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Advanced Utilisation of Street Lights

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Abstract: ***The Advanced Street Light model could be implemented by making a clutch-like device for the street lights. It would be controlled using Arduino and GPS to transfer information and provide signals Siren and the LED Matrix which is embedded in the clutch-shaped body and placed at the upper part of the pole.***
The introduced model would utilize the height of the pole to serve for following major applications:
(a) To clear the pathway used by emergency vehicles like ambulance and police vehicle.
(b) To alert the police and the public about an emergency condition in an area.
(c) To reduce the number of accidents happening on highways.
Keywords: Arduino, GPS, LED Matrix, Mobile App, Road Safety.

I. INTRODUCTION

A. In the present time, Some of the major problems we are facing include:

1) The heavy traffic in roads which is leading to the delay in emergency vehicles like ambulance which is responsible for the major amount of mishappenings that took place just due to the poor and inefficient traffic management system in case of emergencies.

2) The number of accidents during foggy days is also a matter of serious concern.

3) Unavailability of Instantaneous help required for an emergency situation.

Fig. 1: Accident on road

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Fig. 2: ASL device installed on street light pole.

Also, the Streetlight poles have a major part of its length under-utilized. Therefore we face the need to install a device on the underutilized street light poles so as to provide a cost-effective solution to all these major problems and we name it the Advanced Street Lights (ASL). The electronic hardware required for its construction includes Arduino, GPS, LEDs, Siren and the software part includes a Mobile app which would help in the controlling of the whole system. The LEDs embedded in the clutch-shaped body and the Siren would be responsible for all the local notification provided by this system. As the number of accidents increases during the foggy days due to lack of visibility so red LED's are used as it would provide the maximum visibility due to longer wavelength, the red color will penetrate more and scatter back less from the fog particles. Also, a loud siren would be enough to ensure that the alert is heard by all the drivers even with the windows closed.

II. OBJECTIVE

The Objective of making this device is to decrease the number of mishappenings due to time-delay for emergency vehicles, accidents due to fog and to provide a safer atmosphere to the individuals. The applications of the advanced street light networkcould help improve security and contribute towards a safer environment.

III. METHODOLOGY

In case of emergency, the registered home user shall use the ASL app to notify the control station for help. On pressing the 'HELP' button, the app shall fetch the user's location and send it to the server. The Arduino and GSM circuitry fetches the data from the server, switch on the lights and siren of that area, and notify the emergency control station by sending the user's information and location

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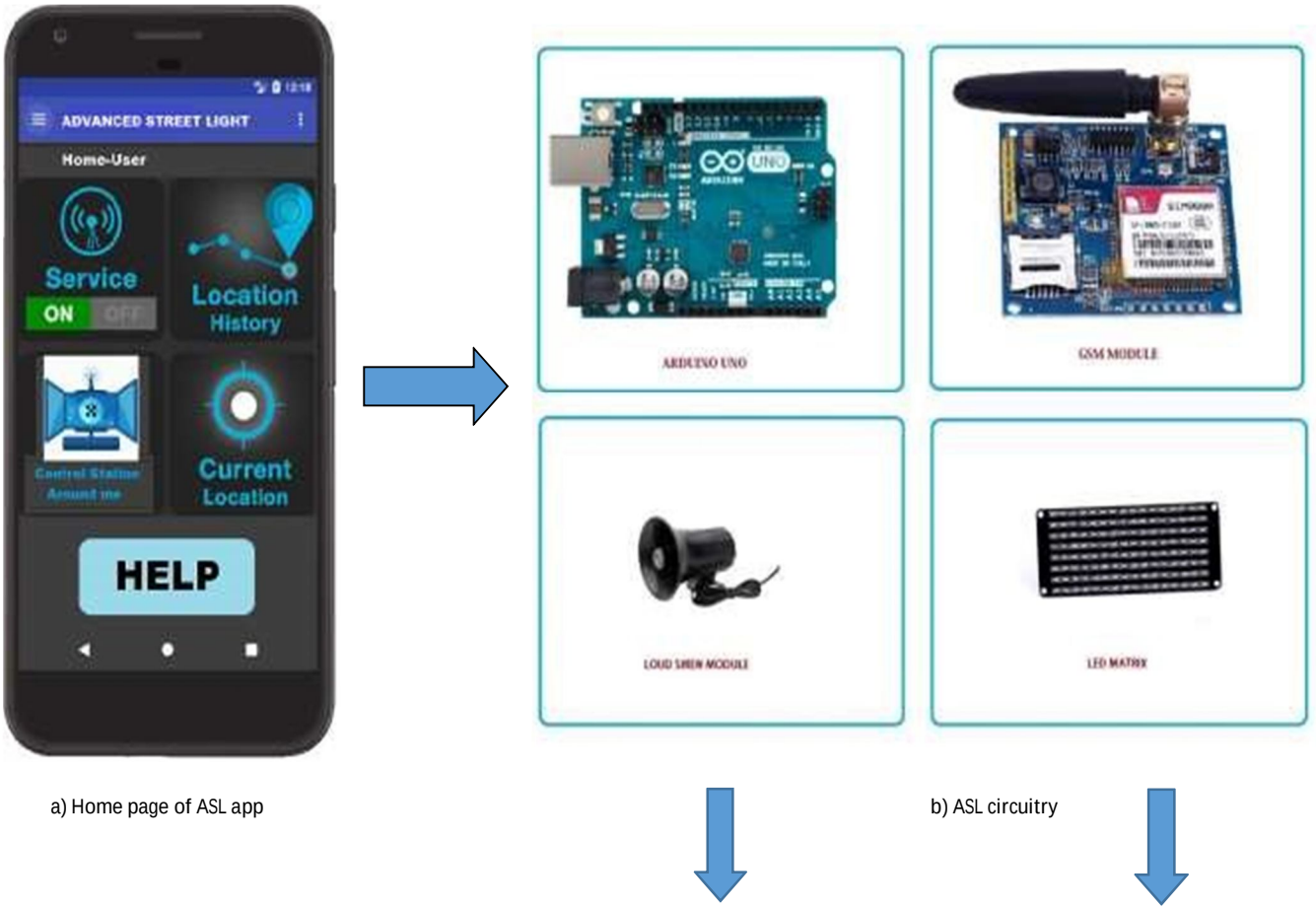

a) Home page of ASL app

b) ASL circuitry

(c) Street lights turned red and alarms switched

(d) Emergency Control Station

Fig. 3: Sequence of steps to help in case of emergency using ASL system.

Ambulances use the authorized user page of ASL app to find its current location, set its path on Google maps, and send the location of the user simultaneously to the server. The Arduino and GSM circuitry fetch the data from the server to switch on the succeeding street light for the traffic to clear the way before the user reaches there.

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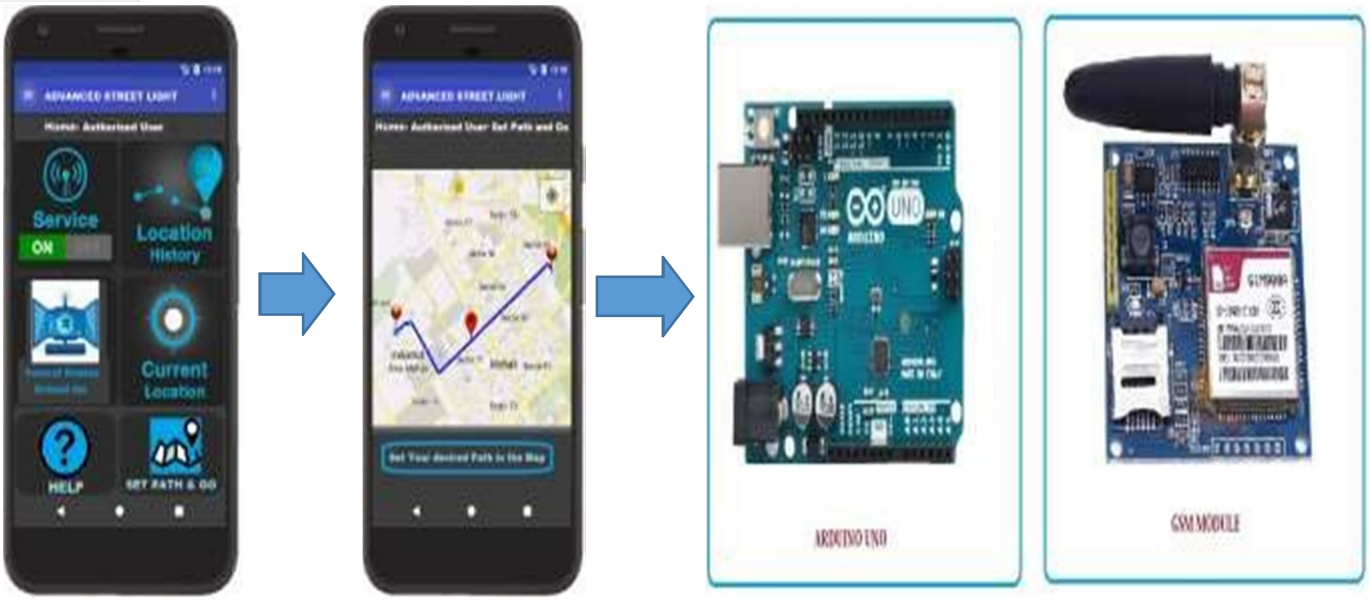

(a) Authorized user frame of ASL app (b) Setting path on Google Maps in ASL app (c) Arduino + GSM

(d) Street lights (red) turned on

\Fig. 4: Sequence of steps to help ambulances reach its destination on time

Interrupt buttons are attached to the street lights of highways which are controlled by an Arduino + GSM circuitry. In case of accident due to fog/mist, the interrupt button is pressed which immediately switches on the LEDs and alarm and the location is sent to the server immediately by the Arduino circuitry. This information is fetched from the server and sent to the nearest control station for help.

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(a) Interrupt button pressed

(b) Arduino + GSM

(c) Street lights turned red and alarms switched on

(d) Emergency Control Station

Fig. 5: Sequence of steps to notify about an accident on highways (during foggy days)

III. CONCLUSION

With an increase in awareness about ASL and its advantages, it would help reduce crimes to a major extent due to:

A. The 'HELP' facility available in the app for people at the time of danger.
B. Increased fear of being caught in criminals.

According to statistics, one person dies every 4 minutes in our country. Road accidents emerge as the cause of 35% of these deaths. It means that there are approximately 1,32,000 deaths due to road accidents only, out of which 55%, i.e. 72,000 deaths, is due to visibility issues (fog/mist in winters) and ambulance delay itself. If 10% of the population utilizes the ASL system and if only 10% of them are helped and benefitted from this, we shall be able to save around 720 lives each year. Therefore, ASL is an efficient and cost-effective approach towards helping the society and protecting lives. Furthermore, the ASL system will be a boon to traffic management in India.

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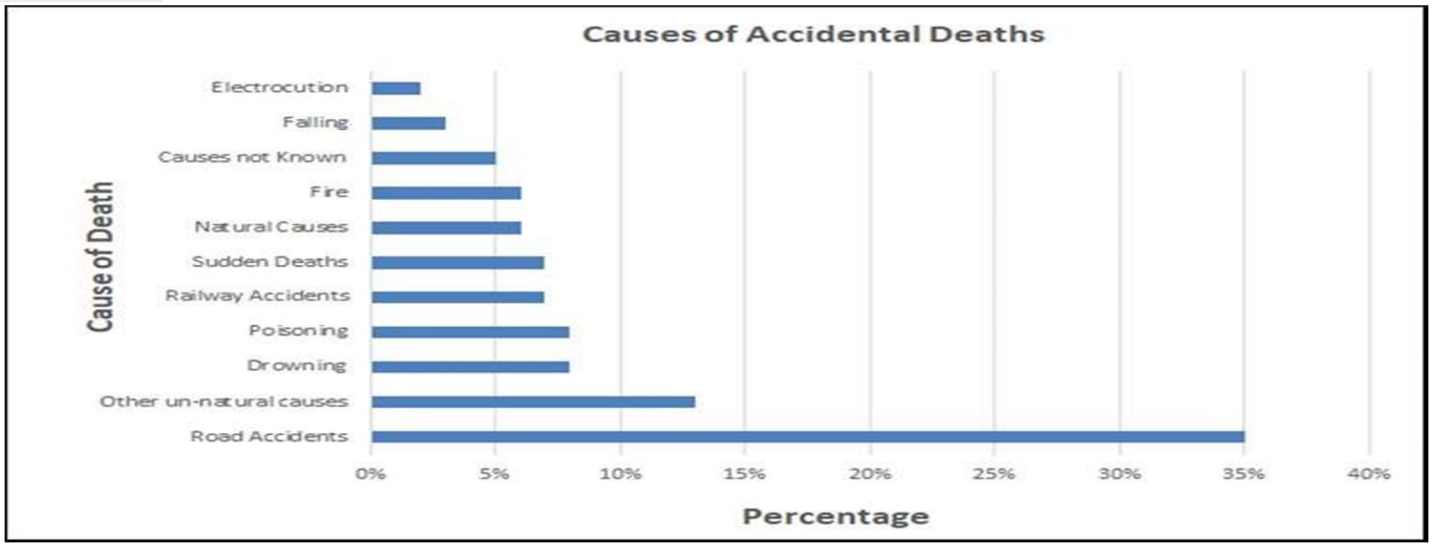

Fig. 6: Causes of deaths due to accidents in India

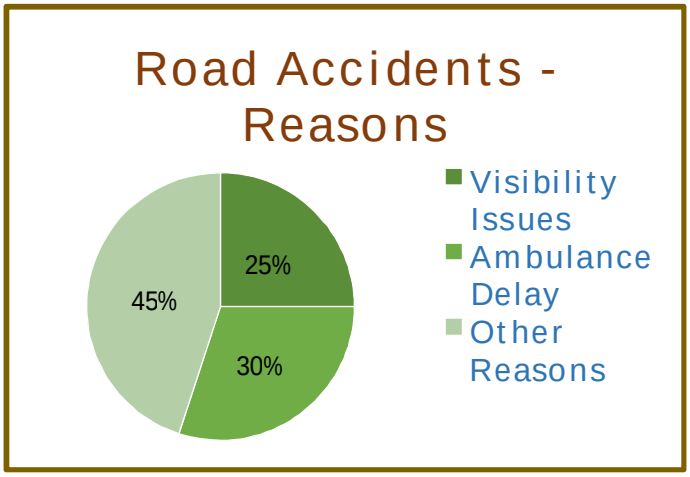

Fig. 7: Reasons for Road accidents in India

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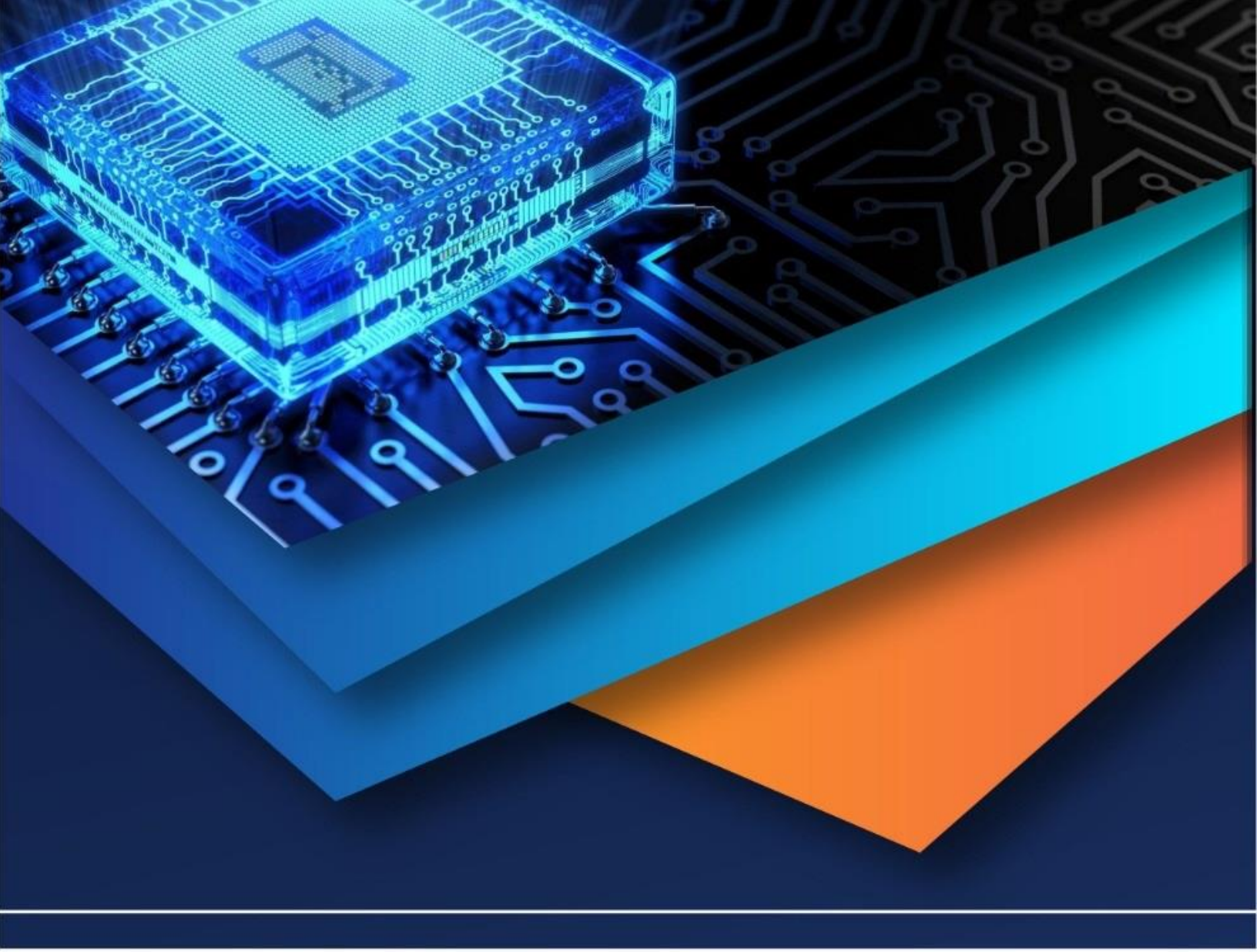

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