What constraints prevent your customers from taking action or limit their choices of solutions? i.e. spending power, budget, no cash, network connection, available devices.  I. Unreliable network connections could make some functions inaccessible. II. Improper images or blurred images might affect the accurate performance of the application.	<b>5. AVAILABLE SOLUTIONS</b> <b>AS</b> Which solutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? i.e. pen and paper is an alternative to digital notetaking  I. requesting an estimate of costs from a third party II. Manual computations are used for cost estimation. III. Using computationally expensive algorithms to find the harm.	Explore AS, differentiate
	<b>2. JOBS-TO-BE-DONE / PROBLEMS</b> <b>J&amp;P</b> Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one; explore different sides.  I. The primary issue will be the amount of time required to calculate the cost and percentage of damage. II. Addressing issues like this is very important identify and unify exact damage ratios cost of this damage III. The corporations did not perfectly compensate for the damage.	<b>9. PROBLEM ROOT CAUSE</b> <b>RC</b> What is the real reason that this problem exists? What is the back story behind the need to do this job? i.e. customers have to do it because of the change in regulations.  I. Deviation or difference between the cost calculated by the company and the actual cost II. Many advanced methods of estimating have emerged as a result of the AI field's quick development. III. Customers must do it as a result of the new regulations.	<b>7. BEHAVIOUR</b> <b>BE</b> What does your customer do to address the problem and get the job done? i.e. directly related: find the right solar panel installer, calculate usage and benefits, indirectly associated: customers spend free time on volunteering work (i.e. Greenpeace)  I. After an accident, the customer must upload pictures of the vehicle. II. The software will evaluate the damages immediately and present the claim amount to the users.	
Identify strong TR & EM	<b>3. TRIGGERS</b> <b>TR</b> What triggers customers to act? i.e. seeing their neighbour installing solar panels, reading about a more efficient solution in the news.  I. Advancing technology in the field of forecasting and estimation. II. coworkers and society calling for a quick insurance claim III. Customer seeking independence and avoiding false traps	<b>10. YOUR SOLUTION</b> <b>SL</b> If you are working on an existing business, write down your current solution first, fill in the canvas, and check how much it fits reality. If you are working on a new business proposition, then keep it blank until you fill in the canvas and come up with a solution that fits within customer limitations, solves a problem and matches customer behaviour.  I. Determine the damage percentage with precision. II. As it relates to the car, forecast the area of damage. III. For functionality, employ quick processing algorithms.	<b>8. CHANNELS of BEHAVIOUR</b> <b>CH</b> <b>8.1 ONLINE</b> What kind of actions do customers take online? Extract online channels from #7  <b>8.2 OFFLINE</b> What kind of actions do customers take offline? Extract offline channels from #7 and use them for customer development.  <b>8.1 ONLINE</b> I. You can browse a webpage to estimate damage using an input image. II. Rapid access to the damage assessment method based on artificial intelligence.	Identify strong TR & EM



## 4. REQUIREMENTS ANALYSIS:

### 4.1 Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail Registration through LinkedIn
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	User Interface	Login System,Dashboard,Uploading Image,Review and Analyze the results.
FR-4	Collection of datasets	Information about the user and their vehicle. Information about Insurance plans.
FR-5	Results	The model must be structured with high accuracy. The results obtained from the model will be displayed for the user to understand easily.

### 4.2 Non-functional Requirements:

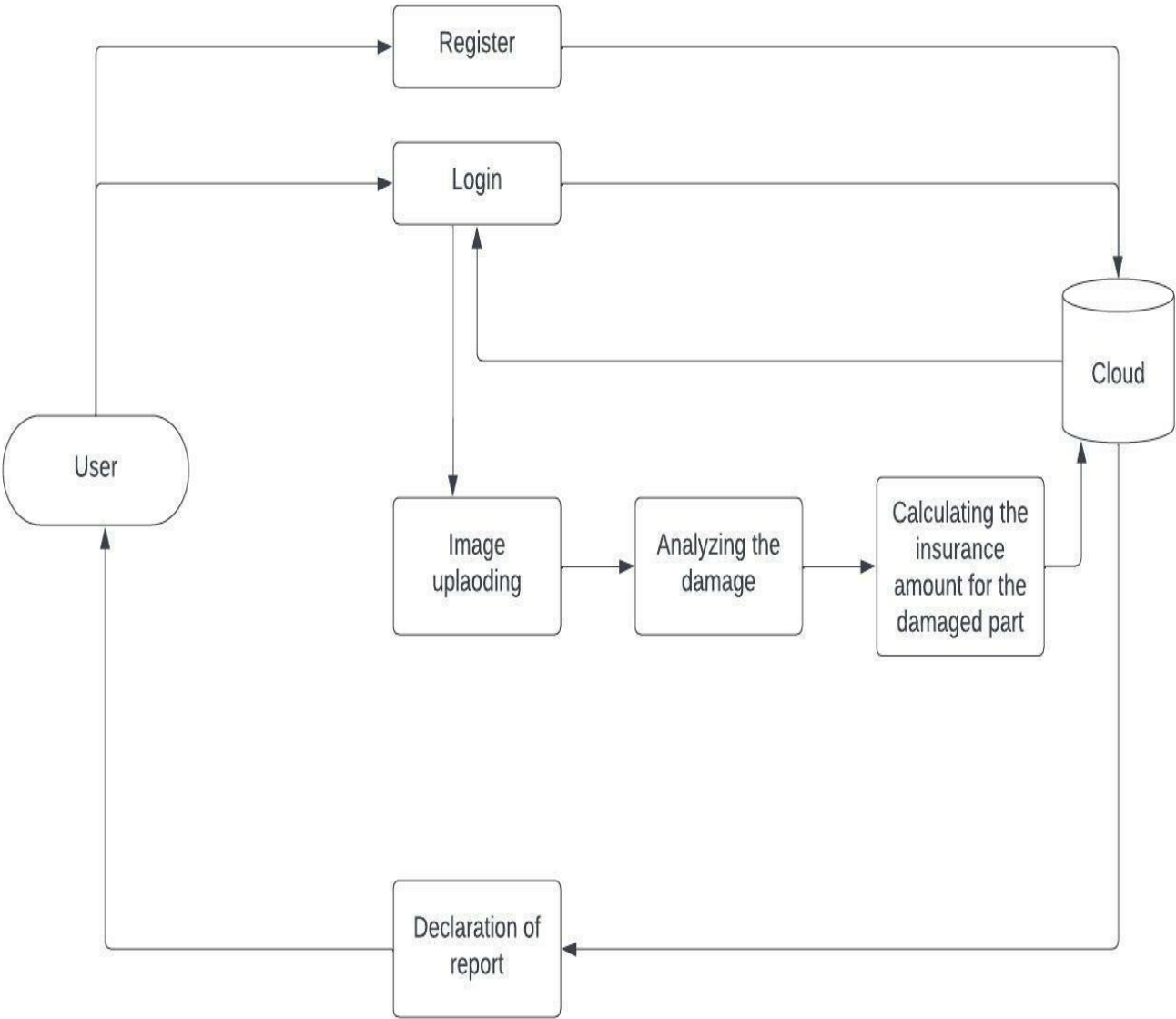
Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	<b>Usability</b>	Intelligent model for damage assessment in vehicle and cost estimate provided by insurance company.
NFR-2	<b>Security</b>	The authenticity of the user and the confidentiality of the user's details relating to his vehicle must be preserved.
NFR-3	<b>Reliability</b>	This project needs to achieve good accuracy in damage assessment as well as cost estimation so that users receive an accurate and unbiased amount of insurance.

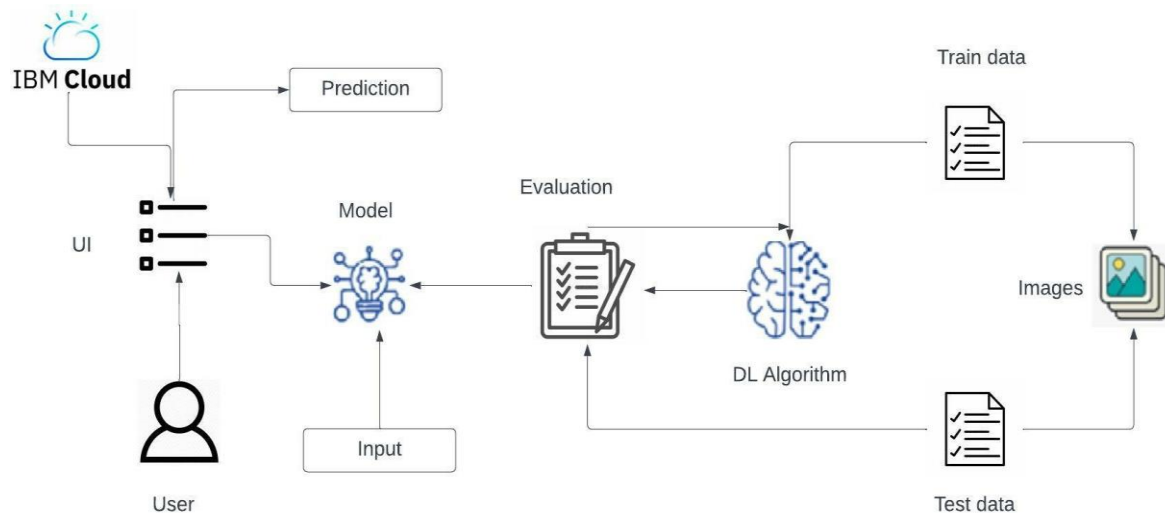
NFR-5	Availability	The webpage must be compatible with web browsers on mobile phones and computers.

5. PROJECT DESIGN:

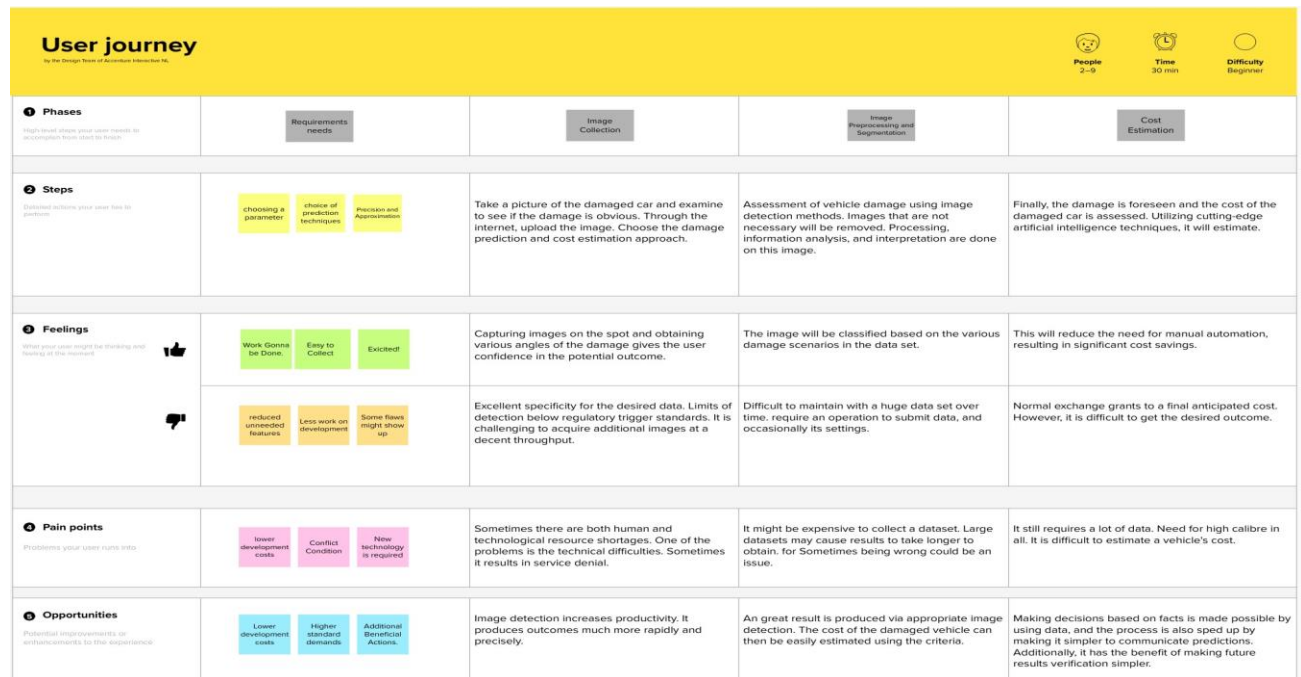
5.1 Data flow diagram:



## 5.2 SOLUTION & TECHNICAL ARCHITECTURE



## 5.3 USER STORIES



## 6. PROJECT PLANNING & SCHEDULING:

### 6.1 SPRINT PLANNING & ESTIMATION:

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	6	6 Days	24	Oct 2022	29	Oct 2022	5	29 Oct 2022
Sprint-2	6	6 Days	31	Oct 2022	05	Nov 2022	5	05 Nov 2022
Sprint-3	6	6 Days	07	Nov 2022	12	Nov 2022	5	12 Nov 2022
Sprint-4	6	6 Days	14	Nov 2022	19	Nov 2022	5	19 Nov 2022

### 6.2 SPRINT DELIVERY SCHEDULE:

Sprint	Duration	Sprint Start Date	Sprint End Date (Planned)	Sprint Release Date (Actual)
Sprint-1	6 Days	24 Oct 2022	29 Oct 2022	29 Oct 2022
Sprint-2	6 Days	31 Oct 2022	05 Nov 2022	05 Nov 2022
Sprint-3	6 Days	07 Nov 2022	12 Nov 2022	12 Nov 2022
Sprint-4	6 Days	14 Nov 2022	19 Nov 2022	19 Nov 2022

### 6.3 REPORTS FROM JIRA:

#### Velocity:

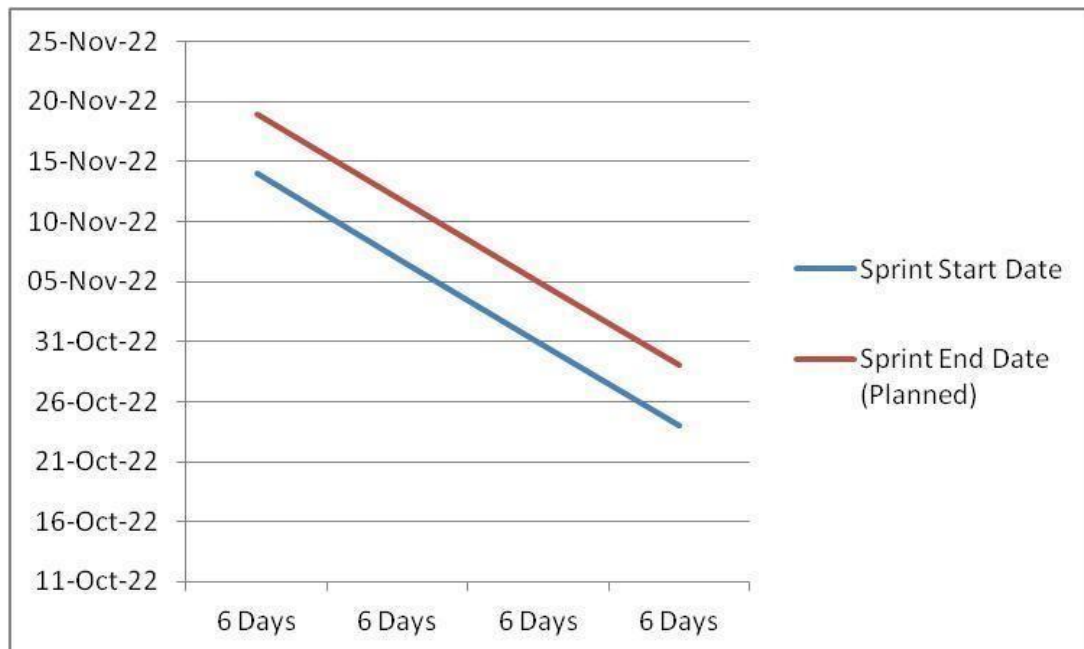
We have a 10-day sprint duration. The velocity of the team is 20 (points per sprint).  
Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

$$AV = \text{Sprint duration} / \text{Velocity}$$

$$= 6/6$$

$$= 1$$

#### Burn down Chart:



## 7. CODING & SOLUTIONING:

New user:

```
<!DOCTYPE html>
<html lang="en" >
<head>
  <meta charset="UTF-8">
  <title>Register</title>
  <!-- <link rel="stylesheet"
href="https://cdnjs.cloudflare.com/ajax/libs/normalize/5.0.0/normalize.min
.css">
<link rel="stylesheet" href="E:\IBM\static\styles\Register.css"> -->
</head>
<body>
  <div class="topnav">
    <a id="logo" href=""> Vehicle Damage Detection</a>
    <a href="{{ url_for('register') }}">Register</a>
    <a href="{{ url_for('login') }}">Login</a>
    <a href="{{ url_for('index') }}">Home</a>
  </div>
<div id="login-form-wrap">
  <h2>Register</h2>
  <form id="login-form" method="POST" action="/afterreg">
    <p>
      <input type="text" id="text" name="name" placeholder="Username"
required><i class="validation"><span></span><span></span></i>
    </p>
    <p>
      <input type="email" id="email" name="email" placeholder="Email
Address" required><i class="validation"><span></span><span></span></i>
    </p>
    <p>
      <input type="password" id="password" name="psw"
placeholder="Password" required=""><i
class="validation"><span></span><span></span></i>
    </p>
    <p>
      <input type="submit" id="login" value="Register">
    </p>
  </form>
```

```

<div id="create-account-wrap">
  <!-- <p>Not a member? <a href="#">Create Account</a><p> -->
</div>
</div>
</body>
</html>

```



New User

Name

Email id

Password



UserLogin

EmailId

Password

Insurance Prediction:

```

<!DOCTYPE html>
<html>
<head>

```

```

</head>
<body>

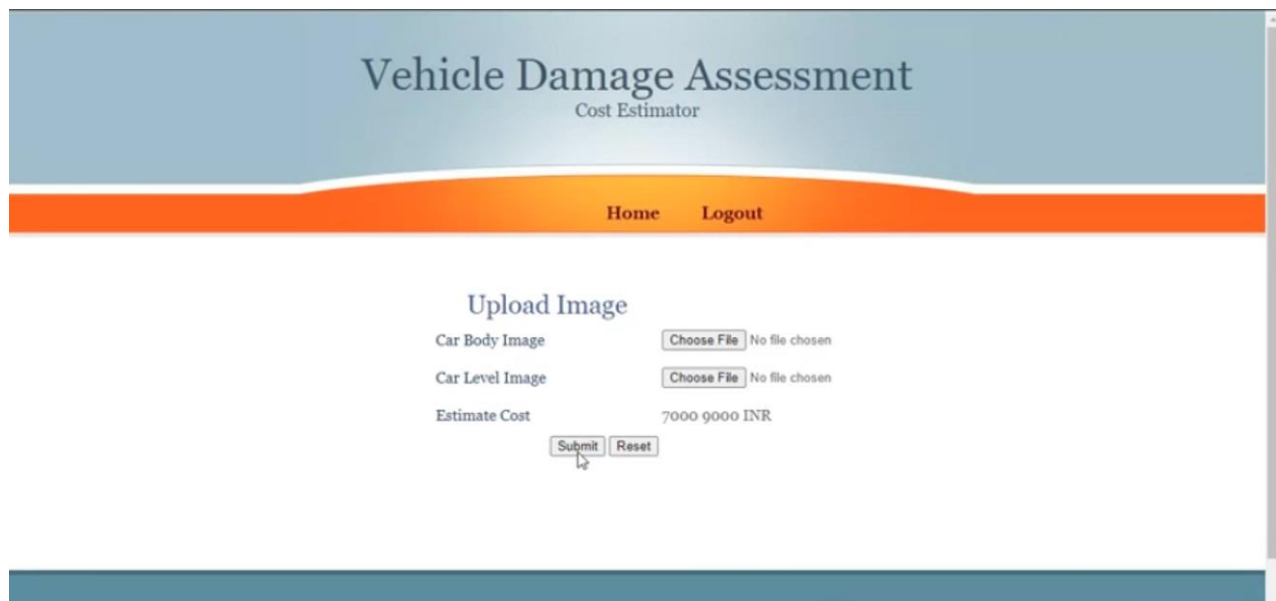
<form id="" method="POST" action="/result" enctype="multipart/form-data">
<div class="topnav">
    <a id="logo" href="#"> Vehicle Damage Detection</a>

    <a href="{{ url_for('logout') }}">Logout</a>
    <a href="{{ url_for('index') }}">Home</a>
</div>
<div style="padding-top: 20px;">
    <input type="file" name="image" id=""/>
    <input type="submit"/>
</div>
<div>
    {% if value %}
        <h3 style="text-align: center ;">The Estimated cost For The Damage
Is: {{value}} </h3>
    {% endif %}
</div>
</form>
<div class="footer">
    <p>Copyright@2021.All Rights Reserved</p>
</div>
</body>
</html>

```







Python code:

```
#prediction
@app.route('/result',methods=["GET","POST"])
def result():
    if request.method=="POST":
        f=request.files['image']
        basepath=os.path.dirname(__file__) #getting the current path Le
where app.py #print("current path", basepath)
        filepath=os.path.join(basepath,'uploads',f.filename) #print("upload
folder is", filepath)
        f.save(filepath)
        img=image.load_img(filepath, target_size=(224,224))
        x=image.img_to_array(img)#ing to array x=np.expand dims(x,axis=e)
used for adding
        x=np.expand_dims(x,axis=0)
        img_data=preprocess_input(x)
        prediction1=np.argmax(model1.predict(img_data))
        prediction2=np.argmax(model2.predict(img_data))

        index1=['front','rear','side']
        index2=['minor','moderate','severe']

        result1=index1[prediction1]
        result2=index2[prediction2]

        if(result1=='front' and result2=='minor'):
            value="3000 - 5000 INR"
```

```

elif(result1=='side' and result2=='moderate'):
    value="9000 - 11000 INR"
elif(result1=='side' and result2=='severe'):
    value="12000 - 15000 INR"
else:
    value="16000 - 50000 INR"

return render_template('prediction.html',value=value)

```

## 8. TESTING:

### 8.1 Test Cases:

	Test Scenarios
1	Verify user is able to see login page
2	Verify if the user is able to login to the application or not?
3	Verify users are able to navigate to the register page?
4	Verify user is able to upload images
5	Verify results

### 8.2 User Acceptance Testing Report:

#### 1. Purpose of Document:

The purpose of this document is to briefly explain the test coverage and open issues of the Intelligent Vehicle Damage Assessment & Cost Estimator for Insurance Companies project at the time of the release to User Acceptance Testing (UAT).

#### 2. Defect Analysis:

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	10	4	2	3	20

Duplicate	1	0	3	0	4
External	2	3	0	1	6
Fixed	11	2	4	18	35
Not Reproduced	0	0	1	0	1
Skipped	0	0	1	1	2
Won't Fix	0	1	0	0	1
Totals	24	14	13	26	77

### 3. Test Case Analysis:

This report shows the number of test cases that have passed, failed, and untested

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	8	0	0	8
Client Application	50	0	0	50
Security	4	0	0	4
Outsource Shipping	3	0	0	3
Exception Reporting	8	0	0	8
Final Report Output	5	0	0	5
Version Control	2	0	0	2

## 8.3 Test Cases Report:

 Testcases Report.xlsx

## 9. RESULTS:

### 9.1 Performance Metrics:

#### Performance Testing - Artificial Intelligence

## 10. ADVANTAGES & DISADVANTAGES:

### ADVANTAGES:

- Easy to utilize claim process thanks to digitization
- Provide a thorough analysis of the damaged vehicle.
- Helps in the analysis of the damaged car and the payment process by the insurance company.

### DISADVANTAGES:

- The manual method for submitting an insurance claim will take longer.
- The corporation acts improperly and currently doesn't make payments as a result of false accusations.
- Poor customer service.

## **11.CONCLUSION:**

The concerns of car damage analysis and position and severity prediction will be dealt with in this research proposal using a neural network-based automobile detecting method. This project does a number of tasks in one go. The technique will undoubtedly help the insurance companies carry out much more complete and organized examinations of the vehicle damage. Simply providing a snapshot of the vehicle will allow the system to examine it, identify whether any damage is present, where it is located, and how bad it is.

## **12.FUTURE SCOPE:**

We will need to use a large dataset and a variety of regularization techniques in our next work. If we have higher quality datasets that include the characteristics of a car (make, model, and year of production), location data, kind of damaged part, and repair cost, we can predict the cost of a broken automotive component more correctly and reliably. Together with a focus on the vehicle insurance sector, this study paves the way for future photo recognition efforts. By removing human bias, the study was able to accurately validate the existence of damage, its location, and its severity. By including the on-the-fly data augmentation methodologies, they can be further improved.

## 13.APPENDIX:

### SOURCE CODE:

#### app.py

```
import numpy as np
import os
from flask import Flask, app, request, render_template
from tensorflow.keras import models
from tensorflow.keras.models import load_model
from tensorflow.keras.preprocessing import image
from tensorflow.python.ops.gen_array_ops import concat
from tensorflow.keras.applications.inception_v3 import preprocess_input
import requests
from flask import Flask, request, render_template, redirect, url_for

# #Loading the model
from cloudant.client import Cloudant

# Authenticate using an IAM API key
client = Cloudant.iam('username','api key',connect=True)

# Create a database using an initialized client
my_database = client.create_database ('my_database')

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

app=Flask(__name__)

#default home page or route
@app.route('/')
def index():
    return render_template('index.html')

#register page
@app.route('/register')
def register():
```



```

        return render_template('register.html')

@app.route('/afterreg',methods=['POST'])
def afterreg():
    x=[x for x in request.form.values()]
    print(x)
    data={
        '_id':x[1],
        'name':x[0],
        'psw':x[2]
    }
    print(data)
    query={'_id':{'$eq':data['_id']}}
    docs=my_database.get_query_result(query)
    print(docs)

    print(len(docs.all()))

    if(len(docs.all())==0):
        url=my_database.create_document(data)
        return render_template('login.html',pred="Registration successful,
Please login your details")
    else:
        return render_template('register.html',pred="You re already member,
Please login using r details")

#login page
@app.route('/login')
def login():
    return render_template('login.html')

@app.route('/afterlogin',methods=['POST'])
def afterlogin():
    user=request.form['_id']
    password=request.form['psw']
    print(user,password)
    query={'_id':{'$eq':user}}

    docs=my_database.get_query_result(query)
    print(docs)

```

```

print(len(docs.all()))

# if(len(docs.all())==0):
#     return render_template('login.html',pred="The username not found")
# else:
if(user==docs[0][0]['_id'] and password==docs[0][0]['psw']):
    return redirect(url_for('prediction'))
else:
    return render_template('error.html')

#prediction page
@app.route('/prediction')
def prediction():
    return render_template('prediction.html')

#logout page
@app.route('/logout')
def logout():
    return render_template('logout.html')

#prediction
@app.route('/result',methods=["GET","POST"])
def result():
    if request.method=="POST":
        f=request.files['image']
        basepath=os.path.dirname(__file__) #getting the current path Le where
app.py #print("current path", basepath)
        filepath=os.path.join(basepath,'uploads',f.filename) #print("upload
folder is", filepath)
        f.save(filepath)
        img=image.load_img(filepath, target_size=(224,224))
        x=image.img_to_array(img)#ing to array x-np.expand dims(x,axis-e) used
for adding
        x=np.expand_dims(x,axis=0)
        img_data=preprocess_input(x)
        prediction1=np.argmax(model1.predict(img_data))
        prediction2=np.argmax(model2.predict(img_data))

        index1=['front','rear', 'side']
        index2=['minor', 'moderate', 'severe']

        result1=index1[prediction1]
        result2=index2[prediction2]

```

```

        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="9000 - 11000 INR"
        elif(result1=='side' and result2=='severe'):
            value="12000 - 15000 INR"
        else:
            value="16000 - 50000 INR"

    return render_template('prediction.html',value=value)

#run app
if __name__ == "__main__":
    app.run(debug=True,port=8080)

```

## register.html

```

<!DOCTYPE html>
<html lang="en" >
<head>
    <meta charset="UTF-8">
    <title>Register</title>
    <!-- <link rel="stylesheet"
href="https://cdnjs.cloudflare.com/ajax/libs/normalize/5.0.0/normalize.min.css
">
<link rel="stylesheet" href="E:\IBM\static\styles\Register.css"> -->

```

```

</head>
<body>
  <div class="topnav">
    <a id="logo" href=""> Vehicle Damage Detection</a>
    <a href="{{ url_for('register') }}">Register</a>
    <a href="{{ url_for('login') }}">Login</a>
    <a href="{{ url_for('index') }}">Home</a>
  </div>
<div id="login-form-wrap">
  <h2>Register</h2>
  <form id="login-form" method="POST" action="/afterreg">
    <p>
      <input type="text" id="text" name="name" placeholder="Username"
required<i class="validation"><span></span><span></span></i>
    </p>
    <p>
      <input type="email" id="email" name="email" placeholder="Email Address"
required<i class="validation"><span></span><span></span></i>
    </p>
    <p>
      <input type="password" id="password" name="psw" placeholder="Password"
required=""><i class="validation"><span></span><span></span></i>
    </p>
    <p>
      <input type="submit" id="login" value="Register">
    </p>
  </form>
  <div id="create-account-wrap">
    <!-- <p>Not a member? <a href="#">Create Account</a><p> -->
  </div>
</div>
</body>
</html>

```

login.html:

```

<!DOCTYPE html>
<html lang="en" >
<head>
  <meta charset="UTF-8">
  <title>Login</title>

```

```

<!-- <link rel="stylesheet"
href="https://cdnjs.cloudflare.com/ajax/libs/normalize/5.0.0/normalize.min.css
">
<link rel="stylesheet" href="E:\html\login.css"> -->
</head>
<body>
  <div class="topnav">
    <a id="logo" href="#">Vehicle Damage Detection</a>
    <a href="{{ url_for('register') }}">Register</a>
    <a href="{{ url_for('login') }}">Login</a>
    <a href="{{ url_for('index') }}">Home</a>
  </div>
  <div id="login-form-wrap">
    <h2>Login</h2>
    <form id="login-form" method="POST" action="/afterlogin">
      <p>
        <input type="email" id="email" name="_id" placeholder="Email
Address" required><i class="validation"><span></span><span></span></i>
      </p>
      <p>
        <input type="password" id="password" name="psw"
placeholder="Password" required><i
class="validation"><span></span><span></span></i>
      </p>
      <p>
        <input type="submit" id="login" value="Login">
      </p>
    </form>
    <div id="create-account-wrap">
  </div>
</body>
</html>

```

prediction.html:

```

<!DOCTYPE html>
<html>
<head>
<meta name="viewport" content="width=device-width, initial-scale=1">
<style>
body {
  margin: 0;

```

```

font-family: Arial, Helvetica, sans-serif;
}

.topnav {
  overflow: hidden;
  background-color: #333;
}

.topnav a {
  float: right;
  color: #f2f2f2;
  text-align: center;
  padding: 14px 16px;
  text-decoration: none;
  font-size: 17px;
}

#logo{
  float: left;
  font-size: 20px;
  text-decoration: none;
}

.footer {
  position: fixed;
  left: 0;
  bottom: 0;
  width: 100%;
  font-weight: bold;
  background-color: black;
  color: white;
  text-align: center;
}
</style>
</head>
<body>

<form id="" method="POST" action="/result" enctype="multipart/form-data">
<div class="topnav">
  <a id="logo" href="#">Vehicle Damage Detection</a>
  <a href="{ { url_for('logout') } }">Logout</a>
  <a href="{ { url_for('index') } }">Home</a>

```

```

    </div>
<div style="padding-top: 20px;">
  <input type="file" name="image" id="" />
  <input type="submit" />
</div>
<div>
  {% if value %}
    <h3 style="text-align: center ;">The Estimated cost For The Damage Is:
{{value}} </h3>
  {% endif %}
</div>
</form>
  <div class="footer">
    <p>Copyright@2021.All Rights Reserved</p>
  </div>
</body>
</html>

```

## index.html

```

<!DOCTYPE html>
<html>
<head>
<meta name="viewport" content="width=device-width, initial-scale=1">
<style>
body {
  margin: 0;
  font-family: Arial, Helvetica, sans-serif;
}

.topnav {
  overflow: hidden;
  background-color: #333;
}

.topnav a {
  float: right;
  color: #f2f2f2;
  text-align: center;
  padding: 14px 16px;
  text-decoration: none;
  font-size: 17px;

```

```

}

#logo{
  float: left;
  font-size: 20px;
  text-decoration: none;
}

.content{
  text-align: center;
}

.content-button{
  margin-left: 50%;
  background-color: #333;
  padding: 5px 10px;
  color: white;
}

.para{
  padding-top: 25px;
  text-align: center;
  font-size: 22px;
}

</style>
</head>
<body>

<div class="topnav">
  <a id="logo" href="#">Vehicle Damage Detection</a>
  <a href="{ { url_for('register') } }">Register</a>
  <a href="{ { url_for('login') } }">Login</a>
  <a href="{ { url_for('index') } }">Home</a>
</div>

<div>
  <h2 class="content">About Project</h2>
  <div class="para">
    <p class="contentPara">Vehicle detection is used to reduce claims leakage
during insurance processing.</p>

```



```

    <p class="contentPara">Visual inception and validation are usually done.As
it takes a long time, because a person needs to come and inspect the
damage.</p>
    <p class="contentPara">Here we are trying to automate the procedure. Using
this automation, we can avoid time conception for the insurance claim
process</p>
</div>
</div>

</body>
</html>

```

## logout.html

```

<!DOCTYPE html>
<html>
<head>
<meta name="viewport" content="width=device-width, initial-scale=1">
<style>
body {
    margin: 0;
    font-family: Arial, Helvetica, sans-serif;
}

.topnav {
    overflow: hidden;
    background-color: #333;
}

.topnav a {
    float: right;
    color: #f2f2f2;
    text-align: center;
    padding: 14px 16px;
    text-decoration: none;
    font-size: 17px;
}

#logo{
    float: left;
    font-size: 20px;
    text-decoration: none;

```

```

}

.content{
  text-align: center;
  padding-left: 37px;
}

.content-button{
  margin-left: 50%;
  background-color: #333;
  padding: 5px 10px;
  color: white;
  text-decoration: none;
}
</style>
</head>
<body>

<div class="topnav">
  <a id="logo" href="#">Vehicle Damage Detection</a>
  <a href="{{ url_for('register') }}">Register</a>
  <a href="{{ url_for('login') }}">Login</a>
  <a href="{{ url_for('index') }}">Home</a>
</div>

<div>
  <h2 class="content">Successfully Logged out</h2>
  <p class="content">Login for more information</p>
  <a class="content-button" href="{{ url_for('login') }}">Login</a>
</div>

</body>
</html>

```

**GitHub Link:**

<https://github.com/IBM-EPBL/IBM-Project-4986-1658744690>

**Project Demo Link:**

[https://youtu.be/3rPUsc\\_-i7w](https://youtu.be/3rPUsc_-i7w)