TAMILNADU STATE COUNCIL FOR SCIENCE ANDTECHNOLOGY
DOTE Campus, Chennai-00025

STUDENT PROJECTS SCHEME

Proposals invited for 2024-2025

FORMAT FOR STUDENT PROJECT PROPOSAL

1.	Name of the Student(s)	:	ABIVARSHNI K P , VISHNU PRASATH D , JAYANTHAA S T .
2.	One valid e-mail id	:	eeevishnuprasath@gmail.com
	Name of the Guide	:	MRS.C.CHITRA
	Designation	:	ASSISTANT PROFESSOR
	Institutional Address		VELALAR COLLEGE OF ENGINEERING AND TECHNOLOGY, THINDAL, ERODE-638012, TAMILNADU.
	PhoneNo. &Mobile No.	:	88700 45682 , 9360304308
3.	Project Title	:	ENHANCING SAFETY : STRATEGIES FOR ACCIDENT DETECTION AND PREVENTION
4	Sector in which your Project proposal : list to be Considered		
5	Project Details	:	1. Introduction 2. Objectives 3. Methodology 4. Work Plan 5. Budget 6. Any other details
6.	Has a similar project been carried out : in your college/ else where? If so furnish details of the previous project and high light the improvements suggested in the present one		NO

(Item No. 1 to 6 attached at the end)

CERTIFICATE

This is to certify that **ABIVARSHNI K P [732921EER004] , JAYANTHAA S T [732921EER025] [732921EER060] VISHNU PRASATH D** are bonafide final year students of EEE U.G. Engineering courses of our college and it is also certified that two copies of utilization certificate and final report along with seminar paper will be sent to the Council after completion of the project by the end of May 2025.

Signature of the Guide	Signature of the HOD	Signature of the Principal/ Head of the Institution

N.B.: **1 copy**of the proposals are to be submitted through proper channel to **The Member Secretary,TNSCST, DOTE Campus, Chennai - 600 025** on or before **13 SEPTEMBER 2024, 5 pm.**

TAMILNADU STATE COUNCIL FOR SCIENCE AND TECHNOLOGY

DOTE Campus, Chennai- 00025

STUDENT PROJECTS SCHEME

ENHANCING SAFETY : STRATEGIES FOR ACCIDENT DETECTION AND PREV ENTION

1. Introduction

Your paragrapMotorcycle safety is a critical global concern, often due to riders not wearing helmets or losing control. This project aims to develop a smart safety system using ESP32 microcontrollers and ESP-NOW protocol to wirelessly detect helmet usage and monitor the bike's lean angle to prevent falls. The system sends real-time alerts and automatically transfers the rider’s GPS location via mobile phone to emergency services in case of an accident. This ensures quick response and reduces the risk of injury or death. Combining helmet detection, fall prevention, and emergency alerts enhances overall motorcycle safety.

2. Objectives

1. Helmet Detection: Detect helmet usage with a reed switch integrated into the helmet.
2. Bike Fall Detection: Monitor lean angles with a sensor to detect potential falls.
3. Wireless Communication: Use ESP-NOW for real-time data transmission between the helmet and bike.
4. Accident Prevention: Implement actions like engine shutdown or alerts for abnormal conditions.
5. Energy Efficiency**: Ensure low-power, efficient wireless communication.
6. Safety Enhancement**: Improve rider safety by reducing accidents and enhancing response times.

3. Methodology

1. System Design
   - Helmet Module
   - Bike Module

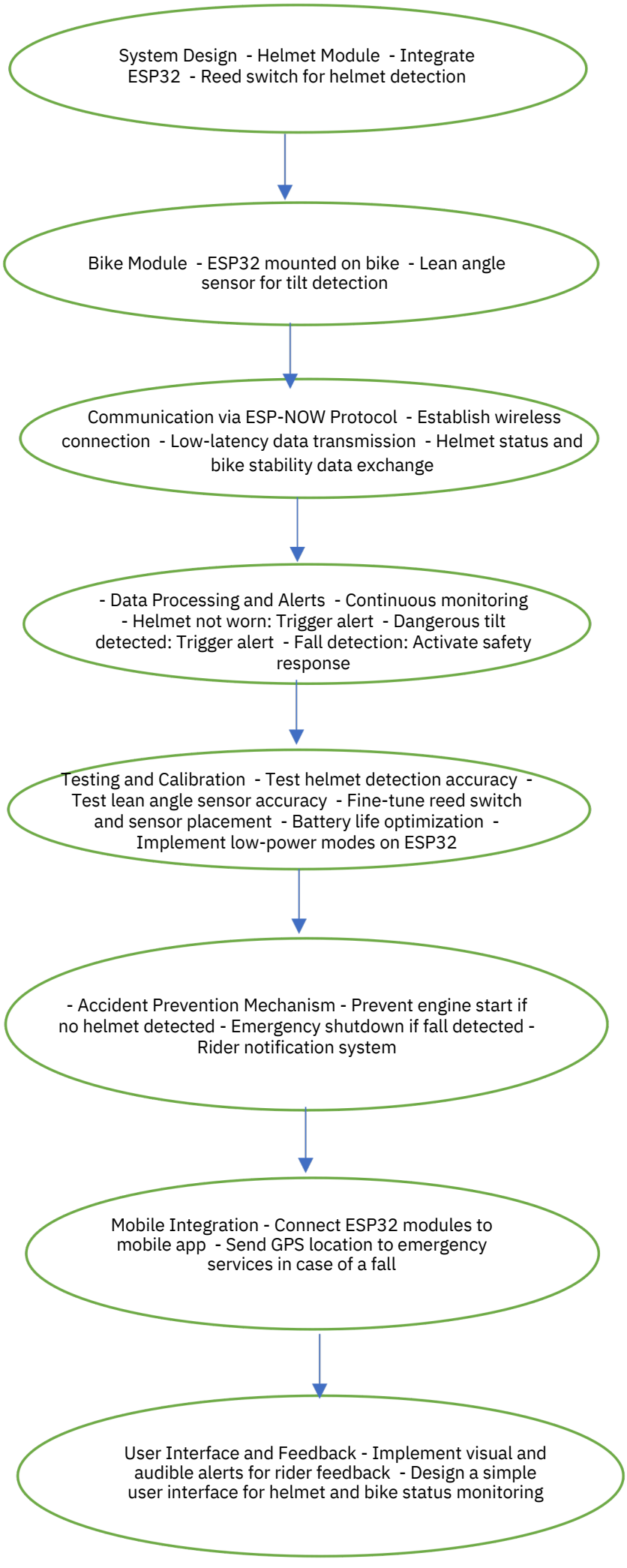
2. Communication via ESP-NOW Protocol

3. Data Processing and Alerts

4. Testing and Calibration

5. Accident Prevention Mechanism

4. Work Plan


System Design - Helmet Module - Integrate ESP32 - Reed switch for helmet detection
Bike Module - ESP32 mounted on bike - Lean angle sensor for tilt detection
Communication via ESP-NOW Protocol - Establish wireless connection - Low-latency data transmission - Helmet status and bike stability data exchange
- Data Processing and Alerts - Continuous monitoring - Helmet not worn: Trigger alert - Dangerous tilt detected: Trigger alert - Fall detection: Activate safety response
Testing and Calibration - Test helmet detection accuracy - Test lean angle sensor accuracy - Fine-tune reed switch and sensor placement - Battery life optimization - Implement low-power modes on ESP32
- Accident Prevention Mechanism - Prevent engine start if no helmet detected - Emergency shutdown if fall detected - Rider notification system
Mobile Integration - Connect ESP32 modules to mobile app - Send GPS location to emergency services in case of a fall
User Interface and Feedback - Implement visual and audible alerts for rider feedback - Design a simple user interface for helmet and bike status monitoring

5. Budget

CATEGORY	ESTIMATED COST
HARDWARE COSTS	
esp32(2) - wires(required) - mobile phone - Miscellaneous **Subtotal**	Rs.2000 Rs.500 Rs.2000 Rs.1000 **Rs.5500**
SOFTWARE TOOLS	
- Arduino Ide vs code- Development Tools	Rs.free Rs.free Rs.2000
TESTING AND VALIDATION	**Rs.2,700**
- Testing Equipment & Tools - Test Runs and Data **Subtotal**	Rs.800 Rs.1,000
CONTINGENCY	**Rs.1,800**
MISCELLANEOUS	
- Documentation & Reporting - Training and Support **Subtotal**	Rs.2,000 Rs.2,000 **Rs.4,000**
Total Estimated Budget	**Rs.14,000**