

Approach for Preventing Suicide on Ceiling Fan

S. Sankaranarayanan^{1*}, Azha Periasamy²

^{1,2}Department of Electronics and Instrumentation Engineering, Bharathiar University, Coimbatore, India

Abstract: Suicide by hanging is very alarming in India quite a high number of hanging cases is reported every year. As per a report of the World Health Organization (WHO), 800 000 cases are reported every year. Most of the hanging cases are commonly suicidal. The objective of the project is to develop an approach to the prevention system. The proposed project system consists of a PIC 16f877a microcontroller, PIR sensor, flex sensor, GSM module, Buzzer and actuator. The software used is MPLAB IDE with Embedded c programming and Proteus 8 professional for simulation purposes. When the person tries to hang the flex sensor senses the set weight, if it's more than the set point weight, the GSM sends the message to the particular guardians. An actuator or the motor attached to the fan rod will extend downwards and make the person touch the floor. Buzzer will start beep to give alert to the surroundings.

Keywords: Ceiling fan, Hanging, PIC Microcontroller, Suicide.

1. Introduction

Hanging is one of the 10 driving reasons for death on the planet representing in excess of 1,000,000 passing's yearly. In India, hanging is a second basic strategy for ending it all in the wake of harming. In the course of recent years, the rate of suicide by hanging is on increment, particularly among youthful grown-ups. The way that 71% of suicides in India are by people beneath the age of 44 [1]. Hanging is a typical technique for suicide in a few nations [2]. An aggregate of 312 instances of self-destructive hanging autopsied in this five years review distinct investigation traversing from January 2000 to December 2004 at Sir Salimullah Medical College (SSMC) funeral home [3]. The most generally utilized ligature material was rope (28%) trailed by 'dupatta' (22%). The idea of ligature material was delicate in 68% of cases while hard material was utilized in 5% of cases [4]. Its avoidance is as yet a difficult occupation for general wellbeing specialists. Point-by-point information on different variables related to self-destructive hanging in that specific topographical region is a lot of important to forestall such suicides. The fundamental goal of the task is to decrease the suicide endeavors happening through a ceiling fan. At any point if the individual attempts to hang the flex sensor detects the set weight, if it's more than the set point weight, the Buzzer is sounded and GSM sends the message to the specific gatekeepers.

2. Methodology

1) Block diagram

The figure below shows the block diagram for the simulation

purpose as well as for the implementation purpose.

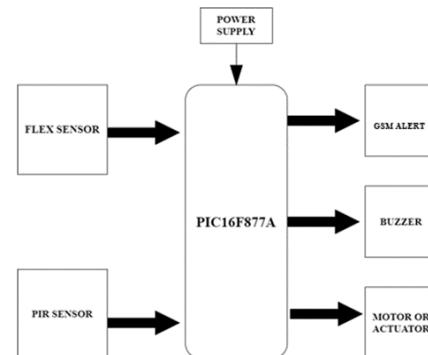


Fig. 1. Block diagram

2) Flow chart

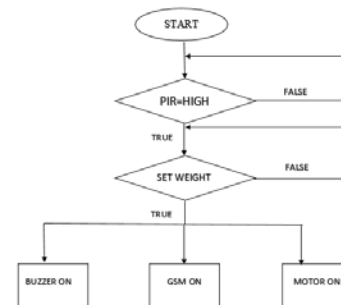


Fig. 2. Flow chart

In this proposed system if the PIR sensor is detected next it will look for the change in weight if there is change in set weight the buzzer, GSM and motor or actuator will work if not it will go back to the initial condition.

3. Implementation

1) Hardware used in simulation

The hardware components used for the simulation is listed below

- PIC 16f877a
- PIR Sensor
- Flex Sensor (potentiometer)
- GSM Module (virtual terminal)
- Buzzer
- Stepper Motor and Driver

*Corresponding author: sankaranarayanan1105@gmail.com

2) *Software used for simulation*

- Proteus 8 Professional
- MPLAB IDE

3) *Working*

By using the above-mentioned components, the simulation setup can be made. The PIR sensor is used to find the presence of a human, the flex sensor is used to find if there is any added weight on the ceiling fan, GSM module has been used to send alert to the registered mobile number and the motor or the actuator is attached to the ceiling fan to protect the hanging. The working of my approach is as follows: In the beginning, all the sensors will be off if the person is trying to hang on the ceiling fan they will come closer to the ceiling where the PIR sensor will detect the human but there will not be output because sometime the ceiling fan should be under cleaning process. So to avoid the confusion of suicidal hanging or not, a flex sensor can be placed, now the person trying to hang will tie the rope or some material on the ceiling fan, and then he or she will hang since the flex sensor is placed on the fan there will be a change of resistance when the person is hanging. This change in resistance value is given to the PIC microcontroller as well as the PIR value is also given to the 16f877a when both the input gets the high value then the resultant output will occur. First, the motor or the actuator attached to the ceiling fan will have a linear movement and make the person touch the floor next the buzzer will get beeped to intimate the surrounding peoples and the GSM will send the emergency message to the ambulance or for some other related people to save the life. To show all the working processes in simulation and for good understanding, I had attached an LCD to know what happens in the simulation when the conditions are satisfied. For the simulation purpose, I have used the Proteus 8 simulation software where we can drag and work with virtual components and for the programming purpose, MPLAB IDE is used where it is the tool suite used to program the various microcontroller and microprocessor like PIC, ARM, and STM32, etc.

4) *Circuit connection*

The initial stage of the simulation will look like in the below figure, in this fig. 3 PIR sensor is attached to RC0, FLEX Sensor to RA0, GSM module to the RX and TX Pins of PORTC, and buzzer to the RD4 receptively. The below figure shows the connection of input to the Microcontroller and output from the microcontroller.

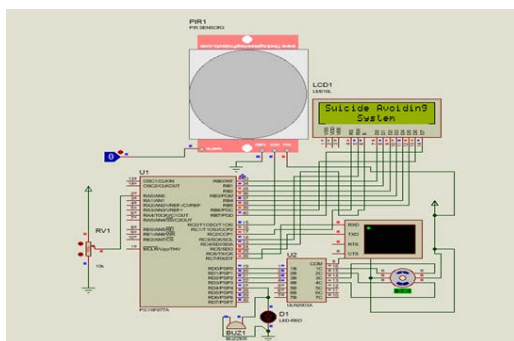


Fig. 3. Circuit connection

4. Result and Discussion

I completed my project “Approach for Preventing Suicide on Ceiling Fan” through simulation, in the simulation setup, all the input sensors and the output devices are connected to the PIC microcontroller. When the PIR and flex sensors value goes high then there will be input to the microcontroller and the resultant output will take place such as Motor on, GSM to send the SMS and buzzer to alert the surrounding. Since this is an approach or an idea to prevent suicide on ceiling fan the hardware component is not made, in the future all the above processes can be implemented in small chip and can be attached to the ceiling fan.

1) *Simulated Output Images*

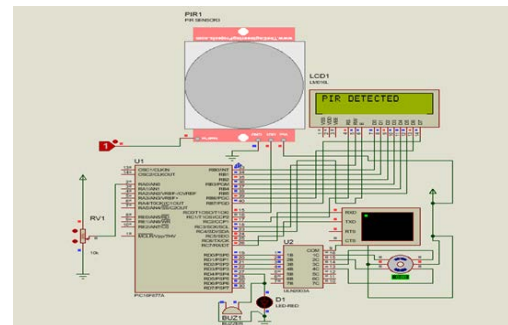


Fig. 4. PIR Detected

In the above stage, the PIR sensor is alone detected so there will not be any change in the output as shown in the fig 4

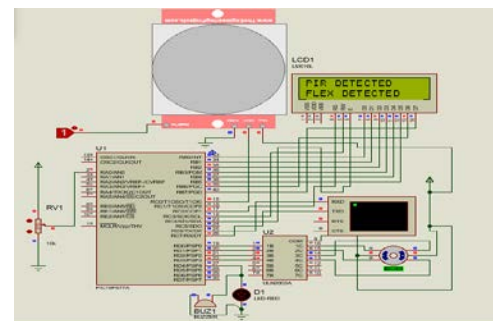


Fig. 5. Both sensors detected

Now both the sensors got detected so the system will start to work as you can see in the fig. 5 the stepper motor has started to rotate or the actuators can also be placed in order to extend the rod downwards.

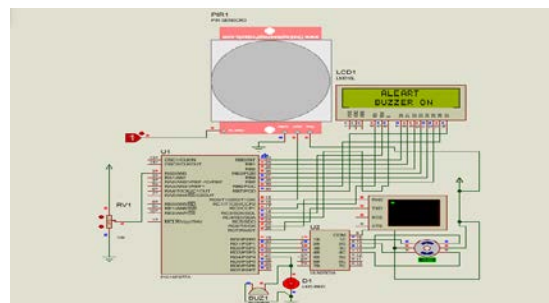


Fig. 6. Buzzer started to beep

In this stage, the buzzer will start to beep for our understanding I had placed LED for the intimation as shown in the fig. 6

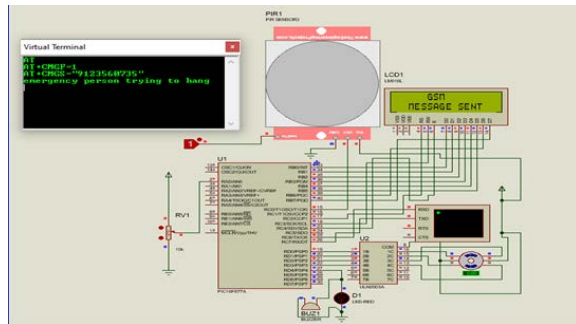


Fig. 7. GSM alert sent

Now the GSM message is sent to the particular number, you can see the message “emergency person trying hang” in the virtual terminal as shown in the fig. 7.

5. Conclusion

According to the reports subsequent to harming, hanging is the regular suicide strategy hence the motivation behind the undertaking is to give an approach for preventing suicide on the ceiling fan by hanging. I had given a simulation thought to prevent suicide on the ceiling fan utilizing the Proteus 8 software and the programming for the simulation is finished utilizing MPLAB IDE. The given thought can be effectively executed as a Real-Time Framework Since Science is finding or making a forward leap in different fields, and henceforth innovation continues to change occasionally and going further, a large portion of the units can be created on a solitary chip consequently making the framework compact. So this sort of framework ought to be mulled over with the goal that the suicide endeavors and passing’s on the ceiling fan by hanging will decrease.

6. Future scope

- The simulation can be done as real-time hardware where all the process should be implemented in a single chip and can

be placed on the ceiling fan.

- GPS can also be added to share the location to the ambulance via GSM, so it can emerge and give first aid in any emergency condition.
- In combination with this preventing system, the smart fan can be manufactured where we can control speed, on/off of the fan using remote or Mobile phone connected with IoT.

References

- [1] Raghavendra. SNarsapur, Basavaraj. P Hiremath, B. M. Jayadevappa “A Novel Approach on Ceiling Fan Based System to Avoid Suicide by Hanging”, Special issue 2019 *International Journal of Engineering Research & Technology*, 2019.
- [2] Kishan Kariippanon, Coralie J. Wilson, Timothy J. Mc Carthy and Kairi Kõlves “A Call for Preventing Suicide by Hanging from Ceiling Fans: An Interdisciplinary Research Agenda”, *International Journal of Environmental Research and Public Health*, vol. 9, 2019.
- [3] Rahman Z. M, Al-Azad MAS, Ahmad. M, Wahab M. A, Khalil M. I, and Hakim. M “Suicide by Hanging: An Analysis of 312Cases”, *Journal* vol4, no. 1, July 2013.
- [4] Md Syedur Rahaman Sumon, Kishoara Binte Quader, Moushumi Taher Asha, Ferdows Ara Mollika, Mustafa Sumon a Rashid, Md Belayet Hossain Khan, Farzana Ahmed “Materials Used for Suicidal Hanging Recorded during Autopsy from Sir Salimullah Medical College Morgue”, *Delta Med Col J*, vol. 7, no. 2, pp. 66-70, 2019
- [5] Ibrahim Uzun, Yalcın Buyuk, Kagan Gurpinar, “Suicidal hanging Fatalities in Istanbul Retrospective analysis of 761 autopsy cases”, *Journal of Forensic and Legal Medicine*, vol. 14, pp. 406-409, 2007
- [6] Negar Morovatdar, Maziar Moradi-Lakeh, Seyed Kazem Malakouti & Marzieh Nojomi “Most Common Methods of Suicide in Eastern Mediterranean Region of WHO: A Systematic Review and Meta-Analysis”, 06 May 2014.
- [7] Prithvi Nath Saranu, Abirami. G, Sivakumar. S “Theft Detection System using PIR Sensor”, 4th *International Conference on Electrical Energy Systems*, vol. 978, 2018
- [8] Cynthia Twumasi, K. A. Dotche, “Energy Saving System using a PIR Sensor for Classroom Monitoring”, 2017
- [9] Vikas Arya, Andrew Page, David Gunnell, Rakhi Dandona, Haider Mannan, Michael Eddleston, Gregory Armstrong, “Suicide by hanging is a priority for suicide prevention: method specific suicide in India (2001–2014)” *Journal of Affective Disorders*, vol. 257, pp. 1–9, 2019.
- [10] Yip, P.S., Caine, E., Yousuf, S., Chang, S.S., Wu, K.C.C., Chen, Y.Y., 2012. Means restriction for suicide prevention. *Lancet*, vol. 379, pp. 2393–2399
- [11] World Health Organization. Global Health Observatory Data. Available online http://www.who.int/gho/mental_health/suicide_rates/en/.
- [12] National Institute of Mental Health. Suicide. Available online https://www.nimh.nih.gov/health/statistics/suicide.shtml#part_154969.