



## Sri Lanka Institute of Information Technology

### PROJECT REGISTRATION FORM

(This form should be completed and uploaded to the Cloud space on or before XXXXXXXXX)

The purpose of this form is to allow final-year students of the B.Sc. (Hon) degree program to enlist in the final-year project group. Enlisting in a project entails specifying the project title and the details of four members in the group, the internal supervisor (compulsory), the external supervisor (may be from the industry), and indicating a brief description of the project. The description of the project entered on this form will not be considered as the formal project proposal. It should however indicate the scope of the project and provide the main potential outcome.

PROJECT TITLE (As per the accepted Topic Assessment Form)	“Motorbike Defect Checker and Predictor” –Android App to identify vehicle auto parts altered and their usage prediction
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RESEARCH AREA (As per the Topic Assessment Form)	Select Research Group Machine Learning
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PROJECT NUMBER	TMP-23-383	(Will be assigned by the RP Team)
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PROJECT GROUP MEMBER DETAILS: (Please start with the group leader's details)

	STUDENT NAME	STUDENT NO.	CONTACT NO.	EMAIL ADDRESS
1	S.L.D.P Pramodya	IT20219598	0770397287	it20219598@my.sliit.lk
2	A.M. K. A. P. Amarasingha	IT20257040	0762969702	It20257040@my.sliit.lk
3	D.M.D.H Dissanayaka	IT20261764	0762596360	it20261764@my.sliit.lk
4	P. U. Rathnasooriya	IT20156206	0763327266	it20156206@my.sliit.lk

**SUPERVISOR, CO\_ SUPERVISOR Details**

<b>SUPERVISOR Name</b>	<b>CO-SUPERVISOR Name</b>
<b>Dr. Amithalal Caldera</b>	<b>Ms. Supipi Karunathilaka</b>

**EXTERNAL SUPERVISOR Details** (if any, may be from the industry)

				<b>Attach the email as Appendix 3</b>
<b>Name</b>	<b>Affiliation</b>	<b>Contact Address</b>	<b>Contact Numbers</b>	<b>Signature/Date</b>

**ACCEPTANCE BY CDAP MEMBER** (This part will be filled by the RP team)

<b>Name</b>	<b>Signature</b>	<b>Date</b>

## PROJECT DETAILS

## Brief Description of your Research Problem: (extract from the topic assessment form)

The topic that we have selected for our research project “Vehicle auto parts originality identification and Prediction on usage” provides a solution to an issue faced by people who do not have any knowledge in the automobile engineering domain to identify the mechanical issues in a vehicle that an individual is going to purchase a vehicle.

The problem that we have identified is that when an individual tries to purchase a vehicle (Motorbike) he will not be able to identify the defects, auto parts fixed as an alternative to original parts, engine defects, usage of the current tyres, vehicle details and the registration paper details comparison.

This problem is mainly faced by individuals mostly when they are purchasing a motorbike for the first time without any experience where they cannot identify the defects straightly by looking at it at once, therefore they will need to get the knowledge of an expert after purchasing in order to identify the malfunctions, altered auto parts.

When identifying the initial scope for our research project we have used the following mechanisms since the vehicle industry is a huge industry in the present world.

The scope that we have selected is only for Indian Motorbikes because it is the most widely sold type of motorbike. In future, we are planning to extend to all the other vehicles.

## Main expected outcomes of the project: (extract from the topic assessment form)

As a solution, our team has come up with a mobile application which is based on the sub-section of Machine Learning (ML) which is called Image Processing and a vast database with all the necessary data regarding auto parts to solve this issue. The major functions of our mobile application will be;

- Capture images of the auto parts in the vehicle and compare them with the
- original parts and provide a summary regarding the altered parts.
- Capture the sound of the engine and provide a summary of the engine’s
- current condition and a prediction of future fault occurrences.
- Capture an image of the Registration paper and compare it to the bike’s
- original details.
- Capture the images of tyres and predict the usage and possible life
- expectation.

Using this mobile application, the buyer can get full output whether it is a modified motorbike or it is in its original condition and in a condition to be used without getting any major repairs at the moment of purchase

**WORKLOAD ALLOCATION (extract from the topic assessment form after correcting the suggestions given by the topic assessment panel.)**

(Please provide a brief description of the workload allocation)

MEMBER 1	S.L.D.P Pramodya IT20219598
<p><b>Identify the altered parts from the original parts.</b></p> <ul style="list-style-type: none"> <li>• Getting auto parts images</li> <li>• Image labelling</li> <li>• Model training</li> <li>• Obtaining the outcomes</li> <li>• Create user interfaces in mobile application.</li> <li>• Unit testing</li> <li>• Integrating components to the main system</li> <li>• Application testing</li> <li>• Fine-tuning for accuracy if required</li> </ul> <p><b>Novelty:-</b> Get an accurate output of the auto part used instead of the original part from the spare part analysed using image enhancement and pattern identification. Furthermore, we are expected to apply appropriate colour models like HSV (Hue, Saturation and Value).</p>	
MEMBER 2	A.M.K.A.P Amarasingha IT20257040
<p><b>Identify defects in the engine by the sound of the engine.</b></p> <ul style="list-style-type: none"> <li>• Obtaining the sounds of the engine</li> <li>• Image labelling</li> <li>• Model training</li> <li>• Obtaining the outcomes</li> <li>• Create user interfaces in mobile application.</li> <li>• Unit testing</li> <li>• Integrating components to the main system</li> <li>• Application testing</li> <li>• Fine-tuning for accuracy if required</li> </ul> <p><b>Novelty:-</b> Differentiate these common engine defects that could occur in motorbikes: - Tick, tick tick, Bump &amp; grind, Creepy krink, Boo hiss, Snap, crackle, pop.</p>	


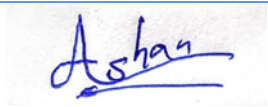
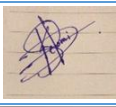

MEMBER 3	D.M.D.H Dissanayaka IT20261764
<p><b>Compare the vehicle details with the registration paper details.</b></p> <ul style="list-style-type: none"> <li>• Obtaining the registration papers and vehicle's details.</li> <li>• Image labeling</li> <li>• Model training</li> <li>• Obtaining the outcomes</li> <li>• Create user interfaces in</li> <li>• mobile application</li> <li>• Unit testing</li> <li>• Integrating components</li> <li>• to the main system</li> <li>• Application testing</li> <li>• Fine-tuning for accuracy if required</li> </ul> <p>Novelty :- This comparison is done by enhancing the quality of images to clearly identify these details match with registration paper details if these areas are worn out or rusted.</p>	

MEMBER 4	P. U. Rathnasooriya IT20156206 .....
<p><b>Tyre usage prediction along with life expectancy</b></p> <ul style="list-style-type: none"> <li>• Obtaining tyre images, tyre worn out measures.</li> <li>• Image labeling</li> <li>• Model training</li> <li>• Obtaining the outcomes</li> <li>• Create user interfaces in mobile application</li> <li>• Unit testing</li> <li>• Integrating components to the main system</li> <li>• Application testing</li> <li>• Fine-tuning for accuracy if required</li> </ul> <p><b>Novelty</b> :- Predict the life expectancy of the tyres based on the analyzed data using the ML model.</p>	

**DECLARATION (Students should add the Digital Signature)**

"We declare that the project would involve material prepared by the Group members and that it would not fully or partially incorporate any material prepared by other persons for a fee or free of charge or that it would include material previously submitted by a candidate for a Degree or Diploma in any other University or Institute of Higher Learning and that, to the best of our knowledge and belief, it would not incorporate any material previously published or written by another person in relation to another project except with prior written approval from the supervisor and/or the coordinator of such project and that such unauthorized reproductions will constitute offences punishable under the SLIIT Regulations.

We are aware, that if we are found guilty for the above mentioned offences or any project related plagiarism, the SLIIT has right to suspend the project at any time and or to suspend us from the examination and or from the Institution for minimum period of one year".

	<b>STUDENT NAME</b>	<b>STUDENT NO.</b>	<b>Signature</b>
1	S.L.D.P Pramodya	IT20219598	
2	A.M.K.A.P Amarasingha	IT20257040	
3	D.M.D.H Dissanayaka	IT20261764	
4	P. U. Rathnasooriya	IT20156206	

## Reference :

- [1] J.R. Parker “Algorithms for Image Processing and Computer Vision, Second Edition.” Computer Vision, Graphics, and Image Processing, Published by Wiley Publishing, Inc. 10475 Crosspoint Boulevard Indianapolis, IN 46256 Copyright 2011 Published by Wiley Publishing, Inc., Indianapolis, Indiana Published simultaneously in Canada [www.wiley.com](http://www.wiley.com)
- [2] Goddard, William. “Speech Recognition Algorithm.” ITChronicles, 4 Apr. 2022, [itchronicles.com/artificialintelligence/speech-srecognitionalgorithms](http://itchronicles.com/artificialintelligence/speech-srecognitionalgorithms).
- [3] Ilminen, Gary. “Top 6 Strange Motorcycle Noises | What They May Mean.” Ultimate Motorcycling, 29 Mar. 2016, [ultimatemotorcycling.com/2016/03/29/to-p-6-strange-motorcycle-noises-what-they-may-mean](http://ultimatemotorcycling.com/2016/03/29/to-p-6-strange-motorcycle-noises-what-they-may-mean).
- [4] “How Does Speech Recognition Work? Which Algorithm Is Used in Speech Recognition? – IndianTTS Blog.” How Does Speech Recognition Work? Which Algorithm Is Used in Speech Recognition? – IndianTTS Blog, [indiantts.com/blog/how-speechrecognition-synthesis-work-whichalgorithm-used-voice-recognition](http://indiantts.com/blog/how-speechrecognition-synthesis-work-whichalgorithm-used-voice-recognition). Accessed 1 Feb. 2023.
- [5] <https://d-nb.info/1159675910/34>
- [6] [https://www.researchgate.net/profile/As-hfaqShafin/publication/344519283\\_Automati-c\\_Environmental\\_Sound\\_Recognition\\_AESR\\_Using\\_Convolutional\\_Neural\\_Network/links/5f7de369458515b7cf6f22d7/Automatic-Environmental-Sound-RecognitionAESR-Using-Convolutional-NeuralNetwork.pdf](https://www.researchgate.net/profile/As-hfaqShafin/publication/344519283_Automati-c_Environmental_Sound_Recognition_AESR_Using_Convolutional_Neural_Network/links/5f7de369458515b7cf6f22d7/Automatic-Environmental-Sound-RecognitionAESR-Using-Convolutional-NeuralNetwork.pdf)
- [7] Tokozume, Yuji, and T. Harada. “Learning environmental sounds with end-to-end convolutional neural network,” 2017 IEEE International Conference on Acoustics,
- [8] “How Optical Character Recognition Algorithms Redefine Business Processes Page 4 of 15 IT4010 – Research Project - 2023 Topic Assessment Form & ITrex.” ITrex, 6 Apr. 2022, [itrexgroup.com/blog/how-ocr-algorithmsredefine-business-processes](http://itrexgroup.com/blog/how-ocr-algorithmsredefine-business-processes).
- [9] Speech, and Signal Processing (ICASSP), pp. 2721-2725. IEEE, 2017.
- [10] D. Barchiesi, D. Giannoulis, D. Stowell and M. D. Plumbley, “Acoustic Scene Classification: Classifying environments from the sounds they produce,” in IEEE Signal.
- [11] Ilminen, Gary. “Top 6 Strange Motorcycle Noises | What They May Mean.” Ultimate Motorcycling, 29 Mar. 2016, [ultimatemotorcycling.com/2016/03/29/to-p-6-strange-motorcycle-noises-what-they-may-mean](http://ultimatemotorcycling.com/2016/03/29/to-p-6-strange-motorcycle-noises-what-they-may-mean).
- [12] “Toyota Accessories Augmented Reality [TAAR] App. (2021, November 17). Groove Jones. <https://www.groovejones.com/toyota-accessories-augmented-reality-taar-app/> In-Text Citation: (Toyota Accessories Augmented Reality [TAAR] App, 2021)

## Appendix 1 :

Origin	Indian				Malaysian	Japan
Model	Dio/Pleasure/pept	Bajaj Pulsar	CT 100	FZs	Demak	4
The number of bikes to be sold in ikman.lk, Riyasewana (Bikes to be sold in 1 <sup>st</sup> three pages)	20	13	19	8	4	

Figure 1 :- Analysis done by team for scope selection



System	Mobile compatibility	Input type	Availability	Outputs
A Deep-Learning-Based Approach for Aircraft Engine Defect Detection		Images of engine	UK	Whether any maintenance needed or not.
AutoPartsPro		Vehicle details and sapre parts details	World wide	Specific part for specific vehicle
Dunlop tyre app	✓	Vehicle details	Sri Lanka	Tyre specifications for spefici vehicle.
The Toyota Accessories Augmented Reality [TAAR] App[12]	✓	The customer identifies the vehicle model name	Worldwide	The App then visualizes AR accessories on the actual vehicle
Motorbike Defect Checker and Predictor	✓	Real time image + sound	Sri Lanka	Altered part Engine defects Registration validation Tyre usage

Table 1:-Research Gap



## Appendix 2:

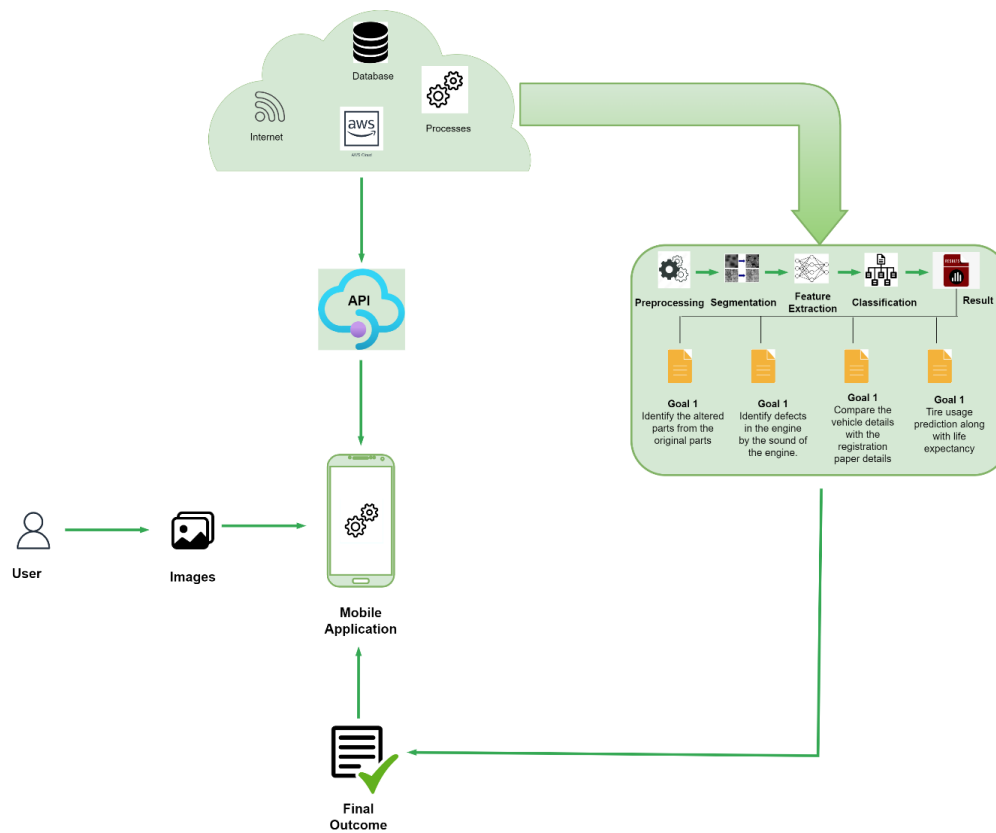


Figure 2:-Overall system architecture Diagram