UNIVERSITI TEKNOLOGI MARA

ENHANCING URBAN TRAFFIC FLOW WITH ARDUINO TRAFFIC MANAGEMENT SYSTEM

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ABSTRACT

This report presents the information and designs of an Enhancing Urban Traffic Flow with Arduino Traffic Management System by using an Arduino Mega 2560, to optimize the traffic flow and enhance the overall road safety. The objectives of the project are to build a prototype of Enhancing Urban Traffic Flow with Arduino Traffic Management System and to display the real-time traffic data and traffic light timings on an LCD display. The aim of this report is to design a Enhancing Urban Traffic Flow with Arduino Traffic Management System by using an Arduino Mega 2560. The methodology includes combining the controller that utilizes a network of sensors, and communication devices to gather real-time data on traffic patterns, vehicles, and pedestrian movements as the inputs for Arduino Mega, where the sensors used such as infrared sensors for the pedestrians before they cross the zebra-line on the road and ultrasonic sensors, mainly use to detect the presence of vehicles on the road during the red light of the traffic light is on. As for the outputs, the components are LED, buzzer, and LCD display. Simulation results shows the timing of the traffic lights to change colours. The importance of this project is in its contribution to notifying or give alertness to the people on the road and creating the traffic lights for further improvements in traffic lights.

Keywords – Arduino Mega, Humidity Sensor, Ultrasonic Sensor, Infrared Sensor, LED, Buzzer, LCD, Traffic Management

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INTRODUCTION

1.1   Research Background

The Enhancing Urban Traffic Flow with Arduino Traffic Management System project is a is a cutting edge initiative aimed at enhancing traffic efficiency and safety in areas. Traditionally traffic lights have been programmed to operate on fixed schedules or rely on sensors that detect vehicles and pedestrians to trigger signal changes. However, with the introduction of traffic light controllers real time adjustments can now be made based on traffic conditions resulting in reduced congestion and increased safety. This innovative project utilizes a variety of sensors and data sources, including humidity sensors, infrared sensors, ultrasonic sensors, LEDs, buzzers, LCD displays and flashing lights. By detecting vehicle presence and alerting others accordingly it helps minimize accidents while also providing drivers with, up to date weather information, in time.

1.2   Problem Statement

Common signal systems do have a disadvantage, they function with set schedules and result in waste and inefficient traffic Secondly, there are frequent examples in which cars are lined up for a long time at intersections while the other lanes remain empty. This can be a source of annoyance to the drivers and a waste of fuel that will contribute to air pollution. [1]

However, there is a potential solution to this problem which involves adjusting traffic light timing with sensors. The sensor system can measure the number of approaching vehicles so that traffic signals are adjusted to allow for the flow of traffic. [2]

Eventually, it uses machine learning algorithms to analyse traffic trends and predict the weather. Eventually, if this is the case, people waiting at intersections can sigh in relief as traffic here will improve. [3]