Automated Elevator with Overload Alert

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***Abstract*- This work introduces a new solution of elevator controlling system which is based on microcontrollers. The purpose of this work is to design an effective elevator control system, which can be reprogrammed in a fashion to minimize the congestion on a particular lane by directing the lift on a particular floor using time management scheme. Present scope of the project is to provide an automatic congestion control and hence found its importance in various fields of applications. By the use of such design complexity of the system has been simplified. This system helps to indicate limit of an elevator, which is how many people can be inside an elevator at a particular time. The system displays the number of people inside an elevator with the help of 7 segment display. Each pair consists of 2 sensor pairs placed at a certain distance from one another in the opposite direction. The system includes Infrared Sensor pairs which are placed near the elevator door. These sensors senses when a person enters an elevator and it opens the door of the elevator and simultaneously increments the counter for the number of people entering the elevator. The IR transmitter is used to transmit IR rays straight to the receiver which receives the input and feeds this to a Microcontroller.**

***Index terms*- Automated Elevator, ATMEGA-328, Driver IC, LM7805CT Regulator**

I.INTRODUCTION

Lift or elevator, is a transport device that is very common to us nowadays. We use it every day to move goods or peoples vertically in a high building such as shopping center, working office, hotel and many more. It is a very useful device that moves people to the desired floor in the shortest time. Elevators are generally powered by electric motors that either drive traction cables and counterweight systems like a hoist, or pump hydraulic fluid to raise a cylindrical piston like a jack. So, these motors need to be controlled by sophisticated control circuits. If the costs of these control circuits and other parts can be reduced then the overall costs of the elevator will be reduced. In this work, we have developed a low cost elevator system using microcontroller based control circuit. Because microcontroller has emerged as one of the low cost controller IC and many works have been found in the literatures using microcontroller for minimizing the cost. The advantages of the electric elevator, however, including efficiency, relatively low installation costs, and virtually constant speed regardless of the load, spurred inventors to search for a way of using electric motive power in skyscrapers. We are using a Atmega328 microcontroller for this project. This project is carried out with the aim of designing and implementing an elevator system which will fulfill the criteria given. This elevator system can be referred to existing systems nowadays.

The objectives of this project are:

- To integrate the hardware and software in order to simulate the functions of a basic lift system which is more user friendly.
- To develop a more power efficient than that which is currently in use.
- To develop a elevator system that does not require a manual supervision and is more friendly and easy to understand
- To understand interfacing concepts.

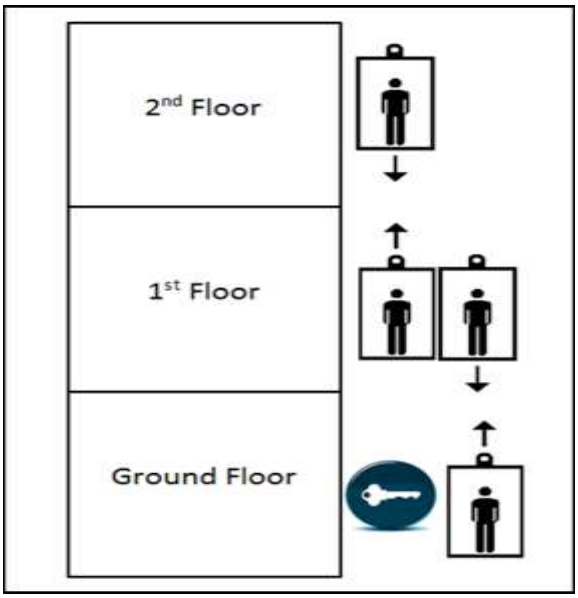
II. RELATED WORK

In this project, AT89C51 microcontroller is used as the primary controller. Besides, it is consist of various inputs and outputs circuits together with a lift model. The AT89C51microcontroller is used to coordinate the functions of various hardware circuits .The lift model was constructed to simulate an actual lift in the real life. It can be counted as the output hardware of the system. The software for the system was too designed according to the real lift traffic management algorithm. The combination of the hardware and software perform the simulate function of a basic lift system.

These sensors senses when a person enters an elevator and it opens the door of the elevator and simultaneously increments the counter for the number of people entering the elevator. The IR transmitter is used to transmit IR rays straight to the receiver which receives the input and feeds this to an Microcontroller. The microcontroller process this input received. At this time the system also counts the number of people present and increments a counter on each arrival and decrements when a person exits from the elevator. The system even includes a buzzer for demonstrating an alarm. The buzzer starts ringing as soon as more number of people enters the elevator than the limit of the elevator which is already set and the buzzer stops ringing only when the people inside the elevator come outside the elevator. This will cause the counter to be decremented and the buzzer stops ringing as soon as the counter is less or equal to the limit of the elevator set.

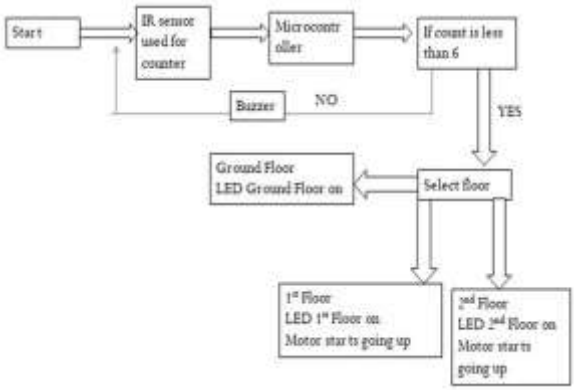
III. METHODOLOGY

For this particular elevator system, a 3 floored elevator was designed. It consists of ground floor, first floor, and second floor.



So, the user will have to enter floor number in order to going up either to first or second floor. User in first floor can choose to go up to second floor up go down to ground floor while user in second floor can go down only.

Flowchart



The simulation for this system has been done using Keil uVision4 and Proteus software. The coding was written and debugged using Keil uVision4 while the simulation was done using Proteus.

Using the Keil uVision4 software, the coding was converted to .hex file after debugged. This .hex file was then used for the microcontroller simulation in Proteus. The physical implementation of this lab was done by firstly connecting the circuit of the system on the breadboard. The connection is as shown in methodology part above. Then, 5 V DC power supply was given to the circuit. The complete connection of the elevator system on the breadboard is as shown below.

IV.RESULT

Project Output

Output with floor and count

Output at Overload Condition

There was no mention of overload and required a manual supervision to keep a check on the number of people entering the elevator at a single time earlier whereas, this model is a user friendly as well as does not require manual supervision since a count is already provided each time the elevator operates.

After the two stages of testing the elevator system which are simulation and implementation of hardware, it is satisfied to say that the results are at its expected because they are consistent with each other. The delay on simulation and real time experiment is exactly 3 seconds and the logic is working perfectly.

This shows that all procedures are followed correctly during the conduction of this lab. However, some error occurs during the burning process of the coding into the microcontroller. This is causing the hardware to fail to work. But thanks to the lecturer that gave support and knowledge to the student, this problem has been identified and repaired.

The connection on the breadboard is also an important thing to highlight. It is a must to double check the connection before supplying a power supply. This is because some connection might become loose or in touch with each other.

V. CONCLUSION

In conclusion, the rise of tall buildings has led to the increase in demand for more sophisticated elevators, therefore elevator dispatch systems are being continuously improved and are forever changing. These improved systems aim to ensure that waiting durations are less and less and human behavior is one of the major key factors which needs to be taken into consideration when it comes to restructuring elevator calling systems, as elevators can be one of the main annoyances in some one's experience with tall buildings. Additionally, the dispatch systems aim at eradicating crowds at peak traffic periods within buildings and at constantly developing new dispatch system that can overcome these problems. One way to achieve this is by grouping people based on their destinations.

Assigning elevators to specific floors will also reduce crowds and avoid instances of overlapping elevators. Elevators should be developed in a manner that makes them energy efficient, with minimal repairs. To conclude, there are many opportunities and great potential in addressing the current issues that necessitate an ever smarter elevator system. This work is being started to develop a microcontroller based elevator control. A working is developed that replicates the real elevator system. The proposed scheme is implemented and testing of the algorithm (program) on the model is used to validate the efficiency on the microcontroller. To conclude we have designed and implemented a prototype elevator and its control systems using a very low cost microcontroller based circuit.

VI. ACKNOWLEDGEMENT

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REFERENCES

[1] Ákos Becker, Department of Electronics Technology, Budapest University of Technology and Economics, Budapest, Hungary

[2] Cheah, Siew Hoon (2006) Microcontroller Based Lift Control System. Faculty of Electrical & Electronic Engineering, University Malaysia Pahang.

[3] Poorvi Behre, Viveka Nema, and Bhupendra Badoniya, Congestion-Free Elevator Control Using Microcontroller, International Journal of Scientific & Engineering Research Volume 4, Issue 1, January-2013 1, ISSN 2229-5518.

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[7] Xibo Wang and HongshuaiGe; Wenbo Zhang; Yingzhen Li. Design of Elevator Running Parameters Remote Monitoring System Based on Internet of Things. China, 2015.

[8] Tundong Liu; Xiaosheng Liao; Jianping Zeng. Design of Intelligent Elevator Remote Monitoring System Based on Ethernet. China, 2010.