



Final Year Project Proposal

Damaged Vehicle analyzer system

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Mansoor Ebrahim

<Coordinator>

Work collaboration:

Peerzada Ibrahim Asif (leader): 100%

Uneeb Anees: 100%

Ali Asif: 100%

List of Abbreviations and Acronyms

IBM: International Business Machines

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Final Year Project Proposal

Section – 1

1.1 Project Identification

Project Title: Damaged Vehicle analyzer system			
Group Leader (GL):			
1.	Name:	Peerzada Ibrahim Asif	
	Reg #:	40778	
	CGPA:	3.15	
	Mobile # :	03122323917	Email: Peerzadaibrahim8256@gmail.com
	Signature:	Ibrahim	
Group Members (GM's):			
2.	Name:	Ali Asif	
	Reg #:	40597	
	CGPA:	3.1	
	Mobile # :	03182545263	Email: Aliasif332498@gmail.com
	Signature:	Ali	
3.	Name:	Uneeb Anees	
	Reg #:	40745	
	CGPA:	2.80	
	Mobile # :	03073129889	Email: Shaikhuneeb90@gmail.com
	Signature:	Uneeb	

What technology is core to your product? *(Please mark ☒ where applicable)*

- | | |
|---|--|
| <input type="checkbox"/> 3D/4D Printing | <input type="checkbox"/> Augmented Reality / Virtual Reality |
| <input checked="" type="checkbox"/> Big Data, Artificial Intelligence | <input type="checkbox"/> Blockchain |
| <input type="checkbox"/> Cloud | <input type="checkbox"/> Neurotech |
| <input type="checkbox"/> Robotics | <input type="checkbox"/> Shared economy |
| <input type="checkbox"/> The Internet of Things | <input type="checkbox"/> Wearables, Implantables |
| <input type="checkbox"/> Others (specify): _____ | |

What is the target market(s) for the products? *(Please mark ☒ where applicable)*

- | | |
|--|---|
| <input checked="" type="checkbox"/> Automotive, aviation, marine | <input type="checkbox"/> Business, marketing, finance |
| <input type="checkbox"/> Defence, security, safety | <input type="checkbox"/> Education and training |
| <input type="checkbox"/> Environment, water management | <input type="checkbox"/> Entertainment, tourism, sport/recreation |
| <input type="checkbox"/> Food, livestock, agribusiness | <input type="checkbox"/> Healthcare |
| <input type="checkbox"/> Infrastructure, housing & transport | <input type="checkbox"/> Mining equipment technology & services |
| <input type="checkbox"/> Oil, gas, energy | <input type="checkbox"/> Textiles, clothing, footwear |
| <input type="checkbox"/> Others (specify): _____ | |

Other Organizations Involved in the Project: *(Please identify all affiliated organizations collaborating in the project, and describe their role/contribution to the project.)*

Academic Organizations:

#	Organization Name	Role / Contribution
1.	IQRA UNIVERSITY	Supervising the project
2.		

Industrial Organizations:

#	Organization Name	Role / Contribution
1.	None	none
2.		

Funding Organizations:

#	Organization Name	Role / Contribution
1.	Self	All the members
2.		

Key Words: *(Please provide a maximum of 5 key words that describe the project)*

Damaged vehicle analyzer for automotive websites.

Research and Development Theme: *(please identify the Research Theme.)*

We have researched from IBM Watson Vehicle analyzer.

Project Status: (Please mark ☒)

- ☐ tick] New ☐ Modification to previous Project
☐ Extension of existing project

Project Duration: 12 Months

Proposed Budget: PKR

The Problem:

(Please describe the problem / opportunity / gap / need that you want to address/solve. Maximum 300 words.)

The problem we can face when we upload the image the visual analyzer can face is lighting, angle, focus, color, shape, distance from subject, Presence of other objects in the image. It's not always feasible to build a training dataset with this level of variation. This issue can be addressed by automatically generating manipulated images. For example, images can be duplicated and automatically rotated, shifted, rescaled, zoomed, and horizontally flipped. Doing this can drastically increase your training dataset size with little effort. Without doing this random assignment, the classifier might learn on too narrow a dataset and result in poor performance when tested against visually dissimilar images. One of the problems also include that creating a big dataset for the vehicle is also very important to make this analyzer to work.

Following are some of the Current State of the Art (well-known -identify the best known if possible) existing solutions to this problem. Their known strengths and weaknesses are also provided.

(Maximum 200 words.)

As we all know about the IBM Watson it uses Watson analyzer to identify the damaged parts of the Vehicle such as side mirror and scratches on the bumpers etc. They identify the objects with the comparisons of the datasets. But it does not identify the amount of the vehicle when not been damaged and it does not identify the vehicle after been damaged. It has one of the best visual analyzers in the market.

Our solution will address the following weaknesses of above mentioned solutions.

(Maximum 200 words.)

According to the weakness of Watson analyzer as it does not show the cost of the damaged vehicle parts and the market value of the vehicle, we will identify the cost as well as visualize the whole vehicle for damaged areas.

We will use the following techniques to achieve improvements mentioned above.

(Maximum 200 words.)

We will use different techniques to improve the system such as creating the report and generating a unique code for the user identification for the organization usage. In the report we will represent the cost and the damaged parts of the vehicle with percentage of damage respectively. We will show the original value of the vehicle and after damage value of the vehicle. As it will also identify the exterior parts with scratches and dust.

Synopsis:

*(A brief description of the idea, in non-technical language, explaining product benefit, target market, basic technology, commercial partners, investors, and potential customers. **Maximum 200 words.**)*

According to the market our project will work drastically because the user has to visit the organizations for the original cost of the vehicle and the damaged parts cost as well. Such that we will develop an app that will analyze the exterior of the vehicle and identify the damage parts of the vehicle. It will show the cost and percentages of the damaged parts of the vehicle such that user will have no problem to understand and no need to visit the organization for testing the vehicle.

Section – 2

2.1 Background

Scope of the Project:

The main purpose of this project is to make customers life much easier as we are developing an app which detects the damaged parts of the vehicles and displays it in probability. It also shows the cost of the car after being damaged by using Watson visual analyzer. We think that when this app is developed the customer would not need to travel to the market and analyze his vehicle our damaged vehicle analyzer will accomplish this task. It will show the cost of the vehicle parts and overall cost of the vehicle.

Literature Review: *(Detailed summary of what all has been done internationally in the proposed area quoting references and bibliography. Maximum 1500 words.)*

As we took a reference from Watson application of damaged vehicles we are creating a similar application that will identify the damaged body parts of the vehicle. The application will analyze the vehicle by Watson visual analyzer that is used by Watson applications as well we will use the same analyzer. But we are using different techniques to analyze the vehicle such as defining the probability of the damaged parts of the vehicle, scratches respectively. We will also represent the model of the car so that we could show the original cost of the vehicle and after being damaged. Cost of the damaged parts will also be displayed. The Watson Application of damage cars just displays flat tire, broken windshield, how the accident happened, Vandalism and their probability.

There are three major organization that works of Automate vehicle Damage Assessment:

1-IBM Watson Damage Car Analyses

2-AMAZON (Intelligent Car Damage Assessment Demo)

3-Altoros (Using Machine Learning to Automate Car Damage Assessment)

In IBM Watson it give basic report of damage caused by accident like how percent Car(tyers, windshield, side body)is broken whereas in Amazon the benefits over IBM Watson is that it gives the Damage Cost estimation and also brief detail(cost estimation, previous and after damage condition on car)in the form of PDF files that you can send to any one and also option available in App to send this report to Insurance Carrier, In Altoros a famous company also created a app that generate report of damage cars by capturing a photos same as done by others which gives damage parts prediction they claims it saves a lots of time of industries like insurance company due to quickly managed documentations of damage car through their apps.

IBM Code Pattern link:

<https://developer.ibm.com/patterns/classify-vehicle-damage-images/>

YOU TUBE LINK:

<https://www.youtube.com/watch?v=rKy2ZztKuR4>

Altoros Link: (using Intel AI Technology)

<https://www.altoros.com/solutions/car-damage-recognition>

YOU TUBE LINK:

<https://www.altoros.com/solutions/car-damage-recognition>

Amazon Link:

https://www.youtube.com/watch?v=iW_j8oxb0W4&t=848s

Yolo about image detection:

<https://www.youtube.com/watch?v=Cgxsv1riJhI>

Challenges: *(Please describe the challenges, specific to this research topic, currently being faced internationally. **Maximum 500 words.**)*

A lot of researches is done in the field of machine vision in the detection of manufacturing defects. The techniques developed for the manufacture industry require special equipment and approaches but lack of public developed (like on android play and ios app store) new models make it harder to build upon ideas of other researches. So from this point of view it is not possible to compare new model performance and differences merely to old models and to have beneficial discussion.

Motivation and Need: *(Please describe the motivation and need for this work. **Maximum 500 words.**)*

The latest advance in computer vision algorithm using deep learning and achieving interesting result in the classification of images, object detection and image segmentation. The applications are still emerging and increasing number of companies are starting to look at this technologies as a way to make insurance claims processes easier and more efficient as the motor vehicle insurance companies biggest challenge. Claims processing in 2030 remain a primary function of insurance carriers, but headcount associated with manual claims is reduced by 70-90% compared with 2018 levels. - McKinsey Research

2.2 Outcomes and Benefits

Expected Outcomes: *(Provide a list of proposed project outputs including publications, databases etc.)*

We will develop mobile application as a software for the use of the customer. The application will be cross platform. The features our application will include is that application will have the ability to take pictures of the vehicle, images will be detected and the system will verify that whether the images is clear or not. After the images are verified our system will generate a report that will include the original cost the cost of the vehicle after being damaged. The probability of the damaged car parts is also displayed.

Key Benefits and Beneficiaries: *(Please identify clearly the benefits and potential customers/beneficiaries of the project.)*

The benefits of this application would be that it would provide the original cost of the vehicle and the cost of the vehicle which the user will have. The user will not have to visit the market to check his vehicle cost. The cost of the parts of the vehicle will also be displayed so every part will have the cost shown in the report.

Whoever has the vehicle and he needs check the cost of his vehicle and the damaged parts of the vehicle will be a beneficiary. If the application is launched in the market the user does not need to visit the market the accurate result in the form of the report will be displayed.

Technology Transfer/Diffusion Approach: *(Please describe how the outputs of the project will be transferred to the beneficiaries/customers. **Maximum 500 words.**)*

Technology we will use is mobile application that will be cross platform. We will provide the application to the user through Playstore and Appstore so that he/she could be able to access it. The application will be user friendly so it will be easy to use. The application will access the camera abilities of the mobile device such that user will be needed to use camera featured phone. The application will have database for the storage of the customers data and previous data as well.

2.3 Objectives

*(Please describe the measurable objectives of the project and define the expected results. Use results-oriented wording with verbs such as 'to develop..', 'to implement..', 'to research..', 'to determine..', 'to identify..' **The objectives should not be statements and should actually specify in simple words what the project team intends to achieve (something concrete and measurable/ deliverable). Fill***

only those objectives that are applicable to the proposed project.)

Research Objectives: *(if any)*

- We have taken the research from the IBM Watson. They have not implemented this in an application so we have decided to take the research on the next level and implement it in the form of application.

Academic Objectives: *(if any)*

- None

Commercial Objectives: *(if any)*

- Our commercial objective is to make our application public so that it would work for the benefit of the users. The user would not need to visit the market to check the damaged parts cost and how much damaged they are and the real cost as well as the damaged cost of the vehicle .
- **Other Objectives:** *(if any)*
- None

2.4 Research Approach

Development / Research Methodology:

*(Please describe the technical details and justification of your development and research plan. The block diagrams, system flow charts, high level algorithm details etc. have to be provided in this section. **Maximum 3000 words.**)*

Software process model: In Modern Retail Management System we shall use plan driven methodology and mainly focus to use **Agile methodology**.

Agile methodology is a practice that promotes **continuous iteration** of development and testing throughout the software development lifecycle of the project. Both development and testing activities are concurrent.

The agile software development emphasizes on four core values.

1. Individual and team interactions over processes and tools
2. Working software over comprehensive documentation
3. Customer collaboration over contract negotiation
4. Responding to change over following a plan

Advantages using Agile model:

- One of the advantages of using agile method is whenever we need to change something in the project can do it easily unlike other models.
- Due to fixed duration, the cost is predictable and limited to the amount of work

that can be performed by the team in the fixed-schedule time box.

Challenges to use this model:

A cross-functional team is a team that is organized around customer value stream mapping and must include all competencies needed to accomplish their work without depending on others that are not part of the team. These teams deliver products iteratively and incrementally, maximizing opportunities for feedback and ensuring a potentially useful version of working product is always available.

Although cross-functional teams are certainly not a new idea.

Steps of agile methodology with this project:

Requirements collection:

We have collected the requirements for this project such as

- How Watson visual analyzer works
- How to make changes in the algorithms
- How to create cross platform application
- How to acquire the database from the company
- How to include the dataset in the Watson analyzer and train it.

Analysis:

Analysis according to our project is that we have done research according to our project that how Watson visual analyzer operates and how to include the dataset in the Watson visual analyzer. We have been studying how Watson visual analyzer's algorithm works and how we can train it according to our need. As Watson visual analyzer is using the computer vision and object detection so we have been researching on it as well. Second analysis we have done on is cross platform application we have to develop.

Designing:

In designing phase we have to make a prototype of our project. We will make a design of the project how the application will work and how the interface will look. How we include the Watson visual analyzer in the prototype. In this prototype we will identify styling of the application and which are the necessary items needed to be included in the project.

Coding:

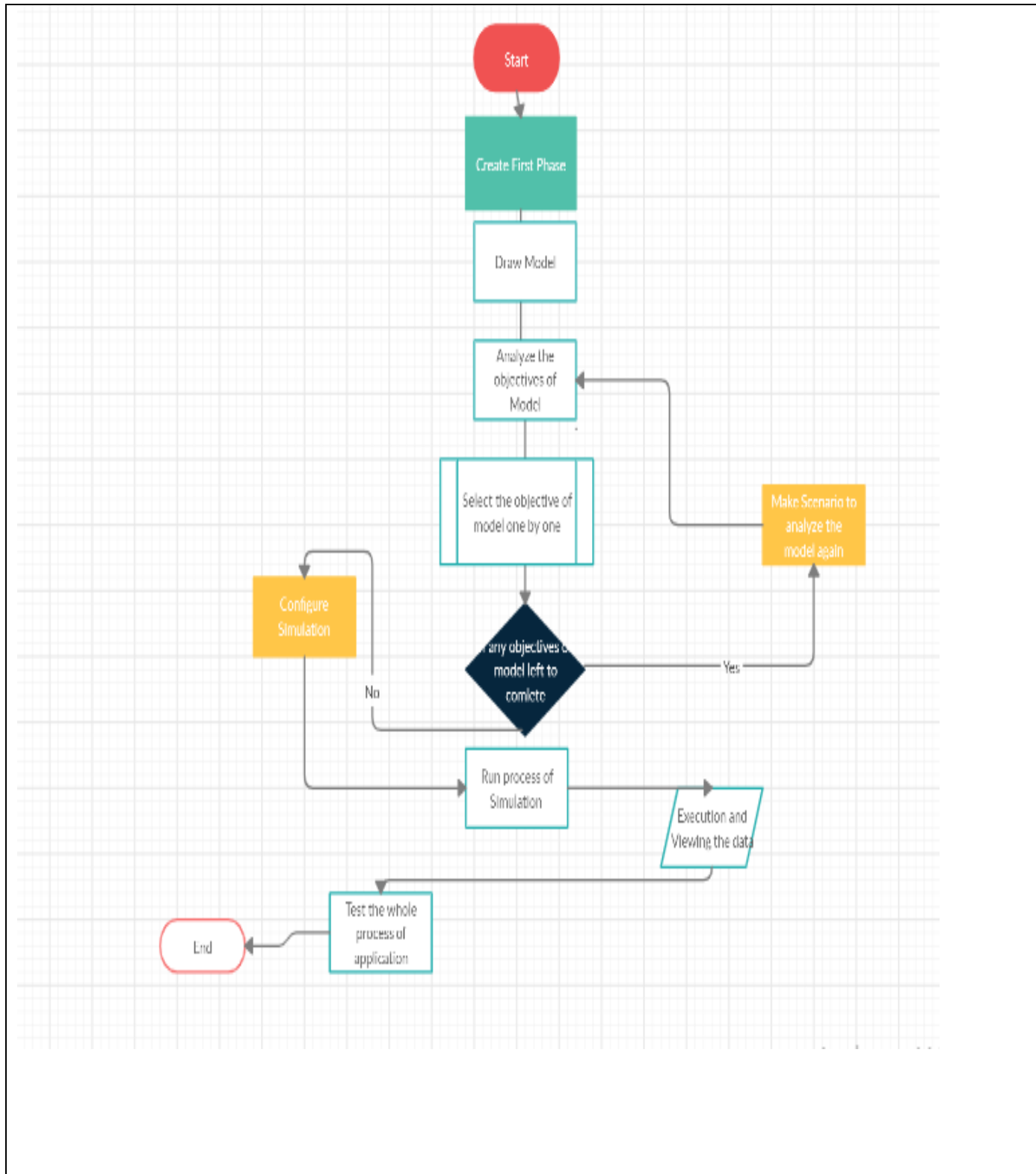
In this phase we will start developing the cross-platform application. We will include ios and andriod both for the development of the project. We train the Watson visual analyzer in this phase by adjusting our own algorithm in the Watson visual analyzer according to our need. We will develop a Database that will hold our images of the vehicles which are not damaged. The database will also include the damaged vehicle images which will be taken by the user. The Dataset will be then attached will the Watson visual analyzer. Watson visual analyzer will be included by the api of the application.

Testing:

In this phase the project will be completed but will be needed to be tested thoroughly. If any errors will be shown they will be removed immediately. The visual analyzer will be tested whether it is trained according to the need of the project. Then the application will be tested whether it is compatible with both the platforms or not. Lastly database will be tested for the data it is holding.

Maintenance:

In this phase the project will be developed and will be in working. But we will improve the application with respect to time by including new features and sending updates to the user. We will also remove the bugs if any needed. Maintenance of the application is very necessary with the time as the mobile software's updates the cross-platform application is needed to be updated respectively.



Key Milestones and Deliverables:

(Please list and describe the principal milestones and associated deliverables of the project. The timing of milestones is also to be shown in the Gantt chart in Annexure-A. **Quarterly deliverables are preferred.**)

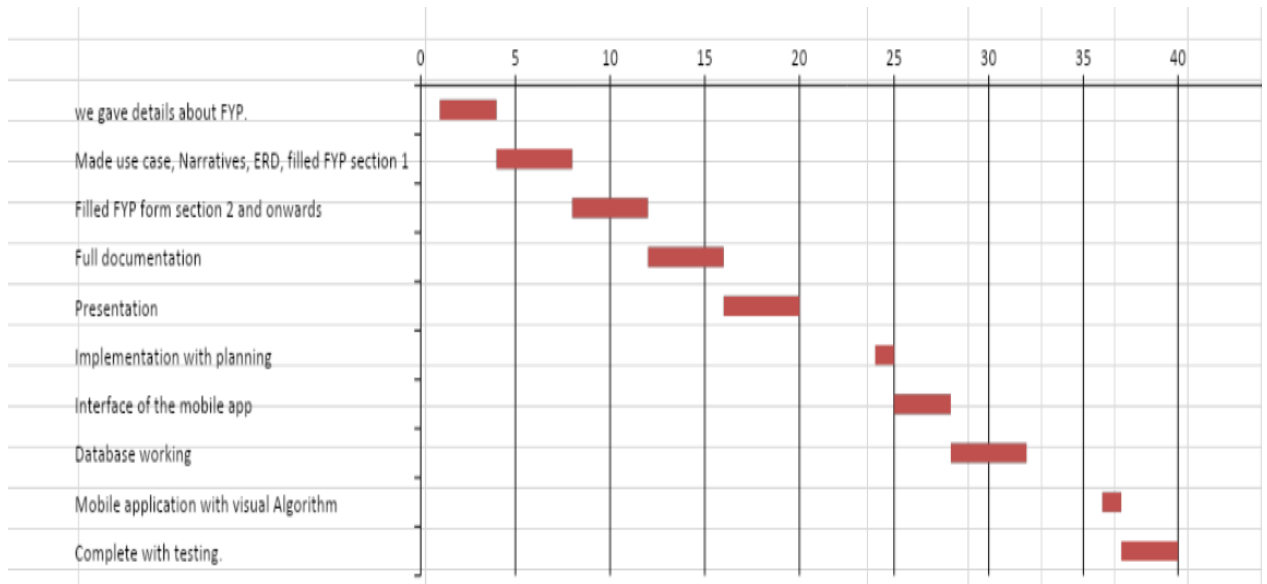
S. No.	Elapsed time since start of the project	Milestone	Deliverable
1.	Week 01 – 04	we gave details about FYP.	Selected with the project
2.	Week 05 – 08	Made use case, Narratives, ERD, filled FYP section 1	Provided the use case and erd details according to the project
3.	Week 09 – 12	Filled FYP form section 2 and onwards	Filled all the form with details but changes possible
4.	Week 13 – 16	Full documentation	Full documentation given with no more changing
5.	Week 17 – 20	Presentation	pending
6.	Week 25 – 24	Implementation with planning	pending
7.	Week 25 – 28	Interface of the mobile app	Pending
8.	Week 29 – 32	Database working	Pending
9.	Week 37 – 36	Mobile application with visual Algorithm	Pending
10.	Week 37 – 40	Complete with testing.	Pending

(Please add more rows if required.)

Timings

	Start Date	End week	Duration	
we gave details about FYP.	1	4	3	
Made use case, Narratives, ERD, filled FYP section 1	4	8	4	
Filled FYP form section 2 and onwards	8	12	4	
Full documentation	12	16	4	
Presentation	16	20	4	
Implementation with planning	24	25	1	
Interface of the mobile app	25	28	3	
Database working	28	32	4	
Mobile application with visual Algorithm	36	37	1	
Complete with testing.	37	40	3	

Gantt chart



2.5 Risk Analysis

(Please list the risks that may cause delays in, or prevent implementation of, the project. For each risk estimate the likelihood, likely impact/consequences on the project and steps to minimize/avoid the risk)

Risk	Likelihood (Low, Med, High)	Impact	Mitigation
Possibility that server would be down	low	Depends on the visual analyzer	We can prevent it by making the visual analyzer work according to our system.
If the user could not understand how to use the application	low	The application will not work according to customer needs	We will make the application user friendly in cross platform
If the images are blurred not showing the damaged parts properly	high	The application will show the wrong results in the document.	We have to make the algorithm for the visual analyzer properly that could identify the problem and dataset will be given properly.

Section – 3

3.1 Resources & Other Requirements

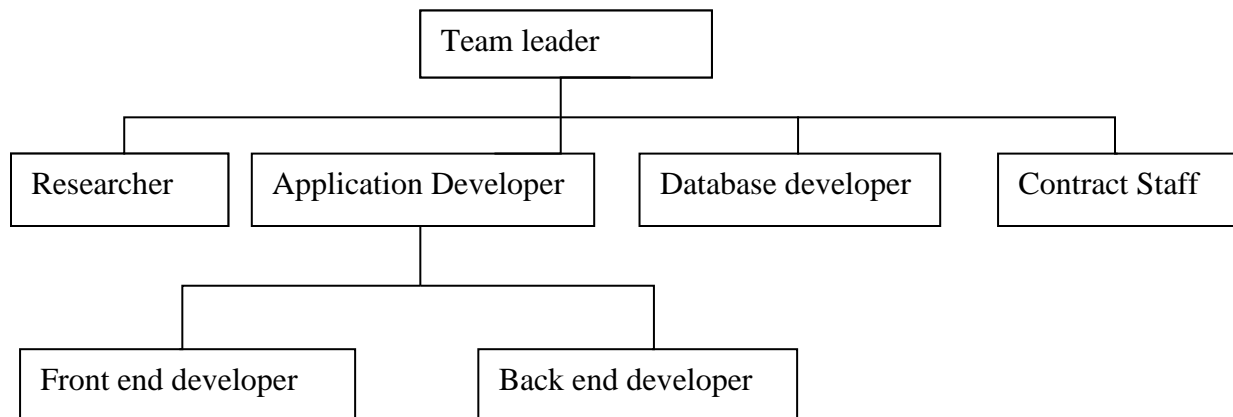
Project Team:

The numbers in the table below must tally with the HR Cost sheet in the Budget file.

Title / Position	Number
Team Leads	1
Researchers / Developers	2
Researcher / Development Assistants	1
Support Staff	0
Contract Staff (please specify)	2
Database Developers	3
Front end Developers	3

Team Structure:

(Please define the team structure (organogram) and role/key responsibilities of each member. If in collaboration with another partner, the division of manpower at various locations of partners be provided.)



Title/Position (of each member)	Role/Key Responsibilities	Minimum Qualification Required	Expertise / Background Required	Minimum Experience Required (years)
--	----------------------------------	---	--	--

Team Leader	To keep check on all the members.	BSCS	Development expertise and Database expertise.	0-2
Researcher	To collect all the data related to the project	BSCS	Basic software documentation skills and knowledge of computer vision and neural networks.	0-1
Frontend Developer	To develop the frontend of the application including the styling etc.	BSCS	Application development skills required, HTML, CSS , etc.	0-3
Backend Developer	To develop the backend programs of the application.	BSCS	Application development and complete knowledge of computer vision.	0-2
Database Developer	To develop the database.	BSCS	Knowledge about the database SQL server etc.	0-1

Remarks:

1. Name & Signature of Supervisor: _____

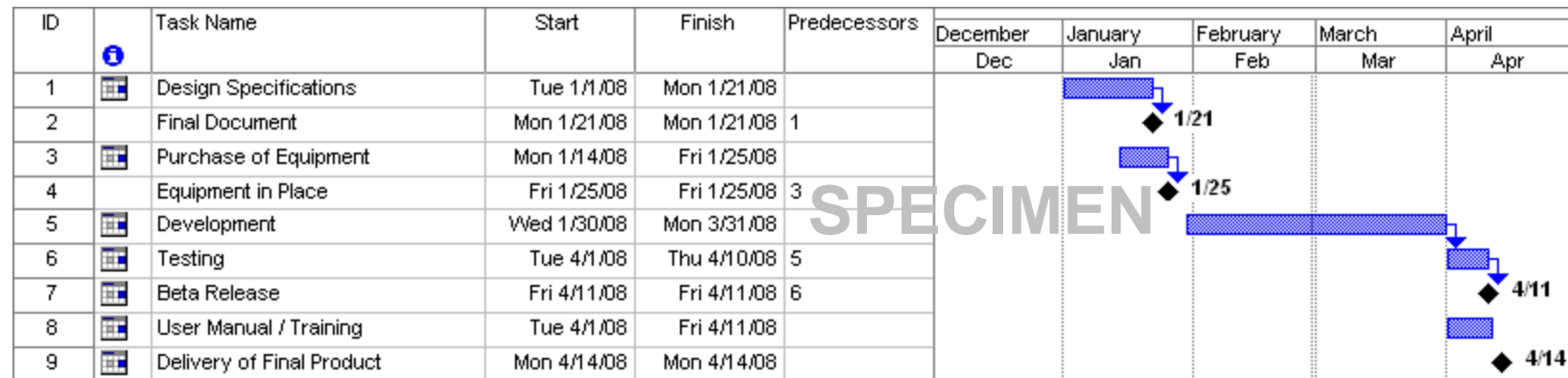
2. Name & Signature of Co-Supervisor: _____

3. Name & Signatures of FYP Coordinator: _____

Annexure–A: Project Schedule / Milestone Chart

(Project schedule using MS-Project (or similar tools) with all tasks, deliverables, milestones, cost estimates, payment schedules clearly indicated are preferred.)

Example:



Annexure–B: Proposed Budget

Please use the embedded Excel Worksheet for providing budget details.

Double click the icon to open the worksheet.

Project Title					
Proposed Budget					
Summary:					
(Do not enter the summary amounts (Sr.# 1-6) as they are automatically updated.)				Please read carefully	
Sr.	Description	Amount (Rs)		Guidance Notes: 1. This worksheet has been designed for the convenience of the PI/PO. 2. The filled in data and amounts are for the project. Please enter the actual project. 3. Total amounts mentioned are updated automatically in the worksheets. 4. Rows and Columns are for the project. 5. Services such as rent, etc. should not be charged. 6. Please do not change the data. 7. Proper justifications should be provided against each item.	
	Heads of Expenditure				
1	Technical HR Deployment Cost	Rs.144,000			
2	Support Staff	Rs.12,000			
3	Equipments	Rs.65,000			
4	Traveling	Rs.23,400			
5	Boarding & Lodging	Rs.0			
6	Miscellaneous	Rs.52,000			
	Sub Total:	Rs.296,400			
	Total Budget:	Rs.296,400			
Funding Sources: (Please indicate funding sources for the project)					
Sr.	Funding Source	Amount (Rs)	% of Total Funding		
1	National ICT R&D Fund	Rs.296,400	0%		
2	Internal Funds		0%		
3	Other Sources (specify)		0%		
4	(Add more entries, if required)				
	Total:	Rs.296,400	0%		

		Designed for:	Designed by:	Date:	Version:
Business Model Canvas		Vehicle Damage Analyzer	Ibrahim,Uneeb,Ali	1/5/2020	initial
problem	solution	Value Propositions	Customer Relationships	Customer Segments	
<ul style="list-style-type: none">The customer faces the problem when the car is damaged and he wants sell the car or wants to know the market value of the damaged car so he needs technician for knowing the market value.The customer faces problem when he needs to know the value(cost) of the parts.The customer also may face problem when he needs to know which part of the vehicle is how much damaged.	<ul style="list-style-type: none">This application will resolve the regarding market price of the vehicleIt will show the probability of the damaged partsIt will show the cost of the parts which needs to be replaced. <div>Deveelopment resources Should use:</div> <ul style="list-style-type: none">NodeMySQLVisual studioAndriod studioPhoto shopReact Native	<ul style="list-style-type: none">The image is taken from the camera of the device and shows the probability of the damaged partsWhen report is generated suggestions is also shown of the other vehicles including the market value of the those vehicles.	<ul style="list-style-type: none">Application can directly hit potential customers.Application should be secure and trustworthy.Should provide user frinedly interface to the customer so they can easily use <div>Channels</div> <ul style="list-style-type: none">Google playstoreIOS storeFacebookLinked ininstagram	<ul style="list-style-type: none">FamiliesStudentsEmployessTeachersOther potential customers	
Cost Structure			Revenue Streams		

- technical cost => 144000
- staff cost =>12000
- traveling cost =>23400
- boarding and lodging =>0
- miscellancement =>52000
- equipment cost => 65000

- Product services assentance manaintance .
- Downloding application through multiple channels.
- Through rating of the application.

Designed by: The Business Model Foundry (www.businessmodelgeneration.com/canvas). Word implementation by: Neos Chronos Limited (<https://neoschronos.com>). License: [CC BY-SA 3.0](https://creativecommons.org/licenses/by-sa/3.0/)

What is our project about?

One of the software's we use is Visual Recognition service which uses learning algorithms to analyze images for content such as objects, scenes, and faces. This code pattern presents an insurance industry use case: a custom classifier for analyzing vehicle damage. We will create a mobile application that takes a picture of vehicle damage and sends it to the insurance company to identify and classify the problem, for example, a flat tire, a broken window, or a dent.

Technologies/ Programming languages:

- Artificial intelligence
- Mobile development
- Node.js
- Visual recognition

OK
approved
unapproved

Description

The Visual Recognition service provides the ability to create custom classifiers by uploading sample images. We will make use case, where an insurance company requires a custom classifier for analyzing vehicle damage.

We will create a mobile application using Apache Cordova, Node.js, and Watson Visual Recognition. The mobile application sends the images of auto and motorcycle accidents and other vehicle issues to be analyzed by a server application using Watson Visual Recognition. The server application uses the images to train Watson Visual Recognition to identify various classes of issues, for example, vandalism, a broken windshield, a vehicle accident, or a flat tire. We can leverage this to create your own custom Watson Visual Recognition classifiers for your use cases.

When we have completed this code pattern, we will:

- Create a Node.js server that can utilize the Watson Visual Recognition service for classifying images
- Have a server initialize a Watson Visual Recognition custom classifier at startup
- Create a Watson Visual Recognition custom classifier in an application
- Create an Android mobile application that can send pictures to a server application for classification using Watson Visual Recognition

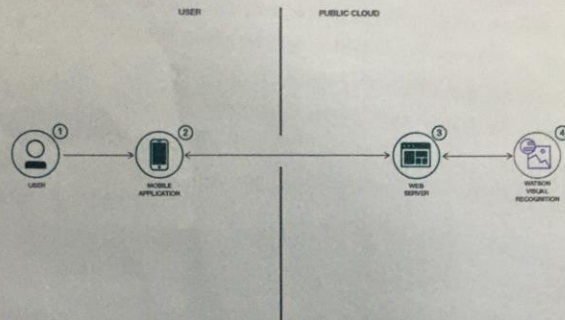
Functional Requirements

- The user interface for the application will be compatible with both Android and IOS platforms
- The application will allow users to capture the damaged parts of the vehicle to be scanned
- The user can also scan the whole body of vehicle for the purpose that user want their vehicle to be rated according to market
- The application will also show user the market value of vehicle according to market value
- The image captured by user will be send to server then server will comeback with result from visual recognition
- The result will include the probability of damaged parts

Non Functional Requirements

- **Performance :**
The system will not take much time with image processing and it will immediately show the result to the user
- **Efficiency:**
The system will be efficient in term that it will process the image of damaged part efficiently and will display the result
- **Portable :**
The system will be platform independent in term that it will be compatible with both Android and IOS
- **Security:**
There need to be clearly defined roles of the users. These roles are 'user' and 'administrator'. Each person that goes to the system will be required to register for the access of the application. A secure-server will be required to ensure confidentiality of user's data and other details.
It should be difficult to gain access to the server in an illegal manner.

Flow Diagram



1. The user captures an image with the mobile application.
2. The user sends the image on the mobile phone to the server application running in the cloud.
3. The server sends the image to Watson Visual Recognition service for analysis.
4. Watson Visual Recognition service classifies the image and returns the information to the server.

