Development of an Automated Side Lock System for Ensuring Safety and Security In Two Wheelers

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Abstract: ***The main motive of the work is to develop an automated system for two wheelers to operate the side lock feature. In the day-to-day scenario, everyone is running out of time which makes the rider to forget the side lock in the vehicle when he stops and gets down. This may lead to theft as well as mishandling of the parked vehicle which is not side locked. The ultimate goal of the present investigation is to avoid such situations there by installing an automated side locking system in the two wheelers. The working of this system is very simple such that when the key is unlocked, a signal is sent to the servo motor which fixed at the base of the handle bar. The servo motor rotates the handle bar to a particular angle after which a signal is sent to the locking system and it tends to side lock the vehicle on its own.***

Keywords: Two wheelers; theft; handle bar; locking system; servo motor; side lock feature

I. INTRODUCTION

A two wheeler has been utilized among human beings since the field of automobile vehicles have been discovered. The automobile technology has been developing day-by-day in the scientific community. The main aim of the work is to provide an automated side lock feature for the two wheelers [1]. The advantage of the innovation is that the rider does not need to side lock the vehicle manually. This helps to improve the safety of the vehicle and to improve the convenience of the rider.

In general, the two wheelers tend to have a handle bar which has to be locked after turning it is turned by the rider in any one of the directions and thereby locking it, once the engine is switched off [2]. When the vehicle key is locked, the fastening system will lock the handle bar in a fixed position thereby restricting its movement. It is mainly used for the safety and security purposes. It also prevents the vehicle from moving forward or backward at that instant. Thus the locking system ensures safety but mostly the riders tend to forget the side lock in the vehicle at the time of parking.

This brings more scope in maintaining safety of the vehicle even if the rider forgets to side lock the vehicle [3].

II. LITERATURE SURVEY

The purpose of utilizing a microcontroller based unit such as arduino, etc. can be basically preferred at the time of establishing communication between several devices thereby performing operations in any of the units [4]. The arduino UNO system comprises of several components which is mainly used for the functioning of automated unit. The arduino can be powered either through external sources such as adaptor, battery, etc or directly through USB port [5]. The servomotor is the component which has the capability to function as a linear or rotary actuator for the precise level of controlling the position in linear or angular motion [6]. This involves the influence of velocity and acceleration of the system. The feedback is obtained using the motor which is coupled to the sensor. This feedback helps in achieving the required motion at the necessary motion and position [7]. The use of encoder along with the motor leads to accurate speed and position. The servomotors are usually of position type which senses the speed of the motion control and performs relevant action based on it [8]. The suitable PID control algorithm is incorporated in the system. This reduced the level of overshooting. This also addresses the lack of feedback data from the stepper motor which controls the performance of the unit. This also leads to several positioning errors within it. The use of encoder and controller helps in optimizing the system there by enhancing overall performance of the system with reference to the capacity of the motor [9].

III. METHODOLOGY

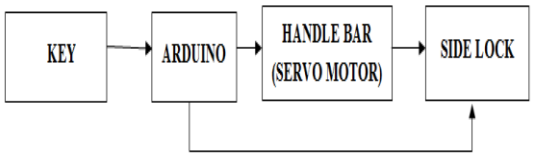

Figure 1 Flow chart of the working of system

The flow chart of the working of each system has been explained in Figure 1 and Figure 2. This shows the flow chart of the suggested unit. The removal of key is indicated through a signal alert which has been passed to the servo motor with the help of arduino controlled key lock sytem attached to the handle bar of the two wheeler.

Revised Manuscript Received on December 08, 2018.

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When the key is once again placed, the arduino sends signal to the side lock system which helps in unlocking it. The setup has been established using the program which is given below.

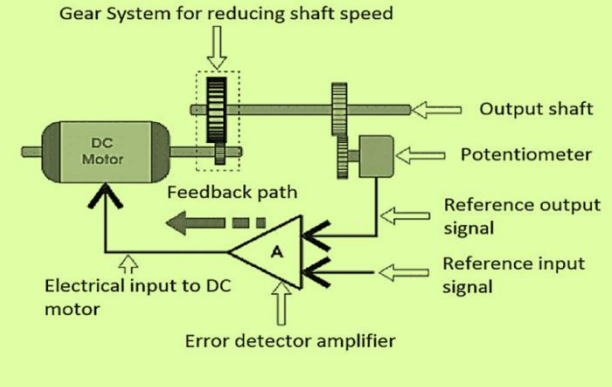

Figure 2 Working of the proposed system

Coding :

```
#include<Servo.h>
Servo steering;
Servo lock;
int i,but=2;
void setup()
{
pinMode(but,INPUT);
steering.attach(A0);
lock.attach(A1);
}
void loop()
{
if (digitalRead(but)==1)
{for (i = 0; i <= 45; i += 1) {
 steering.write(i);
 delay(10);
 }
delay(2000);
{
 for (i = 0; i <= 90; i += 1) {
 lock.write(i);
 delay(10);
 }
 }
}
else
{ for (i = 90; i >= 0; i -= 1) {
 lock.write(i);
 delay(10);
 }}
}
```

IV. RESULTS AND DISCUSSION

The developed unit of automated side lock system has been shown in Figure 3. In this work, the servo motor has been used for steering and rotating the ultrasonic sensor. If there is any of the objects interfere at the time of driving car, the steering of the car will tend to change its direction automatically. A security enabled system can be established for two wheelers in the place of disc lock. These locks usually have several locking mechanisms for preventing the theft. Automatic side lock system works when the key is removed and at the same time, a signal is passed to the motor which is fixed to the base of the handle bar. Then the handle is rotated to an angle of 60 degree which enables the signal to pass through the side lock. The side lock locks automatically. When the rider once again provides the key, the side lock gets unlocked. The servo motor is controlled by arduino. The power supplied to the servo motor, the angle through which the handle should rotate and the locking mechanism of the side lock are controlled by arduino. The command to these motors are passed through the arduino. In vehicle, the arduino can be placed anywhere because it's too small in size. The connections from the arduino to motor should be insulated properly such that the movement and vibrations from the vehicle should not affect its working condition.

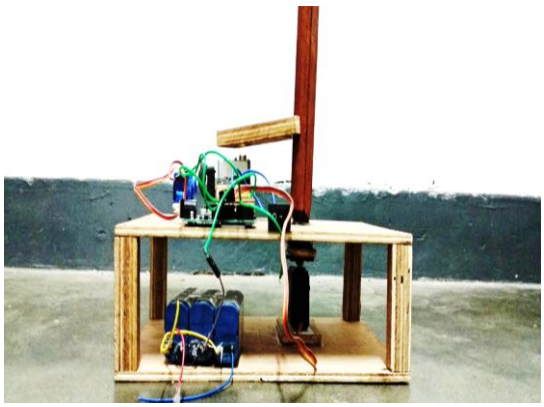

Figure 2 Proposed system for automated side lock feature

V. CONCLUSION

The proposed system is mainly preferred to enhance the safety of the vehicle compared to the manual locking system. The convenience of the rider is further increased by adopting the proposed system. The motive of developing an automated system for two wheelers to operate the side lock feature has been successfully achieved. The theft as well as mishandling of the parked vehicle which is not side locked will be secured by utilizing the developed system. Thus the automated side lock system has been installed in two wheelers and the security has reached to a higher level.

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