Anti-Theft Steering System

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Abstract:- **The objective of this work is to design and fabricate an anti-lock steering control system by locking the steering of the car with the help of microcontroller. This project is very useful for anti-theft, because steering unit is locked when vehicle is in the parking condition. Steering is released when the password is matched with the owner's password.**

And if the password is mismatched at the attempt of three times, the alarm is switched ON. When the vehicle is parked, anti-lock steering system is activated by the microcontroller.

This motivates people to develop the technology into regular use. In this proposed system, password is incorporated existing vehicle security system. The model is to be constructed in modular form thus allowing the replacement/ interchange of the various blocks and their associated technologies.

Key Words: microcontroller, password, security system, anti-theft steering system.

INTRODUCTION

Nowadays Automation occupies various electronic sections by its comfortable nature. This is an era of automation where it is broadly defined as replacement of manual effort by electronic power in all degrees of automation. The operation remains an essential part of the system although with changing demands on physical input as the degree of mechanization is increased.

Degrees of automation are of two types:

1) Full automation.

2) Semi automation.

In semi automation a combination of manual effort and electronic power is required whereas in

full automation human participation is very negligible.

NEED FOR AUTOMATION:

Automation can be achieved through computers, hydraulics, pneumatics, robotics, etc., of the sources; electronics form an attractive medium for low cost automation. The main advantages of all electronics system are economy and simplicity. Automation plays an important role in mass production.

- To achieve quick response
- To prevent the accident by alarm indication
- To reduce the work load
- To reduce the fatigue of workers
- To achieve good quality
- Less Maintenance

ANTILOCK BRAKING SYSTEM:

Anti-lock braking systems were first developed for aircraft. An early system was Dunlop's Maxaret system, introduced in the 1950s and still in use of some aircraft models. This was a fully mechanical system. It saw limited automobile use in the 1960s in the Ferguson P99 racing car, the Jensen FF and the experimental all wheels drive Ford Zodiac, but saw no further use; the system proved expensive and in automobile use somewhat unreliable. A purely mechanical system developed and sold by Lucas Girling was factory-fitted to the Ford Fiesta Mk III. It was called the Stop Control System.

The German firm of Bosch had been developing anti-lock braking technology since the 1930s, but the first production cars using Bosch's electronic system became available in 1978. They first appeared in trucks and German limousines from Mercedes-Benz. Systems were later introduced on motorcycles.

PROBLEM STATEMENT

Based on the discussion and data related to stolen cars this one is observed that the car theft is a global problem. No one likes his or her car to become stolen. Insurance companies al so sense the pressure as they have to pay the claims made by the clients. As a result, the insurance companies have to increase the insurance premium. As soon as this happened only a small percentage of people could afford a good insurance premium. Increase of the insurance premium also due to the lack of security system installed to the car. Car manufacturers installed a minimum standard security system such as an alarm based security system. This device is not operational sufficient. It does not have any pager system attached to this one. The car thief takes only a few

minutes to deactivate the security system. Nobody will pay an attention when the car alarm goes off.

So it is proposed that a GSM-based vehicle anti-theft system progress is designed and developed to improve the presentation of the current automobile security system.

OBJECTIVE

The projected security system for smart cars used to avoid them from theft using AVR microcontroller. This system is use to provide the locking and unlocking system through password locking. This method makes use of an embedded chip that has an sensor, which senses the key through insertion and sends an OTP to the owner's mobile the user have to enter the identical password which is sent to the authorized mobile number then vehicle will be started. In case if the user be unsuccessful to enter the correct password in three trials, then it is treated as theft situation a text message is sent to the owner, a close relative or friend and police with the vehicle number .Further the fuel injector of the car disabled so that the user cannot start the car by any means. In addition it can also help full in detecting fuel theft from the vehicle by monitoring fuel level in the vehicle.

The following works were carried out, in order to achieve the objectives of the project.

1. Design and develop the hard ware of the proposed system

2. Develop a control program of the proposed system.

3. Appropriate selection of OTP Algorithm and implementation.

4. Conduct appropriate tests for the proposed system.

EXISTING SCENARIOS

1.THE AVAILABLE CONTROL SYSTEM:

Data such as global position, speed and velocity of the vehicle is transmitted over the cellular network to the users private account, so the user can get to know about the vehicle and can give command to the vehicle such as stopping the vehicle, door lock…etc through the PDA devices or mobile phones. Other systems include an in vehicle anti-theft component that will not enable the function soft he applications if it should find itself is illegally moved to one more car. There are numerous remote controlled security systems that restricts key auto systems of automobile through remote control when it is stolen. The restriction for first system is that it needs a secure processor and smart card chips to store in the Group

Identification Number, and second type of system needs secure vehicle-vehicle communications

2.DISADVANTAGE OF EXISTING SYSTEM:

Due to the inefficient conventional car security alarm system, the possibility of the car can be stolen is great as that the alarm is limited to the audible distance. Somehow if there is another way of transmitting the alarm to the car owner that is not limited to the audible and line of sight, the system can be up graded, SMS is a good choice of the communication to replace the typical alarm, because it can be done and does not require much cost. Although most of people know GPS can provide more security for the car but the main areas on people does not apply it because the cost. Advance car security system is too costly, as the cost for the gadget is too high.

Sl. No. PARTS Qty. Material

i. Pneumatic Cylinder 1 Aluminium

ii. Solenoid Valve 1 Aluminium

iii. Microcontroller 1 Electronic

iv. Relay driver 1 electronics

v. Pedal arrangement 1 Mild Steel

vi. Flow Control Valve 1 Aluminium

vii. LCD display 1 Cast Iron

viii. Connecting Tube - Polyurethene

ix. Hose Collar and Reducer - Brass

x Stand (Frame) 1 Mild steel

xi Steering 1 Rubber

COMPONENTS AND DESCRIPTION

- Pneumatic cylinder
- Relay driver
- Solenoid valve
- LCD Display
- Flow control
- Power supply
- Steering unit
- Keypad
- Microcontroller

This project constructed with microcontroller. This project is very useful for anti-theft, because steering unit is locked when vehicle is in parking condition. Steering is released when the finger print is matched with the owner's print, then only anti-lock steering is released. Then we put key to vehicle on and OFF. If finger print is mismatched at the attempt of three times. Alarm should be

on. When vehicle is parked anti-lock steering is activated by the microcontroller.

1.Pneumatic cylinder:

Cylinder is a device which converts fluid power into liner mechanical force and motion. These cylinders are widely used in industrial pneumatic systems. These cylinders are also called as linear motors and reciprocating motors pneumatic cylinders are designed for a variety of services. Pneumatic cylinders are designed for a variety of services. Pneumatic cylinders transforms the flow of pressured fluid into a push or pull of the piston rod since out system uses double acting cylinders we shall see some details about them. Double acting cylinders are in one in which fluid force can be applied to the movable element in two directories. The force exerted by the compressed air moves the piston in two directories in a double acting cylinder. They are used particularly. The piston is required to perform work not only on the advance movement but also on the return.

In principle, the stroke length is unlimited, although bucking and bending must be considered before we select a particular size of piston diameter, rod length and stroke length. The main component of any pneumatic system is the cylinder, which receivers air under pressure and the pressurized air helps to move the piston to and fro. The force acting on the piston will be equal to the product of the pressure of air and the area of the cylinder. The amount of air delivered into the cylinder into the cylinder decides the rate of doing work. A cylinder is a hollow circular section with the top and bottom flange provided to prevent the leakage of air.

The compressed air is used to actuate the piston. In order to move the piston to and fro, the air is supplied to the top and bottom of the cylinder alternatively.

Cylinder is mainly classified into two types namely,

⬜ Single acting cylinder.

⬜ Double acting cylinder.

In single acting cylinder, using the spring provided around the piston rod attains the return stroke, but it is not efficient.

2. Solenoid Valve with Control Unit

The directional valve is one of the important parts of a pneumatic system. Commonly known as DCV, this valve is used to control the direction of air flow in the pneumatic system. The directional valve does this by changing the position of its internal movable parts.
This valve was selected for speedy operation and to reduce the manual effort and also for the modification of the machine into automatic machine by means of using a solenoid valve. A solenoid is an electrical device that converts electrical energy into straight line motion and force. These are also used to operate a mechanical operation which in turn operates the valve mechanism. Solenoids may be push type or pull type. The push type solenoid is one in which the plunger is pushed when the solenoid is energized electrically. The pull type solenoid is one is which the plunger is pulled when the solenoid is energized. The name of the parts of the solenoid should be learned so that they can be recognized when called upon to make repairs, to do service work or to install them.

3.Frame

The solenoid frame serves several purposes. Since it is made of laminated sheets, it is magnetized when the current passes through the coil. The magnetized coil attracts the metal plunger to move. The frame has provisions for attaching the mounting. They are usually bolted or welded to the frame. The frame has provisions for receivers, the plunger. The wear strips are mounted to the solenoid frame, and are made of materials such as metal or impregnated less fiber cloth.

4.Modeling:

Model is a Representation of an object, a system, or an idea in some form other than that of the entity itself. Modeling is the process of producing a model; a model is a representation of the construction and working of some system of interest. A model is similar to but simpler than the system it represents. One purpose of a model is to enable the analyst to predict the effect of changes to the system. On the one hand, a model should be a close approximation to the real system and incorporate most of its salient features. On the other hand, it should not be so complex that it is impossible to understand and experiment with it. A good model is a judicious trade-off between realism and simplicity. Simulation practitioners recommend increasing the complexity of a model iteratively. An important issue in modeling is model validity. Model validation techniques include simulating the model under known input conditions and comparing model output with system output. Generally, a model intended for a simulation study is a mathematical model developed with the help of simulation software.

Software for modeling:

1.CREO
2.SOLIDWORKS
3.CATIA
4.UNIGRAFICS..etc

ENGINEERING DESIGN

Creo Elements/Pro offers a range of tools to enable the generation of a complete digital representation of the product being designed. In addition to the general geometry tools there is also the ability to generate geometry of other integrated design disciplines such as industrial and standard pipe work and complete wiring

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definitions. Tools are also available to support collaborative development. A number of concept design tools that provide up-front Industrial. Design concepts can then be used in the downstream process of engineering the product. These range from conceptual Industrial design sketches, reverse engineering with point cloud data and comprehensive free-form surface tools. We created 3D model of this project by using CREO software. The models are shown below…
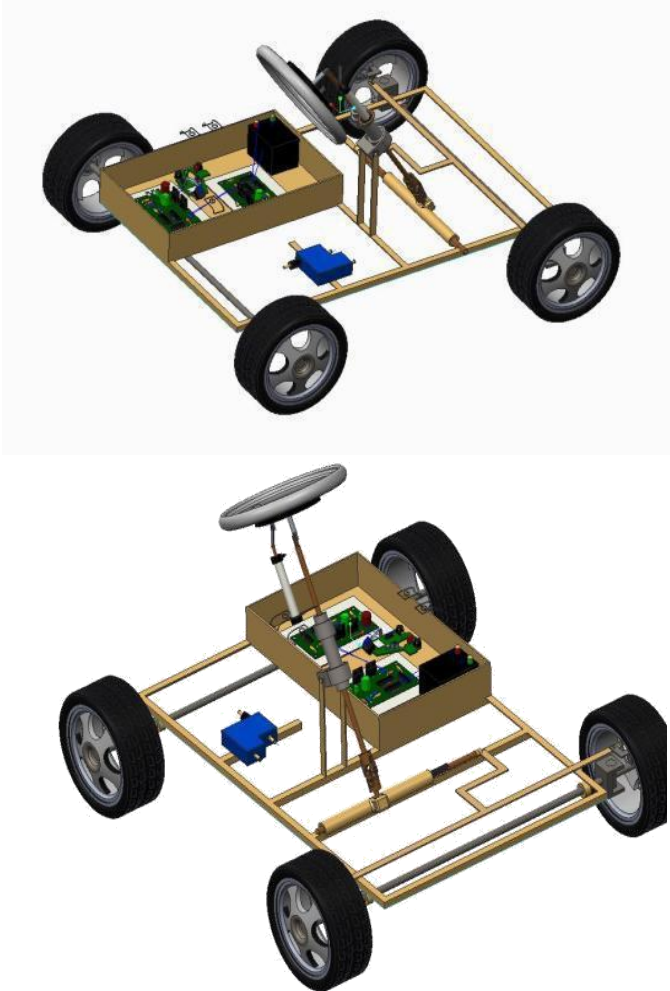
MANUFACTURING PROCESS:

Manufacturing processes are the steps through which raw materials are transformed into a final product. The manufacturing process begins with the creation of the materials from which the design is made. These materials are then modified through manufacturing processes to become the required part. Manufacturing processes can include treating (such as heat treating or coating), machining, or reshaping the material. The manufacturing process also includes tests and checks for quality assurance during or after the manufacturing, and planning the production process prior to manufacturing.
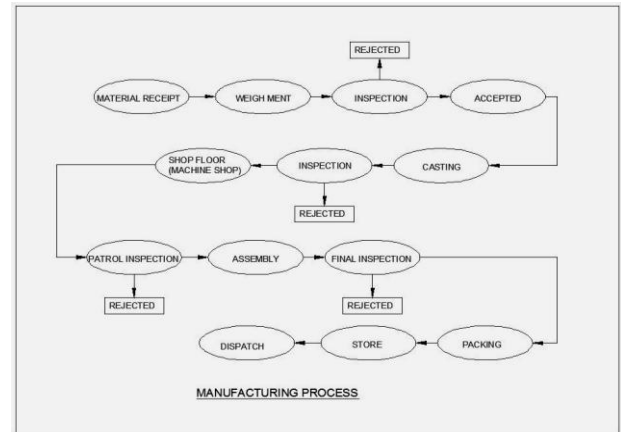
WORKING PRINCIPLE:

It is constructed with microcontroller. This research work is very useful for anti-theft, because steering unit is locked when vehicle is in parking condition. Steering is released when the password is matched with the owner's password, then only anti-lock steering is released. Then we put key to vehicle on and OFF. If the password is mismatched at the attempt of three, Alarm should be on. When vehicle is parked anti-lock steering is activated automatically by the microcontroller.

ADVANTAGES:

- It requires simple maintenance cares
- The safety system for automobile.
- Checking and cleaning are easy, because of the main parts are screwed.
- Easy to Handle.
- High security.
- Repairing is easy
- Replacement of parts is easy.

DISADVANTAGE:

- Initial cost is high.
- Air tank is required for this operation.

*APPLICATIONS***:**

- It is very much useful for Car Owners & Auto-garages.
- Thus it can be useful for the following types of vehicles;

1) MARUTI
2) AMBASSADOR
3) FIAT
4) MAHINDRA

CONCLUSION:

The Anti-theft steering system and vehicle information system through password serves as a best safety and convenience system for the vehicle users to protect themselves from impending danger. This research work widens the area of safety and comfort systems in the field of automobile engineering providing various benefits such as accident prevention and passenger safety installations.

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