Vehicle Accident Prevention and landslide detection system In the Mountain roads

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ABSTRACT:
This overview of security measures that should be taken in the guard section. The main reason behind these safety measures is to prevent the accidents on girder roads. The main problem with these curved roads is that drivers cannot see vehicles coming from other side . Driving at high speeds makes it difficult to control and can lead to accidents. So the main goal is to prevent such problems. Here we use a sensor with anmicrocontroller board consisting of an Radar sensor to detect incoming vehicles, a piezo sensor to detect landslides, an LED light, an LCD display, GSM, and a buzzer. When a vehicle enters at one end, the sensor flashes a red light at the other end to alert the driver, In the event of a landslide, an early distance warning will be issued and the message is given to the nearby police station or ambulance service.

KEYWORDS: Piezo sensor, Radar Sensor, Accident Prevention, Mountain roads, Buzzer, lcd display,

I.   INTRODUCTION

There many narrow roads, and winding roads, and they are often seen in ghat sections. Many accidents occur mainly on such roads. The main problem with these curved roads is that drivers cannot see vehicles on other side of the curve. Driving at high speeds makes it difficult to control and can lead to accidents. So the main goal is to prevent such problems. Driving a ghat section is no easy task. Drivers should receive some kind of warning signal while driving. Accidents occur mainly on ghat roads for many reasons. Second, drivers cannot see vehicles coming from the other side of the curve. On ghat sections or winding roads, vehicles travelling uphill must have priority. However, the problem is that rules are not followed, leading to accidents.

Fig . Ghat section Road

A landslide is the downward movement of soil, rock, and organic matter under the gravity, as well as the terrain resulting from that movement. Landslides are also known as landslides, landslides or slope failures. Early warning systems significance is to minimize human impact, property damage, and loss of life from landslides. The ability to monitor slope movement in a accurately will notify people of potential suspension errors and give them sufficient lead time to move to a safer location.

II.   LITERATURE REVIEW

The system proposed by V. Goud concerns an automatic accident detection system involving vehicles, which sends information about the accident, including where, when and at what angle it occurred, to the rescue teams such as emergency centers and police stations. This information is sent as a warning message. But in the event that no one is injured, a switch is provided which the driver can turn off to stop sending the warning message. The GSM module is used to send warning messages and the   GPS module is used to track the location of the

accident.The GPS and GSM modules are connected to the control unit [1] via serial communication.

Ashutha K described that the proposed system aims to reduce the loss of human life due to road accidents and performs three main tasks - (1) detects accidents and sends the location to the nearest hospital, (2) control the traffic light taking the route. The vital parameters of the patients inside the ambulance are monitored by the ambulance and this information is sent to the hospital. [2]

Kartik Venkata Mutya, Sandeep Rudrapro posed a system where ultrasonic sensorsare used to detect vehicles and give guidance through lights to avoid crashes at turn points. Thanks to this technol ogy, it is possible to recognize where the vehicle is at the turning point. This technique is easy to imple ment. Avoid accidents and save lives. [3]

According to M. Amin, M. SobhanBhuiyan, M. IbneReaz and S. Nasir, the design focuses on measuring and controlling eye blinks using infrared sensors to prevent vehicle crashes when drivers become drowsy while driving. flying.The blink sensor acts as a detection unit to determine if the driver is drowsy while driving and is also an input for the control unit. The Arduino Uno microcontroller is the main part of this design, the power supply maintains the output voltage at a constant 5V required by the microcontroller, and the relays use low voltage circuitry to switch to vehicle state to control motors, brake motors and horn. Horns that alert the driver with a warning signal when drowsiness is detected, traffic lights that alert drivers to nearby vehicles, and automatic braking systems that gradually bring the vehicle to a stop [4].

Chitransh Srivastava, Nikhil Acharya said the installation of the collision avoidance system is aimed at reducing the risk of collisions on hilly roads, ghats or other blind hairpin bends. The proposed system consists of a series of proximity sensors and road warning lights, combined with convex mirrors. [5].

M.Z. Hossain, N.A. Rahim enJ.Selvaraj described that the output characteristics of photovoltaic modules are not linear and that the amount of electricity generated by photovoltaic panels depends on solar radiation and cell temperature, which causes output power fluctuations. Therefore, to overcome this problem and extract the maximum power from the PV module, an integrated DC-DC converter with maximum power point tracking (MPPT) algorithm should be used as a charge controller in the PV system [6].
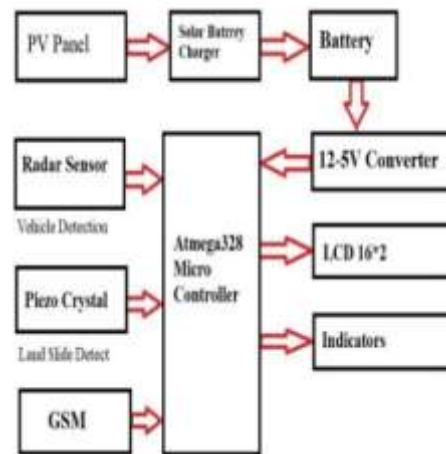
III.   METHODOLOGY

Fig. Block Diagram Of Proposed system.

MPPT:

Typical solar panels only convert 30-40% of incoming solar radiation into electricity. Maximum power point tracking technology is used to increase the efficiency of solar panels.   According   to   the maximum power transfer technique, the output pow er of a circuit is maximum when the source impeda nce matches the load impedance. On the supply sid e, a buck converter is connected to the solar panel t o step up the output voltage. By properly changing the duty cycle of the buck converter via the PWM s ignal, the source impedance matches the load impe dance.

Several MPPT techniques have been prop osed. Among these methods, perturb and observe (P&O) is widely used.A typical solar panel converts only 30 to 40 percent of the incident solar irradiation into electrical energy. Maximum power point tracking technique is used to improve the efficiency of the solar panel. According to Maximum Power Transfer technique, the output power of a circuit is maximum when the source impedance matches with the load impedance. In the source side a buck converter is connected to a solar panel in order to enhance the output voltage. By changing the duty cycle of the buck converter appropriately by PWM signal the source impedance is matched with that of the load impedance. There are various MPPT techniques are proposed. Among those methods, the perturb and observe (P&O) is widely used.

Perturb and observe MPPT algorithm :

In this proposed system, a perturb-and observe MPPT algorithm is used. In this method, the controller slightly adjusts the grid volta

ge and measures the power, and if the power increases, further adjustments are attempted until the power no longer increases. This is called the P&O method. It is the most widely used MPPT method due to its ease of implementation and cost effectiveness**.**

This P&O algorithm periodically increases or decreases the voltage at the output terminals of the photovoltaic cell and compares the power obtained in the current cycle with the power in the previous cycle. If the power is increased, it is assumed that the operating point has moved closer to the MPP. Therefore, further voltage disturbances in the same direction should shift the operating point towards the MPP. If the power is reduced, the operating point has moved away from the MPP and the direction of the disturbance must be reversed to return to the MPP.
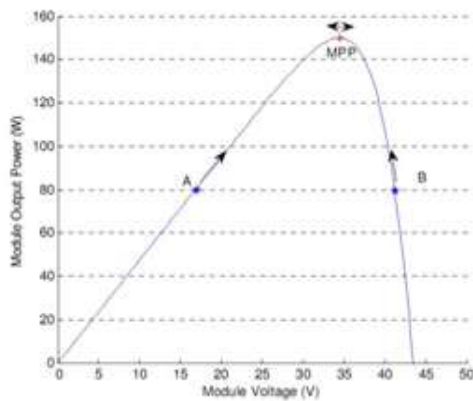
Fig.Characteristics of the solar panel showing **the** MPP and operating points A and B.

The figure shows the module output power plotted against the module voltage for a given solar panel irradiance. The point marked mpp is the maximum power point, the theoretical maximum power that can be obtained from the photovoltaic panel. Consider A and B as two operating points.

As shown in the figure, point A is the left side of mpp. So we can switch to mpp by providing a positive perturbation to the voltage. On the other hand, point B is to the right of mpp. When we give a positive perturbation, the resultant value ΔP of the power change becomes negative, so the direction of the perturbation has to be changed to reach mpp.
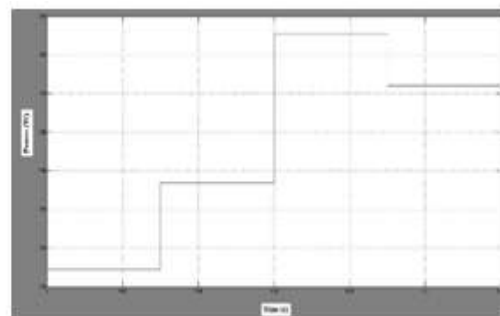
System:

Hardware design consists of Radar sensor, a microcontroller, GSM, Buzzer, solar panel 20watt, 12v 6amp lithium battery, indicators andRadar sensor is used for detecting the vehicle or obstacle and to operate the LED, indicators by using microcontroller. We make use of lights to show the driver coming from other side that the someone is coming from other side. Piezo crystal is used to detect land slide. System is solar powered so as to operate on renewable energy only if grid is not available.

When a vehicle is present, the sensor   then detects the vehicle and the light turns on. If   there is no vehicle, the sensor does not detect, the lights do not come on and the buzzer does not sound. This process is repeated over and over again.
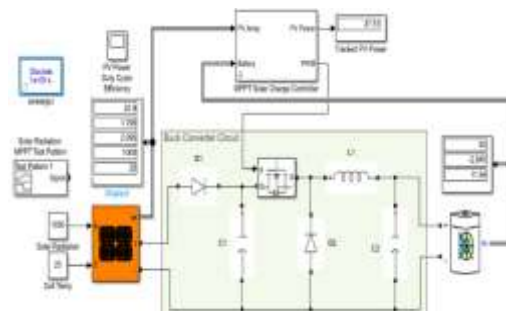
Fig.Matlab model of the MPPT system using P&O algorithm

Fig:Graph of PV array output power against time using MPPT

Test and Result :

The system is applied step by step and each step has been experimentally tested to ensure that it is correct. It is important that this system achieves accurate and expected results. The tests and results of the main system implementation steps are presented below.

Fig .LCD Display

Here,the power for this system is taken from the solar Panel is of 20 watt and for stored in the battary of 12v .Due to the battary it has the backup of usually 24 hours. This system is implemented in the Mounatin roads wheredriver coming from other side is not visible to driver of this side.

The hardware part consist of the of Radar sensor whose range is of 20-22 feet and speaker whose voice is goes upto 1km and piezo vibration sensor for the landlsidedetection.If the battery voltage is below 13.90v then the charging from solar panel will be on.

The LCD display is shown in above fig,it shows the voltage state of the panel output and the condition of the radar sensor and the piezo sensor as,S1 shows the signal from the radar sensor 1 ,S2 shows the signal from the radar sensor 2,S3 shows the signal of the piezo sensor .If the vibration from the piezo sensor exceeds the cut off state then signal will be given to the microcontroller to turn on the Buzzer.

Fig. System Implementation of Project

IV.   CONCLUSION:

This system was developed using the Arduino 8051 processor. In the transmitter section, there are sensors connected to the Arduino, which are also connected to a power supply. When the sensor detects interference, a signal is sent to the receiver and displayed on the receiver's LCD. Human life and property can be proactively prevented and saved through the use of detection systems.

To minimize Mountain road side accidents, we proposed a project to prevent accidents during turns by switching drivers. This is done by holding an Radar sensor on each side of the U-turn, when the vehicle comes from one end of the turn the sensor detects and this Radar sensor sends a signal to the Microcontroller, LEDs Command lights. In the event of a landslide, an early distance warning is issued and the through the use of Gsm nearby police station or Ambulance get the message.

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