

Proposed Fully Automatic Shutters Opener and Closer System

Mr.Harishith.G¹, Mr.Jeeva.P², Mr.K.Arutselvan³, Mr.S.Ayyannan⁴, Mr.R.Kalaikannan⁵

^{1, 2, 3, 4, 5} Dept of EEE

^{1, 2, 3, 4, 5} Paavai college of Engineering

Abstract- Here we propose a fully automatic shutters opener and closer system. To achieve the design and fabrication of an automated shutters opener system we use a large screw with fabricated door belt, pulley, connecting rods, fixtures, mounts, motor and supporting frame. Proposed system will use a fabricate shutters mounted on the top of the wall to efficiently transfer motor power for achieving radial motion of the door. We use a Shaft and rod arrangement in order to drive the shutter by transferring motor power to the system. The shaft rotation moves the shutter in desired direction using motor torque. We use a switch to run the motor in desired direction for both way motion. Also system operated by finger print and specific password with GSM controller.

Keywords- Shutter, Motor, Cable, Relay, Micro controller

I. INTRODUCTION

A wide range of drives and accessories for roller shutter systems operation gives possibilities to choose either a cost-effective variant – manual drives, or more comfortable and modern solutions - multi-functional electric drives with intelligent control systems. Manual drives are more suited to buildings with several windows and small openings. We Automatic control is ideal for spacious houses and offices with a large number of windows. With a single press of a button you can open or close one or several roller shutters all at one time. Automatic operation ease of use, safety and comfort.

The range of automatic smart controllers includes a choice of electric drives and control elements. Electric drives with built-in radio control, an obstacle detection system, a system of manual emergency opening to operate a roller shutter during power failures, control elements from standard switches to smart control systems programmable timers.

A. TYPES OF SHUTTER OPENING AND CLOSING

Programming roller shutters opening and closing time

One can set the required roller shutter opening and closing time, e.g. roller shutters can be opened with the sunrise

and closed with the sunset. Time can be set for one day, a week, or a month.

Fixing roller shutters in the optimal position

A roller shutter can be partially closed to create pleasant shade on a bright sunny day. The effect of being in The time of the roller shutter opening and closing changes randomly

Light and heat sensors

Roller shutters control by means of light and heat sensors Depending on the temperature indoors and the sunlight activity a sensor gives a command to open or to close a roller shutter, thereby maintaining the optimal temperature indoors both in summer and in winter.

Roller shutters control depending on weather conditions

When the wind and the rain are too strong, a special weather sensor gives a command to close roller shutters automatically, protecting windows and doors from bad weather.

B. MOUNTING TYPES

Front mounting

A roller shutter box is installed on the frontage or room wall. Such mounting enables to use a light visible area of the window to the maximum.



Built-in mounting

A roller shutter box is located inside the opening. One of the advantages of the built-in mounting is the absence of any raised roller shutter elements on the frontage. Such mounting type enables installation of the roller shutters in the buildings of different architectural styles. But with this type of mounting the window area is partially reduced by the shutter box.



Combined mounting with the shutter box outside

A roller shutter box is located in the recess of the opening. This type of mounting combines the advantages of the front and built-in mounting – maximum use of the light area and the absence of any raised elements of a roller shutter.



Combined mounting with the shutter box inside

A roller shutter box is located in the recess of the opening with the front part inside. If this mounting type is used, a closed roller shutter aligns with the frontage as they are on the same level. The same or similar colours of the roller shutter and the frontage will emphasize the integrity of a building.



II. PROPOSED SYSTEM

A. INTRODUCTION

In the Existing system the shutter was manually operated or by remote control. Man power is needed for the both systems. There is no security systems in this existing system, for this existing system there is drawbacks. In olden method externally two metal locks is needed for the secure. It should be checked ones or twice. To overcome from the drawbacks this proposed method is executed. In this system automatically shutter was opened and closed. Also it has security system for the safety and it reduces the man power. This system executes three securities as finger print, password and also it has GSM for the authorization. Proposed system is having more advantages and convenient for the rural uses.

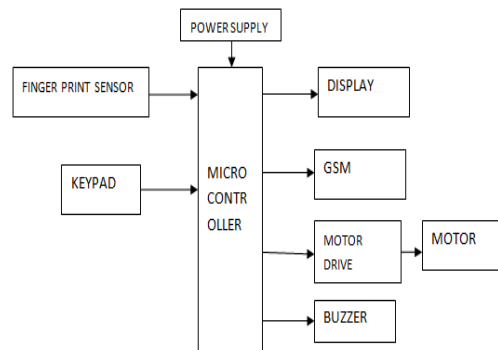


Fig. 1 Block diagram of proposed method

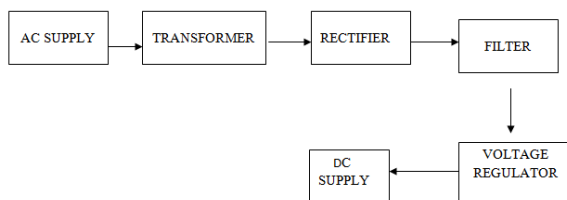
Here in our project used 5v & 12 v supply used, 12v supply used for relay driver and 5v used to each other components. Here fingerprint module is scan the fingerprint and send to the microcontroller and verifying the scanned fingerprint with the stored finger print. Match with the stored fingerprint and the safety pin number& then the Relay is complemented. Also the fingerprint ID is displayed over the LCD display.

Now show in the relay is complemented and locker system is connected with relay then the motor driver controls the shutter. It can only be opened when an authorized user is

present. If any unauthorized person attempts to open the shutter the system will generate the safety or warning SMS to the user people and alarm the buzzer.

Power Supply

The power supply circuit consists of step down transformer which is 230v step down to 12v. In this circuit 4 diodes are used to form bridge rectifier which delivers pulsating dc voltage & then fed to capacitor filter the output voltage from rectifier is fed to filter to eliminate any a.c. components present even after rectification. The filtered DC voltage is given to regulator to produce 12v constant DC voltage.



The main components used in the power supply unit are Transformer, Rectifier, Filter and Regulator. The 230V AC supply is converted into 12V AC supply through the transformer. The output of the transformer has the same frequency as in the input AC power. This AC power is converted into DC power through diodes. Here the bridge diode is used to convert AC supply to the DC power supply. This converted DC power supply has the ripple content and for normal operation of the circuit, the ripple content of the DC power supply should be as low as possible. Because the ripple content of the power supply will reduce the life of the circuit. So to reduce the ripple content of the DC power supply the large value of capacitance filter is used. This filtered output will not be the regulated voltage. For this purpose IC7805 regulator IC is used in the circuit.

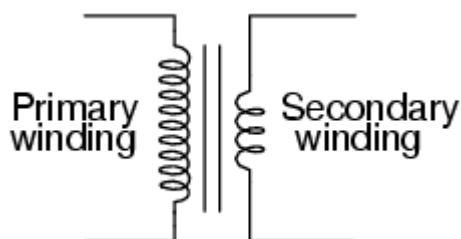
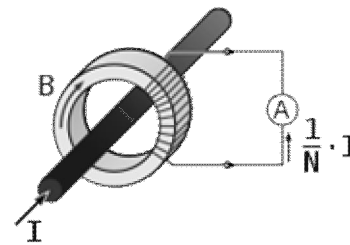


Fig.4 Transformer

E. Current transformer

A **current transformer (CT)** is used for measurement of alternating electric currents. Current

transformers, together with voltage (or potential) transformers (VT or PT), are known as **instrument transformers**. When current in a circuit is too high to apply directly to measuring instruments, a current transformer produces a reduced current accurately proportional to the current in the circuit, which can be conveniently connected to measuring and recording instruments. A current transformer isolates the measuring instruments from what may be very high voltage in the monitored circuit. Current transformers are commonly used in metering and protective relays in the electrical power industry



F. POWER SUPPLY

All digital circuits work only with low DC voltage. A power supply unit is required to provide the appropriate voltage supply. This unit consists of transformer, rectifier, filter and a regulator. AC voltage typically of 230Vrms is connected to a transformer which steps that AC voltage down to the desired AC voltage level. A diode rectifier then provides a full wave rectified voltage that is initially filtered by a simple capacitor filter to produce a DC voltage. This resulting DC voltage usually has some ripple or AC voltage variations. Regulator circuit can use this DC input to provide DC voltage that not only has much less ripple voltage but also remains in the same DC value, even when the DC voltage varies, or the load connected to the output DC voltage changes. The required DC supply is obtained from the available AC supply after rectification, filtration and regulation. Block diagram of power supply unit.

G. TRANSFORMER

Transformer is a device used either for stepping-up or stepping-down the AC supply voltage with a corresponding decreases or increases in the current. Here, a transformer is used for stepping-down the voltage so as to get a voltage that can be regulated to get a constant 5V.

E. RECTIFIER

A rectifier is a device like semiconductor, capable of converting sinusoidal input waveform units into a unidirectional waveform, with a nonzero average component.

F. FILTERS

Capacitors are used as filters in the power supply unit. The action of the system depends upon the fact, that the capacitors stores energy during the conduction period and delivers this energy to the load during the inverse or non-conducting period. In this way, time during which the current passes through the load is prolonged and ripple is considerably reduced.

G. VOLTAGE REGULATOR

The LM78XX is three terminal regulator available with several fixed output voltages making them useful in a wide range of applications. IC7805 is a fixed voltage regulators used in this circuit.

III. EXPERIMENTAL SETUP

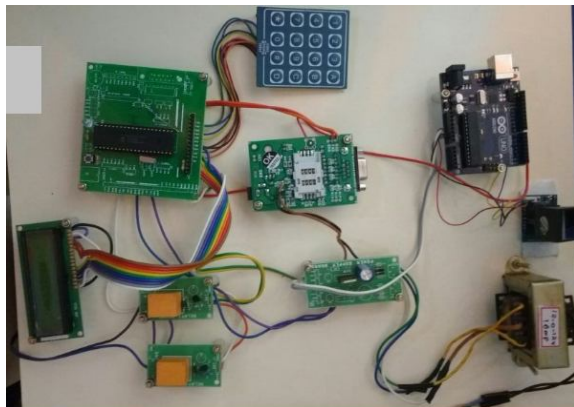


Fig: 2 Experimental setup

OPERATION OF PROPOSED SYSTEM

The automatic shutter opening systems are used in commercial buildings, shopping malls, theatres, etc. These systems are used to open the door when a person comes near to the entrance of the door and close it after he moves away from the door or after entered into the door. There are various kinds of sensors are available in the market to make such types of systems such as Radar sensors, PIR sensors, Infrared sensors and Laser sensors, etc. This project uses a PIR sensor to open or close the door automatically which senses the infrared energy produced by the human body. When someone approaches the door, the IR energy sensed by the PIR sensor changes and activates the sensor to open and close the door automatically. Further, the signal sent to microcontroller to control the door.

The circuit connection of an automatic door opening system is shown above. Here, PIR sensor consists of three

terminals such as Vcc, Dout and GND. Where, Dout pin is directly connected to pin14 (A0) of Microcontroller. An LCD display is used to display the status. LCD display pins RS and EN are connected to 12 and 13 pins of Arduino. Data pins namely D0 to D7 are connected to Arduino digital pins 8,9,10,11 and RW is directly connected to GND terminal. Motor driver L293D is connected to pin0 and pin1 of Arduino for opening & closing the door. Here in the above circuit, a motor is used for a door.

This proposed system uses a Finger print sensor (cryptographic image capture) to sense the Finger print which is already stored in memory. It will sense by PIC microcontroller. Finger image compared by comparator and match with stored image. If the image comparing process is crossed, password enter through keypad then drive signal send to motor and shutter will open.

Moreover, the proposed system can be developed by interfacing a counting arrangement to count the entry and exit of people at a specific place. This can be accomplished by interfacing an EEPROM to store the data when there is no power.



Fig 3: operation of shutter

If password or finger print were mismatch alarm will operate and message will send to authorized person through GSM.

Advantages

- The prime advantage of an automatic shutters system is the lesser effort. It can be operated even if your hands are full like holding the groceries.

- With Automatic shutter system has lock features with GSM so do not have to install additional locks or security systems to keep burglars and thieves from entering.
- There are lesser chances of injuries and accidents since you do not have to get in contact with the garage door just to operate it.
- Man power is reduced and time saving.
- Operate with remotely.

Applications

- Shopping malls
- Jewelry shop
- Industries
- Domestic applications

IV. CONCLUSION

Integrating features of all the hardware components used have been developed in it. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Secondly, using highly advanced IC's with the help of growing technology, the project has been successfully implemented. Thus the project has been successfully designed and tested.

REFERENCES

- [1] Garvin S L, Automatic door and window controls for the disabled, Building Services Journal, pp39-40, August 1997.
- [2] Garvin S L, Domestic automatic door and window controls for use by elderly and disabled people, BRE Report BR334, Construction Research Communications, 1997.
- [3] W. M. P. STUART (Jan 19, 1962) 3,152,368 4. Dough Rasmussen (Oct 18, 2005).