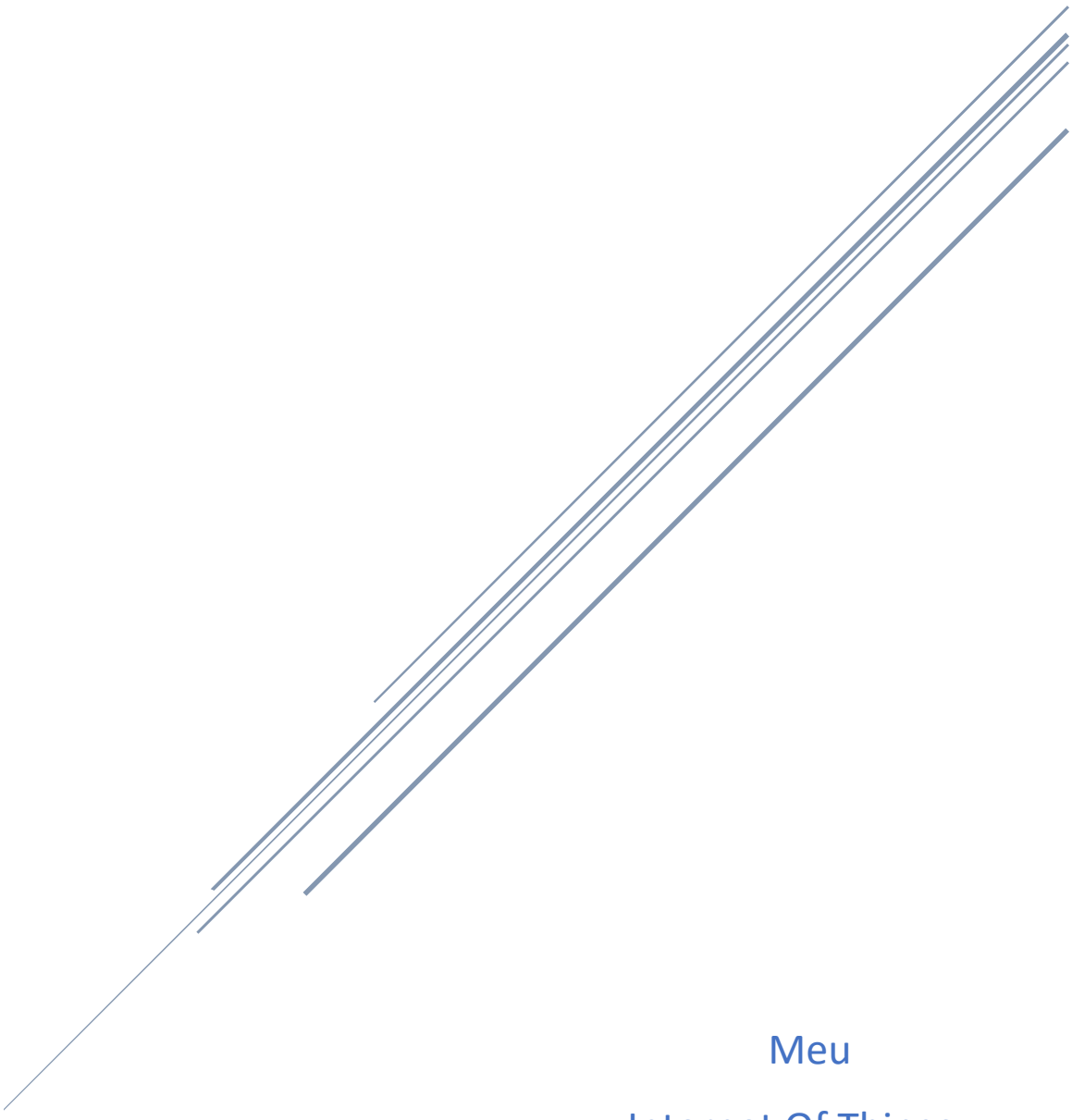
Project Description



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Internet Of Things

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Group info:

Tala Jalouqa 202020220
Sara Alkhalili 202020237

1.Introduction :

The Lane Detection System with IoT Integration is an advanced computer vision project that aims to enhance road safety and provide valuable assistance to drivers. The system incorporates an Internet of Things (IoT) approach by utilizing a camera for real-time lane detection. Image processing and machine learning techniques will be employed to analyze video feed data, offering instantaneous feedback to the driver.

Objectives:

1. Develop a robust lane detection algorithm capable of handling various road conditions.
2. Implement a real-time processing pipeline for efficient lane detection.
3. Implement features to enhance the interaction between the lane detection system and the driver, promoting a safer and more user-friendly driving experience.
4. Implement a screen warning system to alert the driver in case of significant lane departure or potential collision risks.
5. improve the overall user experience by providing timely and intuitive alerts, reducing the risk of human error and enhancing driver awareness.
6. Evaluate and fine-tune the system's performance through rigorous testing, considering real-world IoT scenarios.

Implementation Plan (Phases):

Research and Planning: Conduct a thorough review of existing lane detection methods, select an appropriate IoT-enabled camera.

Camera Integration: Integrate the selected IoT-enabled camera into the system, ensuring seamless communication with the processing unit.

Data Collection and Preprocessing: Gather a diverse dataset from the IoT camera and preprocess images for model training.

Model Development: Implement the lane detection algorithm using a suitable deep learning framework.

Real-time Processing: Develop the real-time processing pipeline for efficient lane detection.

User Interface and IoT Integration: Design and integrate the user interface, incorporating IoT-generated lane information.

Testing and Evaluation: Evaluate the system's performance using various datasets, road conditions, and IoT scenarios.

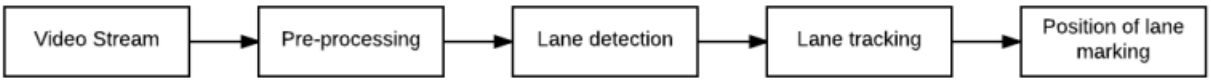
Methodology:

Camera Selection: Choose an IoT-enabled camera system suitable for in-vehicle deployment, ensuring compatibility with the lane detection algorithm.

Data Acquisition: Collect a diverse set of annotated images and videos from the IoT camera for training the lane detection model**.**

Lane Detection Algorithm

Feature Extraction: Use edge detection and color space transformation to highlight lane markings in the input images.



Problem Motivation:

Road safety is a paramount concern globally, with a significant number of accidents attributed to lane departure and driver distraction. Existing lane detection systems often lack real-time capabilities and struggle to adapt to diverse road conditions, limiting their effectiveness. Additionally, the need for seamless integration with the Internet of Things (IoT) to provide instant feedback to drivers is becoming increasingly critical

Problem Statement:

The absence of a robust, real-time lane detection system that incorporates IoT techniques, such as an IoT-enabled camera, hinders the advancement of intelligent transportation systems. Addressing this gap is essential to reduce accidents caused by lane departure and enhance overall road safety.

Scope:

The project focuses on the development of a real-time lane detection system using an IoT-enabled camera.

The system aims to handle various road conditions, including different lighting and weather scenarios.

Integration with a user-friendly interface will provide immediate feedback to drivers, contributing to road safety

Limitations:

The system's performance may be affected by extreme environmental conditions, such as heavy fog or extreme darkness.
The accuracy of lane detection is contingent on the quality and reliability of the IoT-enabled camera Lower-quality cameras may result in reduced accuracy and performance.
The lane detection system is designed as an assistive technology and does not enable full autonomous driving capabilities. The driver remains responsible for overall vehicle control and safety.

Conclusion:

The Lane Detection System with IoT Integration project addresses the critical need for real-time, IoT-enabled lane detection to enhance road safety. By combining image processing, machine learning, and IoT technologies, the proposed system aims to provide drivers with timely information about lane conditions. While acknowledging the scope and limitations, the successful execution of this project will contribute significantly to the advancement of intelligent transportation systems.

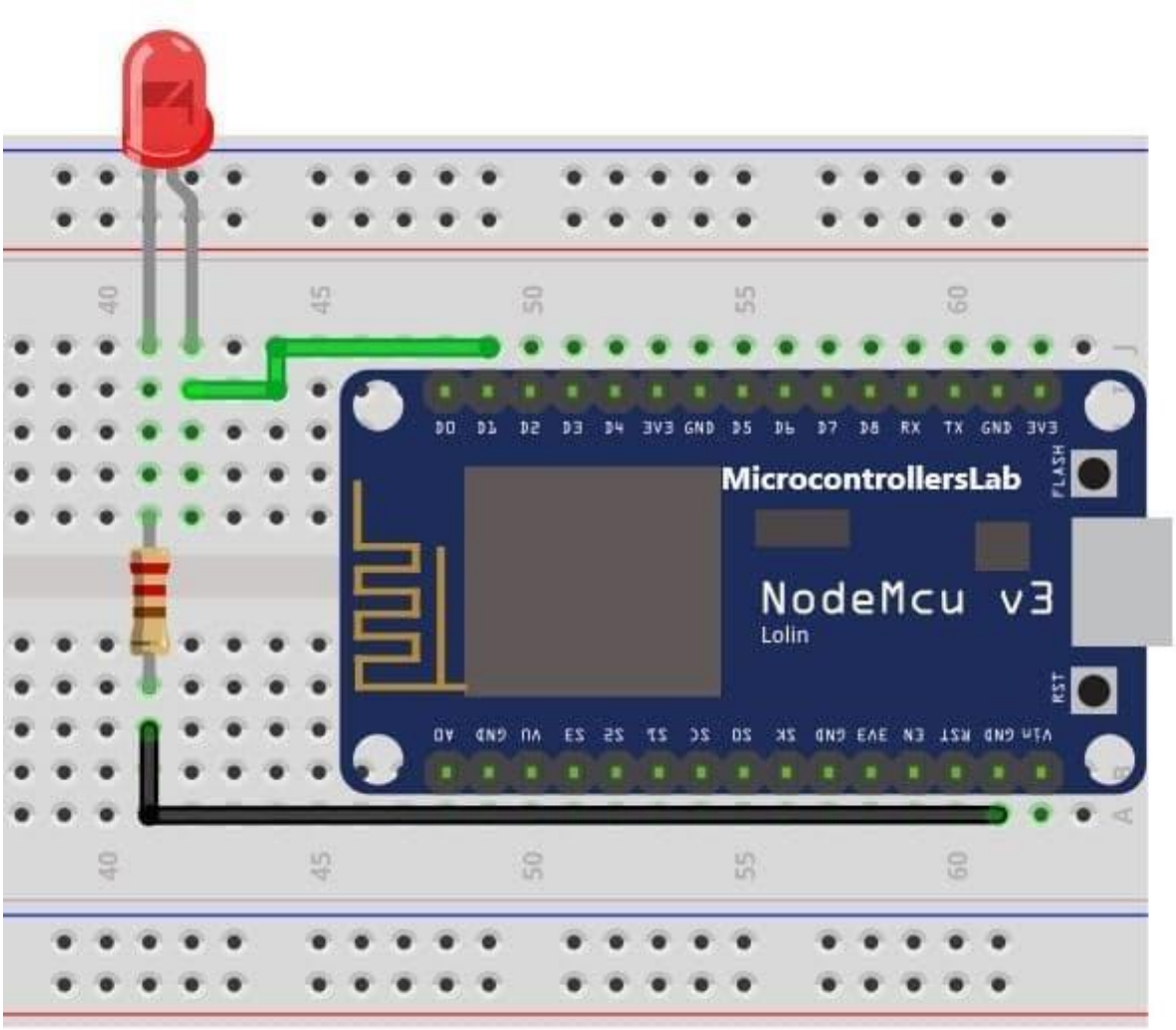
Part 2

Control LED Using Blynk

Components :

1. **ESSP8266**
2. **LED**
3. **Connecting Cable**
4. **Connecting Wires**
5. **Resistor 220 Ohms**
6. **Breadboard**

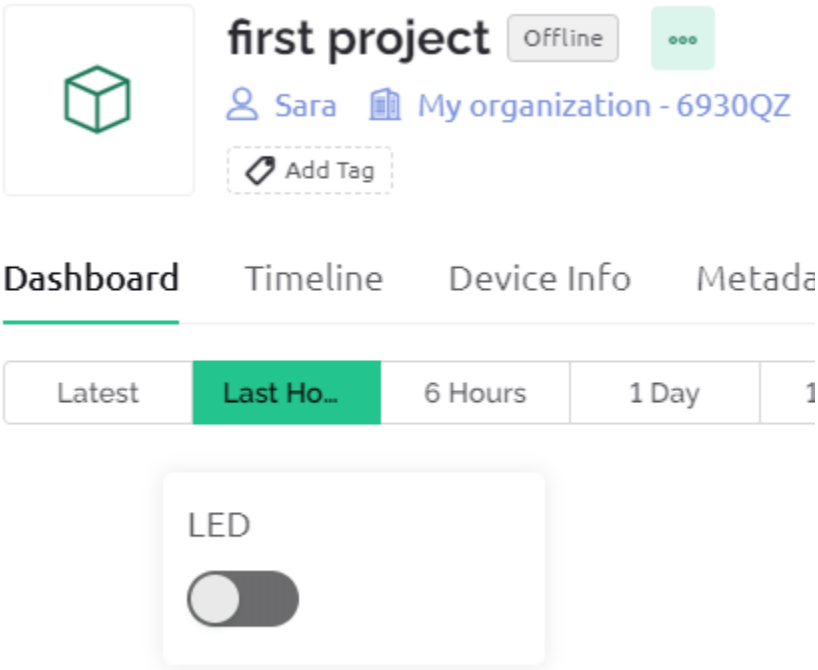
Circuit:



Methodology:

1-Make the circuit diagram on bread board according to connection diagram shown below. Anode of the LED is connected to the D1 pin of the NodeMCU, the cathode of the LED is connected with the one terminal of the resistor and another terminal of the resistor is connected to the ground pin**.**

2- make an account on blynk and making control



Part 3

Object Detection

Introduction

In our project, we integrate computer vision techniques to create a Car and Live Object Detection System. This system is dedicated to improving road safety by leveraging cutting-edge artificial intelligence (AI) and computer vision technologies. Its primary objective is to identify and localize objects within a video, responding in real-time to both stationary and moving objects..

In This Part of Our Project Involves Advancements such as:

- Video Analysis: The project involves the analysis of video streams, enabling the system to make informed decisions based on the dynamic visual input.

- Applicability to Cars: The focus on car detection signifies the relevance and applicability of the system to enhance safety specifically for vehicular transportation

- Integration of IoT and Computer Vision: State-of-the-art Internet of Things (IoT) and computer vision technologies are employed to achieve accurate and efficient object identification and localization in our project.

Samples :