

Shri Madhwa Vadiraja Institute of Technology and Management, Bantakal – 574115
Hackothsava 2023 – Synopsis

Team Name:		TEAM DELTA				
College Name and Address:		Manipal Institute of Technology, Udupi - Karkala Rd, Eshwar Nagar, Manipal, Karnataka 576104				
Theme of submission: (Check mark the relevant box)		Transformative Education <input type="checkbox"/>		Sustainable Industrialization <input checked="" type="checkbox"/>		
Team Members:		Name	USN	Sem	Mobile no.	email - ID
1	Leader	PRAKHAR GANERIWAL	210932136	IV	9024365109	PRAKHARGANERIWAL@GMAIL.COM
2	Member 1					
3	Member 2					
4	Member 3					
Project Title:		Road Quality Index Measurement Device				
Abstract of the proposed project: (word limit 300)		To enable the users to get the data of road quality on their phones and to integrate the road quality data with the Google's Maps API and will optimize the expected time of arrival according to road quality of the route and can suggest optimized route with better road quality.				
Detailed Methodology with proper diagrammatic representation:		<p>The RQI measurement engineering process involves the following steps:</p> <ul style="list-style-type: none"> • Data Acquisition Gyroscope and Accelerometer data will be collected from MPU6050(for the first prototype) then this raw data from MPU6050 and NMEA data from Neo M8n will go into ESP32 which will be processed further. • Data Processing 				

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		<p>ESP32 will then process and run tinyML to determine if the vibration was caused due to a speed breaker or pothole and bad road. Esp32 will be already trained to determine this and identify and further send this data to sim800L to upload it to cloud.</p> <ul style="list-style-type: none"> RQI Calculation The RQI is calculated using a mathematical formula that considers various factors such as the severity and extent of road damage, traffic volume, and road surface condition and acceleration if the sensor at that time. Cloud storage and display The processed data will then be uploaded to the googles firebase cloud-based service then from there we can access that data from anywhere in the world. <p>In further stage we can use Google Maps API to integrate our data with the maps to optimize our route based on potholes on the road, just like the way it does with traffic congestions</p>				

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		<pre> graph TD MPU6050[MPU6050] -- "GYROSCOPE AND ACCELEROMETER READING" --> MC((MICROCONTROLLER)) GPS[GPS NEO M8N] -- "GPS COORDINATES" --> MC MC --> SIM800L[SIM800L] SIM800L -- "DATA TRANSFER TO CLOUD" --> CLOUD[CLOUD (GOOGLE FIREBASE)] CLOUD -- "DATA FETCHED FROM FIREBASE" --> APP[TO THE APP AND GOOGLE MAPS API] </pre>				
Software/ hardware required for the implementation:		<ul style="list-style-type: none"> • A DEVELOPMENT BOARD (PREFEREBLY ESP32/TEENSY/ NANO 33 BLE) • GYROSCOPE AND ACCELEROMETER (MPU6050 FOR PROTOTYPE) • GPS MODULE (PREFERBLY NEO 6M/ NEO M8N) • SIM MODULE (800L) • ARDUINO IDE (FOR PROGRAMMING) 				

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Benefit to the society from the project		<p>Improved driving safety: The road quality index feature would allow users to identify poorly maintained roads and avoid them, reducing the risk of accidents due to potholes or other hazards.</p> <p>Better transportation planning: The road quality index would provide data on the condition of roads, allowing city planners and governments to identify areas that need repairs and allocate resources more effectively.</p> <p>Reduced vehicle maintenance costs: Drivers could use the road quality index to plan their routes and avoid roads that are known to cause excessive wear and tear on their vehicles. This could reduce maintenance costs and extend the life of vehicles.</p> <p>Environmental benefits: better road quality could lead to reduced emissions from vehicles, as smoother roads can improve fuel efficiency and reduce the number of pollutants emitted by vehicles.</p> <p>Improved quality of life: Smooth and well-maintained roads make for a more comfortable and enjoyable driving experience. This could lead to an overall improvement in the quality of life for individuals and communities.</p> <p>Overall, the road quality index feature in Google Maps could have significant benefits for society by improving driving safety, transportation planning,</p>				

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		reducing vehicle maintenance costs, providing environmental benefits, and enhancing the overall quality of life for individuals and communities.				

Signature of the teamleader
Principal

Signature of the HoD/
With seal