GUIDED REPAIRING OF VEHICLES

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ABSTRACT

Thisprojectworkaimsatdesigningaguidedvehiclerepairsystembyintegratingsensorsandrelays with arduino technology. The sensors gather real-time data to guide the repair process. While the relayenablePrecisecontroloverVehiclecomponents.Whenanyfaultoccurs,thentheinformation is Passed to arduino and it will sense the fault that occurs in the vehicle and receives signal from sound module and displays instructions through the speaker. In this prototype we are considering twomajorproblemsthatisoverheatingofengine andbrakefailure. AccordinglyTemperaturesensor andIRsensorsareused.Thisprojectaimstoempowerdriverstoaddresspotentialissuespromptly, ensuring enhanced vehicle reliability and safety on the road.

KEYWORDS: ArduinoUNO,Sensors,HumanSafety.

INTRODUCTION

The creations of Automated Guided Vehicle (AGV) have been around since the 1950's and the technology was first developed by **Barret Electronics from Grand Rapids, Michigan**. It was then developed by the Europeans in the 1970's and nowadays AGVs can be found in any countries.TheimplementationofguidedRepairingVehiclesusingarduino,relayandsensorwhich mayusedforearlydetectionofissueslikeengineoverheatingandbrakefailureenhancingvehicle reliability and road safety. The Guided vehicle repair system control the power of arduino microcontrollers to create an interactive platform for repairing vehicles. By using sensors like Water,IRandtemperaturesensors,Guidedvehiclerepairsystemcanaccuratelydetectandanalyze various components of the vehicle. The heart of guided vehicle repair system lies in its ability to provideguidedinstructionstomechanicsorvehicleownersthroughouttherepairprocess.Byusing the data gathered from sensors. Guided vehicle repair system can identify specific issues within the vehicle and provide step-by-step guidance on how to rectify them. This not only reduce the cause of troubleshoot but also minimize the risk of accidents.

LITERATURE SURVEY

Theneedofadvancedtechnologyintheendovascularfieldhasattractedmanyresearchstudies.As a result we can find an extensive number of improvements and new ideas with the goals of reducingtime, facilitate surgeryand improve the outcome of the operation . is an impressive work which consists of the develpment of a robot for a vascular interventional surgery (VIS) that has a master- slave structure and involves a fluoroscopic guidance. When one compares conventional surgerytoroboticsurgeryitis commontofindoutthatittakesalittlebitmoretimefortherobotic one to perform the surgery . This can be due to the lack of experience in the surgeon to use the

robotitself.Furthermore,itminimizessurgeon-basederror[1].Thework'sobjectiveistoexamine twoAutomatedguidedvehiclecontrolstrategiesandtheroutesthatthemachineshouldtakewhen transporting heavy loads in challenging circumstances, keeping safety and constraints in mind. Individual decisions made by Automated guided vehicleare always made with the flexibility, resilience,andadaptationoftransportationinmind[2].Thisthesisinvestigatesunsupervisedand supervised methods for predicting vehicle maintenance. The methods are data driven and use extensive amounts of data, either streamed, on-board data or historic and aggregated data from off-board databases. The methods rely on a telematics gateway that enables vehicles to communicatewithaback-officesystem. Datarepresentations,eitheraggregationsormodels,are sent wirelessly to an off-board system which analyses the data for deviations. These are later associated to the repair historyand form a knowledge base that can be used to predict upcoming failures on other vehicles that show the same deviations [3]. The Vehicle systemsare complex both in hardware and software so their maintenance is challenging. Maintenance strategy being used in vehicle industry is normally reactive that results in reduction of lifetime of vehicle and also loss of money. Predictive maintenance is required on this stage to overcome these issues. It will requireeffectivestrategies to keep up the vehicle performance. Vehicles havingverycomplex structureneedaneffectivemaintenancestrategy.Preventivemaintenanceisperformedafter afault has occurred. It is used for infrequent failures when the repair is extremely costly[4].

EXISTING METHOD

Existing car systems include essentials like the engine, transmission, brakes, and suspension. Modern cars also feature advanced technologies such as driver assistance, GPS navigation and Safety systems like airbags etc.
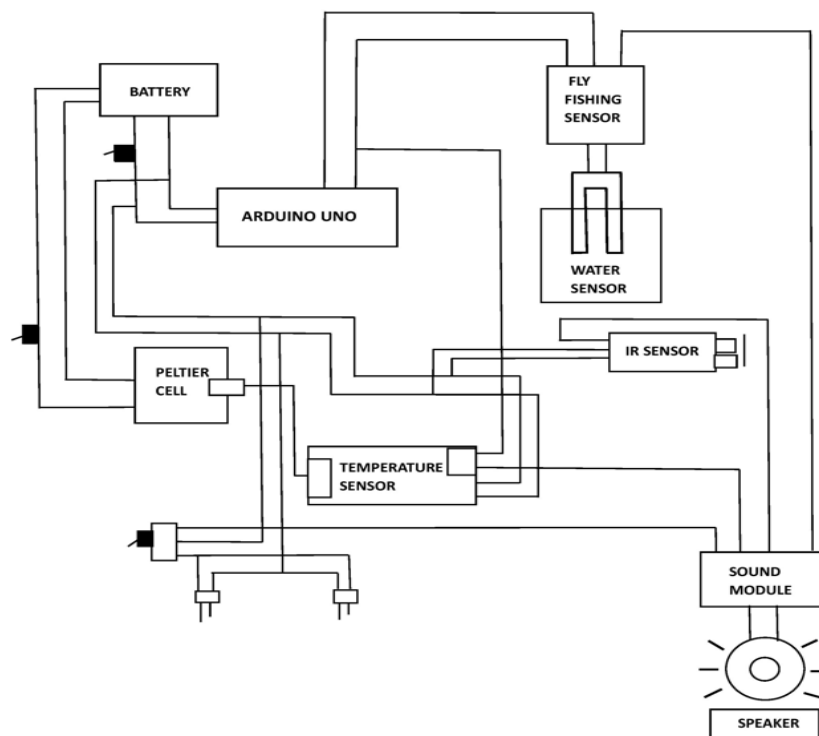

Figure.1.Schematicdiagramforproposedmodel

PROPOSED METHOD

Determinethe commonrepairstepsfor vehiclesthatthesystemwill guide users.Thisinnovative approach aims to provide real-time auditory feedback for critical issues such asoverheating of engine, brake failure, headlights an water sprinklers.Determine the common repair steps for vehicles that the system will guide users.Choose sensors such as Temperature sensor, Water sensor, or IR (Infrared)sensors to monitor relevant parameters during the repair process Utilize Arduino boards to interface with the sensors.Design a user interface, which could be a simple displayto provide instructions and feedback to users throughout the repair process. Develop the logicforguidingusersthrougheachrepairstepbasedonsensordataanduserinputs.Thoroughly test the system to ensure sensors are accurately detecting conditions.
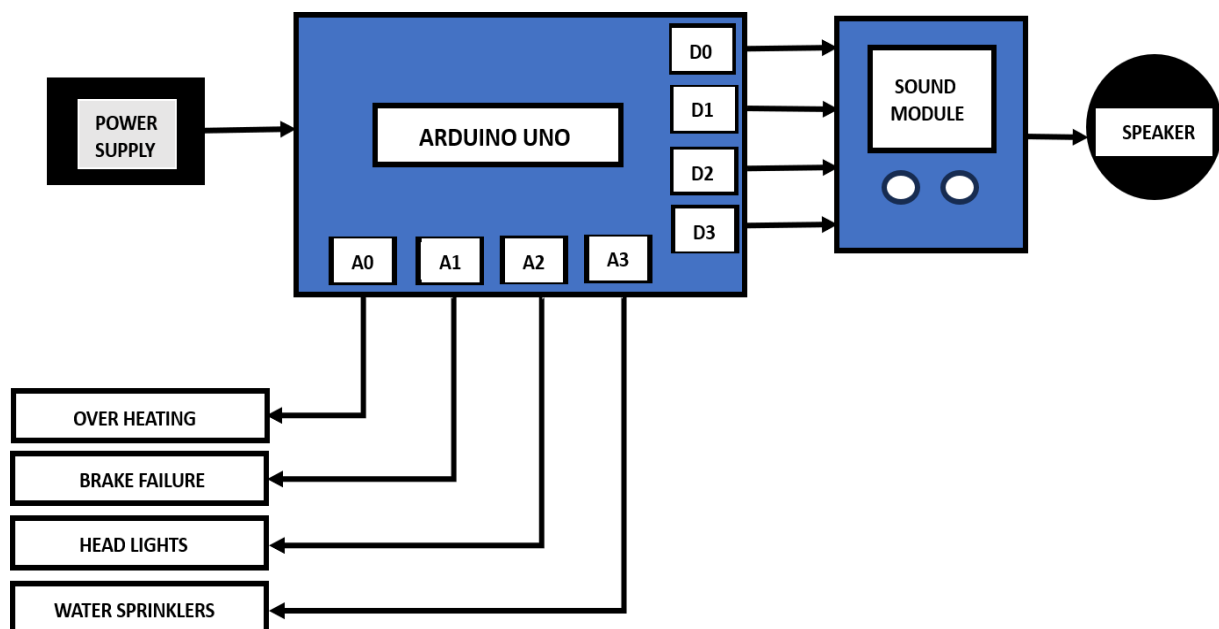

THE DESIGN STRUCTURE OF THE GRV

Arduino UNO, Infrared (IR) sensor, APR33A3 Voice recorder, Andslite 6V 4.5 Ah Battery,Oswal Speaker. These are used for implementation guided vehicle repair system. The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller (MCU) and developed by Arduino.cc and initially released in 2010.IR sensor is an electronic device,that emitsthelightinordertosensesomeobjectofthe surroundings.An IRsensorcanmeasuretheheat of an object as well as detects the motion. These types of radiations are invisible to our eyes, but infrared sensor can detect these radiations. The APR33A3 Voice Recorder and Playback Module is anelectronicdevicedesignedforrecordingandplayingbackaudiomessages.Userscanrecordtheir voice or other sounds onto the module's memory, and then play them back at a later time. The ANDSLITE 6V 4.5 AH battery is a rechargeable lead-acid battery commonly used in various applications such as emergency lighting, security systems, portable devices, and small electronic equipment.Thisbatteryprovidesareliablepowersourceforvariouslowtomoderatepower

applications, offering a balance between performance, cost, and convenience. The Oswal 4 ohm 30 Watt (5-inch) Subwoofer Speaker is a high-quality audio component designed to deliver powerful and immersive sound reproduction, particularly in the low-frequency range. The speaker is constructedwithdurablematerialsandprecisionengineeringtoensurereliableandconsistentaudio output.

RESULT ANALYSIS

Themainproblemwhichisrelatedtoourprojectguidedrepairingofvehicles,usingArduinoand sensors as mentioned below i.e Brake failure.Break failure:

To overcome the problem of brake failure IR sensor is used.In which 4 pads are kept when the brake failure occurs the brake pads gets loose and It will sense the problem through IR sensor which receives signal from sound module and gives instructions through speaker. The IR sensor consists of 3 pins i.e(vcc, gnd, single o/p pin). Infrared (IR) sensors are electronic devices that detect infrared radiation emitted or reflected byobjects. Theyoperate on the principle of detecting changes in the intensity of infrared radiation within their detection range. IR sensors consist of an emitter and a receiver. The emitter emits infrared light, and the receiver detects the reflected or emitted infrared radiation. When an object enters the sensor's detection range, it interrupts or reflects the infrared beam, causing a change in the sensor's output. IR sensors find widespread applications in proximity sensing, object detection, motion detection, and obstacle avoidance in variousfieldssuchasrobotics,automation,securitysystems,andconsumerelectronics.Theyoffer

advantages such as non-contact operation, high reliability, and immunity to ambient light interference, making them versatile and valuable components in many electronic systems.
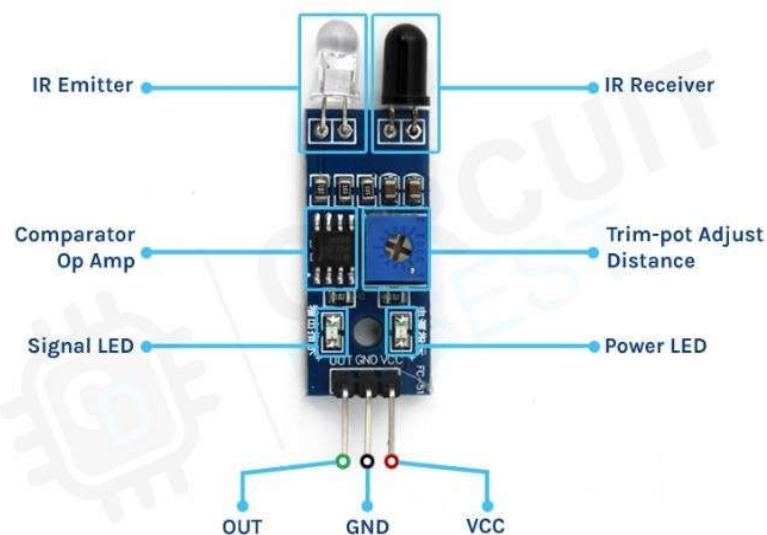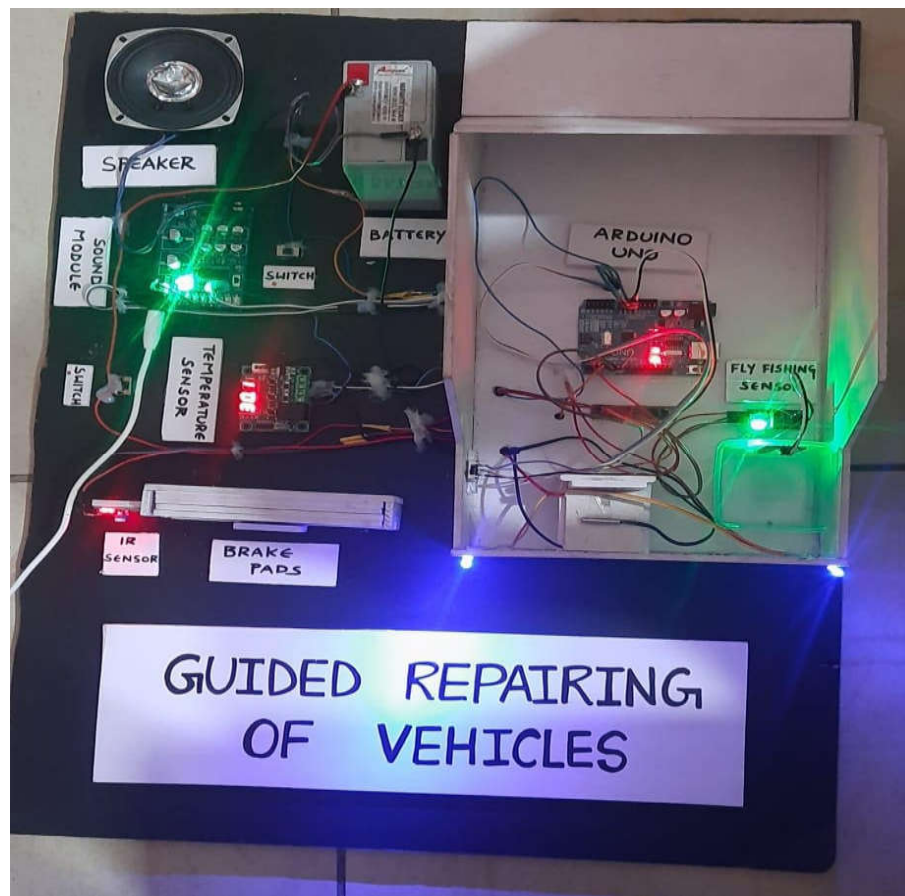
Fig: The output response of the GRV

CONCLUSION

Guided vehicle repair avoids errors, expedites the process, and cuts downtime by methodically locating and fixing issues. It provides technicians with the necessary knowledge and tools they need to quickly fix problems and get the cars back in top operating condition. Furthermore, by guaranteeing precise and effective repairs, this method improves client happiness and creates a satisfying service experience. After identifying the fault, the guided repair system offers detailed guidance for effectively addressing the issue. This guidance includes step-by-step instructions, visual aids, and relevant technical information to assist technicians during the repair process. Furthermore,real-timefeedbackmechanismsareincorporatedtoensuretechniciansarefollowing   the correct procedures and making progress in resolving the fault.

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