

IoT-Based Alcohol Detection and Engine Control System

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Abstract: Most of these days, we hear lot of accidents due to drunken driving. Drunken drivers will not be in stable condition and so the rash driving is the inconvenience for other road users and also question of life and death for the drunken driver and for others. This project is being designed by the modeling software like Catia V5; its analysis is being done by using Ansys Workbench, and later then fabricated. In this project, we are developing an Auto Lock System. Alcohol sensor will be attached with our microcontroller. While alcohol wafers smelled by the sensor. Sensor sends the input voltage to microcontroller. If there are any traces of Alcohol above the set limit, then the system will lock the Engine at the same time will automatically give a buzzer We can avoid accidents by checking the driving people on the roads. So that we can avoid accidents.

Keywords: Drunken Driving Detection, Alcohol Sensor, Auto Lock System, Microcontroller, Engine Locking System, Road Safety, Accident Prevention, Embedded System, CATIA V5, ANSYS Workbench, Buzzer Alert.

INTRODUCTION

Robotics is one of the fastest growing engineering fields of today. Robots are designed to remove the human factor from labor intensive or dangerous work and to act in inaccessible environment. The use of robots is more common today than ever before and it is no longer.

If a robot is used instead, which can be controlled from a distance or which can perform actions intelligently by itself, which will reduce the risk of this task of firefighting. Robot is a mechanical device that is used for performing tasks. There are many types of robots like fixed base robot, mobile robot, underwater robot, humanoid robot, space robot, medicines robot etc. Nowadays, machinery and robotic design become important in helping human.

LITERATURE SURVEY

In today's era Alcohol detection is an dangerous issue. Many authors are working on different techniques for Alcohol detection.. Author Ratnesh Malik et al. has developed an approach towards Alcohol detection. robot. The robot is designed and constructed which is able to extinguish fire. The robot is fully autonomous. It implements the concept likes environmental sensing and awareness, proportional motor control. The robot processes information from its sensors and hardware elements. Ultraviolet, Infrared and visible light are used to detect the components of environment. The robot is capable of fighting tunnel fire, industry fire and military applications are designed and built. Ultraviolet sensors are used to detect fire. Once fire is

detected, robot sounds an alarm. Then the robot activates an electronic valve which release sprinkles of water on the flame. Detailed concept of robot is explained which automatically detects fire and extinguishes it in short time by the use of sensors, microcontroller etc. This robot is used in places where human lives are at high risk.

Wireless Alcohol detection. robot is developed by Swati Deshmukh et al. It comprises of machine which has ability to detect fire and extinguish it. The Alcohol detection. robot can move in both forward and reverse direction and can turned in left and right directions. Thus fire fighter can operate the robot over a long distance and there is

no need for human near the area on fire. Light dependent resistors are used for detection of fire. These resistors are highly sensitive devices and are capable of detecting very small fire. The robot provides security at home, buildings, factory and laboratory. It is an intelligent multisensory based security system which contains Alcohol detection. system in daily life.

Cell phone controlled robot with fire detection sensors developed by Lakshay Arora consists of mobile phone which controls a robot by making a call to the mobile phone which is attached to the robot. During the call activation period, if any button is pressed on the phone, the tone corresponding to the button pressed is heard at the other end of the call that is placed on the robot. The robot perceives Dual-Tone Multiple-Frequency (DTMF) tone with the help of phone mounted on the robot. The received code is processed

Syed Ali Saif Khundmiri *et. al.*, / **International Journal of Engineering & Science Research**

by the microcontroller and then the robot performs actions accordingly. In the proposed system DTMF technology is used to position the shaft of motor at a required point with different sensors, each performing its own task. Rugged, Simple and cost effective system is proposed here.

Android Phone controlled Robot Using Bluetooth is developed by Arpit Sharma *et al.* various techniques of Human Machine interaction using gestures are presented. Gestures are captured by using the accelerometer. The paper analyses the motion technology to capture gestures using an android smart phone which has inbuilt accelerometer and Bluetooth module to control kinetics of the robot. The microcontroller controls the signals of the Bluetooth module. Features like user friendly interface, lightweight and portability OS based smart phone has overtaken the sophistication of technologies like programmable glove, static cameras etc making them obsolete.

Author Saravanan P has designed and developed an Integrated Semi-Autonomous Alcohol detection. Mobile robot. The System controls four

D.C. motors powered by Atmega2560 and controlled autonomously by navigation system. Navigation system comprises of integrated ultrasonic sensors and infrared sensors. The robot is fitted with wireless camera which captures the video and transmits it to the base station. The fire detection comprises of LDR and temperature sensor. If there is a fire the sensor detects it and the robot will be moved to the source and extinguishes it. The extinguishing system consists of a BLDC motor with water container. The SABOT can be operated manually for extreme conditions. It comprises of a GUI support through which robot can be controlled from the base station.

Remote Controlled Alcohol detection. Robot developed by Phyo Wai Aung describes the functions of remote control Alcohol detection. robot. It contains two main parts that is transmitter and receiver in which two sets of RF modules are used. One RF module is used to transmit the data to the motor driver and another RF module is used to know the condition on fire. Microcontroller PIC16F887 is used operate the whole system of the Alcohol detection. robot. The motors are driven by the L298 and ULN2003 drivers in this system. The operator controls the robot by using wireless camera mounted on the robot. If the temperature of fire sight is above 40 degree Celsius, the alarm will be ringing so that operator can control the Alcohol detection. robot and avoid the damage of heat. Authors Prof. Dr. S.N. Kini, Rutuja Wadekar, Shweta Khatade, Sayali Dugane and Rutuja Jadkar proposed a firefighting robot which included a project that aims to promote technology innovation to achieve a reliable

and efficient outcome. The movement of the robot is controlled by the sensors which are fixed on the mobile platform is to provide security of home, laboratory, office, factory and building is important to human life. They also developed an intelligent multisensory based security system that contains an Alcohol detection. system in our daily life. It included the design of the fire detection system using sensors in the system, and program the fire detection and fighting procedure using sensor based method.

OBJECTIVES AND PROBLEM STATEMENT

The objectives for this project are:

- i. To study a robot which can search, detect Alcohol immediately and develop a program using to control the movement of the robot.

Project Scope

The project scopes for this project are:

- i. The robot will stop automatically when the driver is under the influence of alcohols

WORKING METHODOLOGY

A robot is an automatically guided machine, able to do tasks on its own. This project, which is our Endeavour to design a Alcohol detection. Robot, comprises of a machine which not only has the basic features of a robot, but also has the ability to detect mine.

DESCRIPTION OF COMPONENTS

Microcontrollers

Microprocessors and microcontrollers are widely used in embedded systems products. Microcontroller is a programmable device. A microcontroller has a CPU in addition to a fixed amount of RAM, ROM, I/O ports and a timer embedded all on a single chip. The fixed amount of on-chip ROM, RAM and number of I/O ports in microcontrollers makes them ideal for many applications in which cost and space are critical.

Voltage regulator

As the name itself implies, it regulates the input applied to it. A voltage regulator is an electrical regulator designed to automatically maintain a constant voltage level. In this project, power supply of 5V and 12V are required. In order to obtain these voltage levels, 7805 and 7812 voltage regulators are to be used. The first number 78 represents positive supply and the numbers 05, 12 represent the required output voltage levels. DC MOTOR

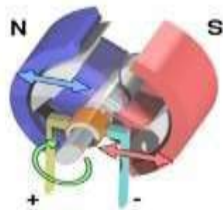
WORKING PRINCIPLE OF A DC MOTOR

A DC motor is an electric motor that runs on DC electricity. It works on the principle of electromagnetism. A current carrying conductor when placed in an external magnetic field will experience a force proportional to the current in the conductor.

OPERATION OF A DC MOTOR



There are two magnetic fields produced in the motor. One magnetic field is produced by the permanent magnets and the other magnetic field is produced by the electrical current flowing in the motor windings. These two fields result in a torque which tends to rotate the rotor. As the rotor turns, the current in the windings is commutated to produce a continuous Torque output this makes the motor to run.



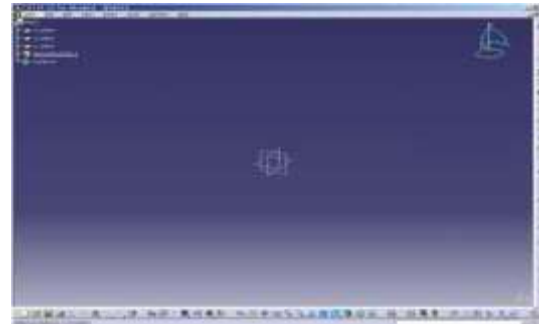
A simple DC electric motor. When the coil is powered, a magnetic field is generated around the armature. The left side of the armature is pushed away from the left magnet and drawn toward the right, causing rotation.

DESIGN METHODOLOGY OF ALCOHOL DETECTION VEHICLE

Introduction to CATIA

CATIA (Computer Aided Three-dimensional Interactive Application) is a multi-platform CAD/CAM/CAE commercial software suite developed by the French company Dassault Systems. Written in the C++ programming language, CATIA is the cornerstone of the Dassault Systems product lifecycle management software suite. CATIA competes in the high-end CAD/CAM/CAE market with Cero Elements/Pro and NX (Unigraphics). The 3D CAD system CATIA V5 was introduced in 1999 by Dassault Systems. Replacing CATIA V4, it represented a completely new design tool showing fundamental differences to its predecessor. The user interface, now featuring MS Windows layout, allows for the easy integration of common software packages

Fig: 1: Home Page of CatiaV5



Modeling Of Alcohol detection. Vehicle In Catia V5

This **ALCOHOL DETECTION. VEHICLE** is designed using CATIA V5 software. This software used in automobile, aerospace, consumer goods, heavy engineering etc. it is very powerful software for designing complicated 3d models, applications of CATIA Version 5 like part design, assembly design. The same CATIA V5 R20 3d model and 2d drawing model is shown below for reference. Dimensions are taken from. The design of 3d model is done in CATIA V5 software, and then to do test we are using below mentioned software's.

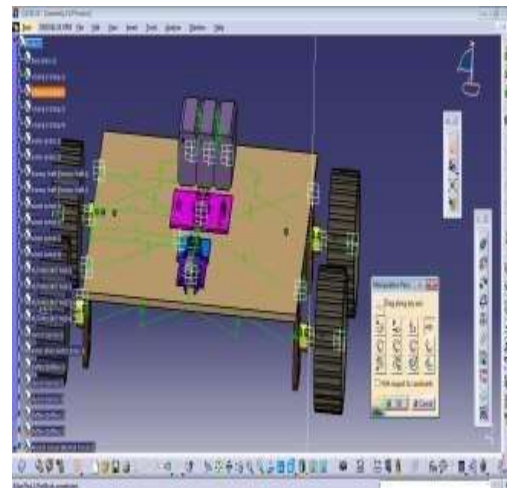


Fig: 2: Model design in CATIA-V5

Assembly Modeling of Alcohol detection. Vehicle

In this modeling each and every component get assembled together with the means of constraints, coincidence, contact, offset, angle, fix component, flexible, manipulate, etc.

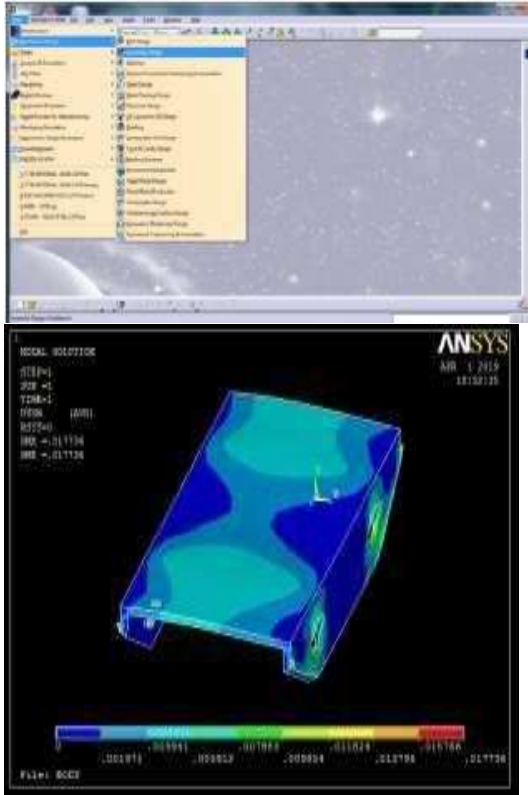


Fig. 3: Addressing to the Assembly

ANALYSIS OF ALCOHOL DETECTION. VEHICLE

Procedure for FE Analysis Using ANSYS: The analysis of the components is done using ANSYS. For motor and attached system is to carried out by applying moments at the rotation location along which axis we need to mention. Fixing location is bottom legs of the components.

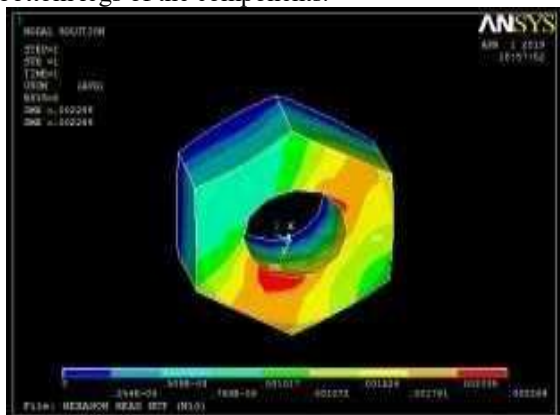


Fig. 5: Displacement of Hexagonal nut



Fig. 4: Importing the existing Catia V5 file in the Assembly Modeling System

Multi View: This is the command in which all the views of the component / model can be displayed on the screen at a same time, they can be edited under the workbench.

Preprocessor

In this stage the following steps were executed:

Import file in ANSYS window

File Menu > Import> STEP > Click ok for the popped up dialog box > Click

Browse" and choose the file saved from CATIAV5R20 > Click ok to import the file

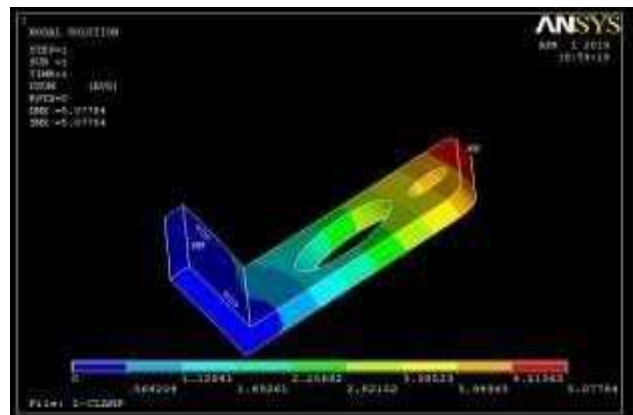


Fig. 6: Displacement of L-clamp

Results of Stress analysis:

7.1 Results of Strain analysis:

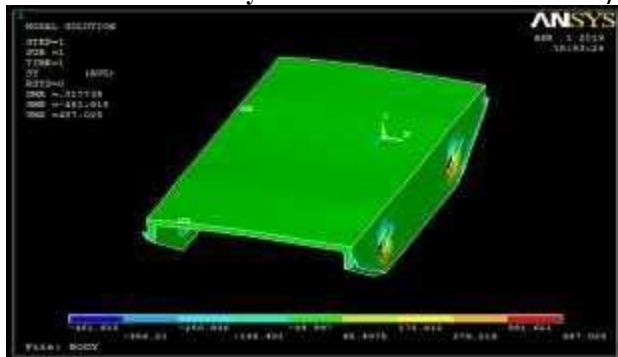


Fig: 7: Stress Analysis of Body

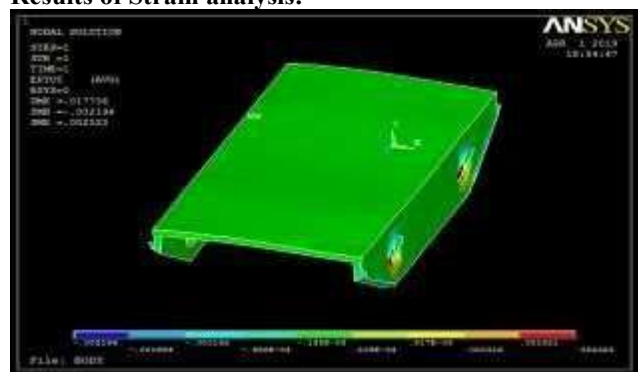


Fig: 11: Strain Analysis of Body

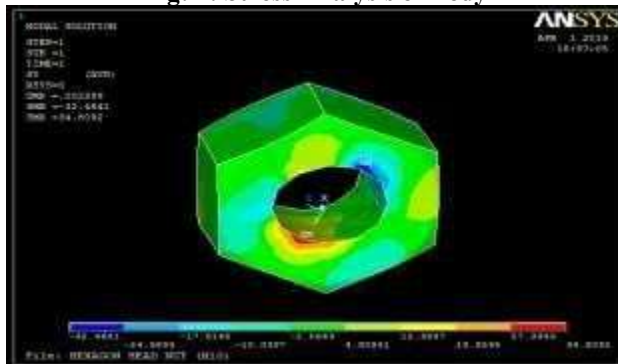


Fig: 8: Stress Analysis of Hexagonal nut

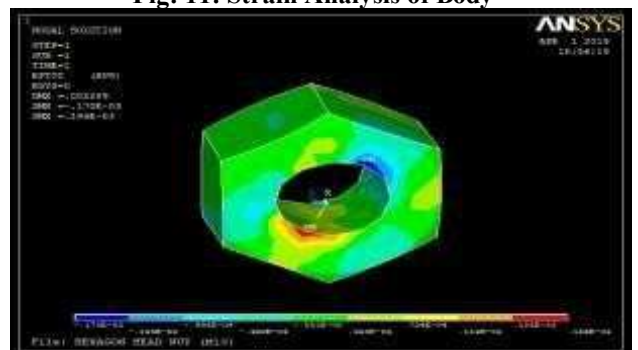


Fig: 12: Strain Analysis of Hexagonal nut

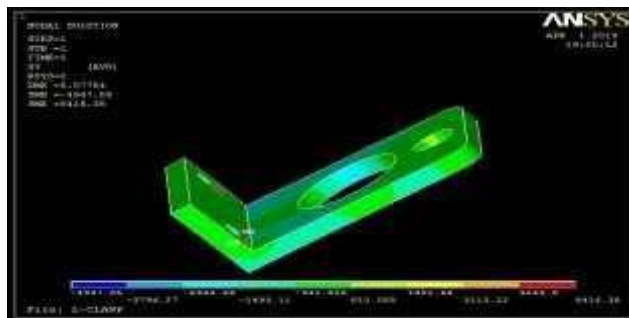


Fig: 9: Stress Analysis of L-clamp

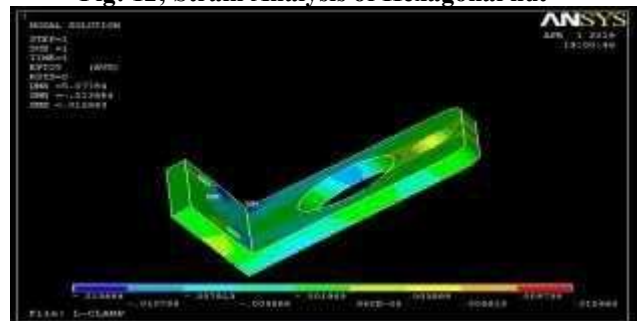


Fig: 13: Strain Analysis of L-clamp

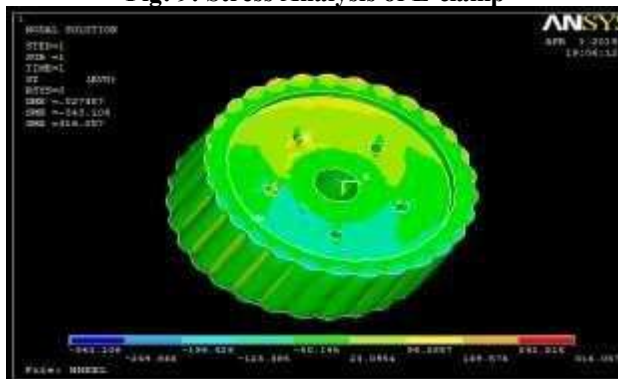


Fig: 10: Stress Analysis of Wheel

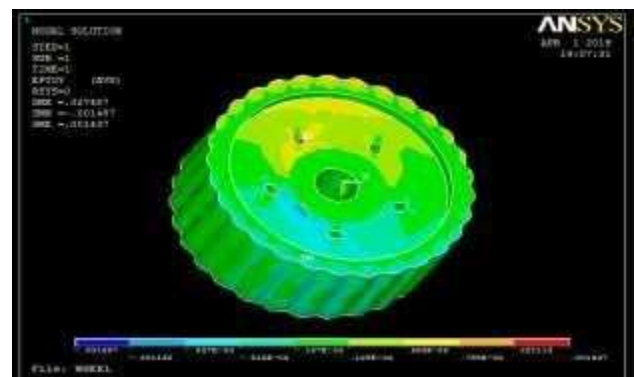


Fig: 14: Strain Analysis of Wheel

CONCLUSION

This paper has set out a vision of how aspects could be automated in the future. Although existing manned operations can be efficient over large areas there is a potential for reducing the scale of treatments with autonomous machines that may result in even higher efficiencies.

As shown above figures, we are considering the Analysis results of Alcohol Detection Vehicle as they are the major working components in the project, so the displacement of the design is meshed and solved using Ansys and displacement is $-0.968E-04\text{mm}$ and 0.006145mm , which is very less. This is showing us that clearly each component in robot assembly is having minor displacement.

Stress is at the fixing location (Minimum Stress which is acceptable), stress value is -1.36622MPa and 0.672097MPa . The value which is very less compared to yield value of Aluminum & Mild steel; this is below the yield point. The maximum strain is $-0.921E-05$ and $0.115E-05$, this solution solving with the help of Ansys software so that the maximum stress is less .so we can conclude our design parameters are approximately correct.

The development process may be incremental but the overall concept requires a shift in the way we think about mechanization for Alcohol Detection Vehicle that is based more on plant needs and novel ways of meeting them rather than modifying existing techniques.

REFERENCES

1. Alcohol Detection Vehicle Take the Field: Science Fiction in the News
2. The Oracle Robot (<http://kernow.curtin.edu.au/www/Agrirobot1/oracle.htm>)
3. The Shear Magic Robot (<http://kernow.curtin.edu.au/www/Agrirobot1/shmagic.htm>)
4. Fruit Picking Robot (<http://kernow.curtin.edu.au/www/Agrirobot1/frutrob.htm>)
5. Multi-Function Robot Is Powered by the Sun(<http://goodcleantech.pcmag.com/future-tech/280063-agbot-multi-function-robot-is-powered-by-the-sun>)
6. A fully customizable home robot (<http://www.zdnet.com/blog/emergingtech/a-fully-customizable-homerobot/1102>)
7. Harvest Automation, Inc. (<http://www.harvestautomation.com/>)
8. "Robotic Harvesting" (<http://www.roboticharvesting.com>).

9. <http://www.agrobot.es>
10. "Casmobot" (http://www.frobomind.org/index.php/FroboMind_Robot:Archive).
11. "The Field Robot Event" (<http://www.fieldrobot.nl/>).
12. "HortiBot - A Plant Nursing Robot" (<http://www.hortibot.dk/>).
13. Blue River Technologies (<http://bluerivert.com/>)
14. "Down on the Farm, Will Robots Replace Immigrant Labor"

BIOGRAPHIES



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