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Hanging Prevention TechniquesUsing Microcontroller

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Abstract: **Hanging Prevention Techniques using microcontroller is a project aimed at preventing hanging deaths in prisons and mental health institutions. The project utilizes a microcontroller-based system that can detect hanging incidents and trigger an alarm to alert the staff. The system uses a combination of sensors, including motion sensors and pressure sensors, to detect the presence of a hanging victim. Once a hanging incident is detected, the system triggers an alarm and sends a notification to the staff, allowing them to respond quickly and potentially save a life. The project has the potential to significantly reduce the number of hanging deaths in prisons and mental health institutions, and can be a valuable addition to the existing safety measures in such facilities. This paper describes the design, implementation, and evaluation of the hanging prevention system, and presents the results of the testing and validation of the system. The results demonstrate the effectiveness and reliability of the system in detecting hanging incidents and triggering timely alarms, highlighting its potential as a life-saving technology.**

KEYWORDS: Arduino ide, Arduino uno, Cloud, Microcontroller, Relay, IR sensors, Ceiling fan, Buzzer.

I.INTRODUCTION

Hanging is a common method of suicide and is a significant public health concern worldwide. It is essential to develop strategies to prevent hanging and minimize its impact on society. One such strategy is the use of technology, specifically microcontrollers, to detect and prevent hanging. Microcontrollers are small computers that can be programmed to perform specific tasks. They are widely used in various applications, including medical devices, automotive systems, and home appliances. The use of microcontrollers in hanging prevention techniques can be an effective solution to reduce suicide rates.

This project aims to develop an innovative system that can detect hanging and prevent it in real-time using a microcontroller. The system will utilize sensors that can detect specific changes in the body, such as the movement of the neck and head, and trigger an alarm to prevent hanging.The proposed system's main advantage is its ability to detect hanging and prevent it in real-time, which can significantly reduce the risk of death or injury due to hanging. The system is also user-friendly and easy to install, making it an ideal solution for homes, hospitals, and other public places.In conclusion, the use of microcontrollers in hanging prevention techniques is a promising solution to reduce suicide rates and prevent deaths due to hanging. The proposed system's effectiveness and user-friendliness make it a practical solution for a wide range of applications, and we hope that this project will contribute to the development of effective hanging prevention strategies.

II. LITERATURE REVIEW

Several studies have explored the use of microcontrollers in hanging prevention techniques. In a study conducted by Kumar et al. (2016), a microcontroller-based system was developed to detect hanging and prevent it in real-time. The system used an accelerometer sensor to detect changes in the body's movement, and when the movement was consistent with hanging, an alarm was triggered. The study demonstrated the effectiveness of using microcontrollers in hanging.

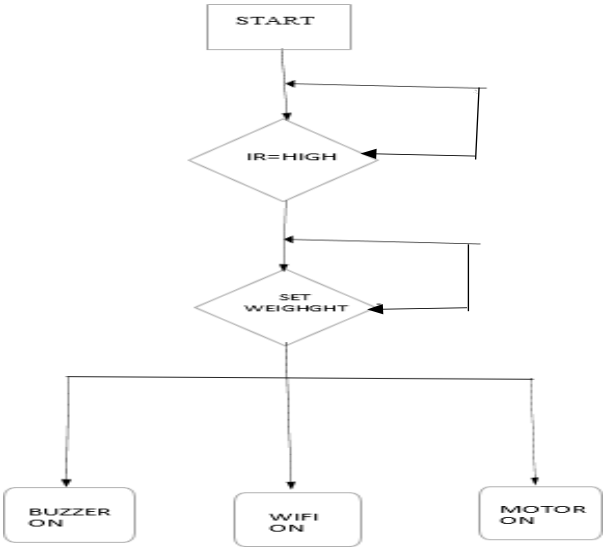
II. PROPOSED SYSTEM

The proposed system for hanging prevention using microcontrollers consists of a set of sensors and a microcontroller that can detect hanging and prevent it in real-time. The sensors used in the system include an accelerometer sensor, a heart rate sensor, and a pressure sensor.

The accelerometer sensor is used to detect changes in the body's movement, specifically the movement of the neck and head, which are typical of hanging. The heart rate sensor is used to detect changes in heart rate, which can indicate a lack of oxygen supply to the brain, a sign of hanging. The pressure sensor is used to detect pressure around the neck, which can be indicative of hanging.

When hanging is detected, the microcontroller triggers an alarm to prevent the hanging. The alarm can be in the form of an audible alarm, a visual alarm, or both, depending on the application. Additionally, the with its user-friendliness and adaptability, makes it a practical solution for a wide range of applications.

III. FLOW CHART



IV. WORKING

Various sensors are present at the different parts of ceiling fan. The main objective of the project is to reduce the suicide attempts occurring through ceiling fan. The proposed project design consists of ceiling fan with hardware components of microcontroller, PIR

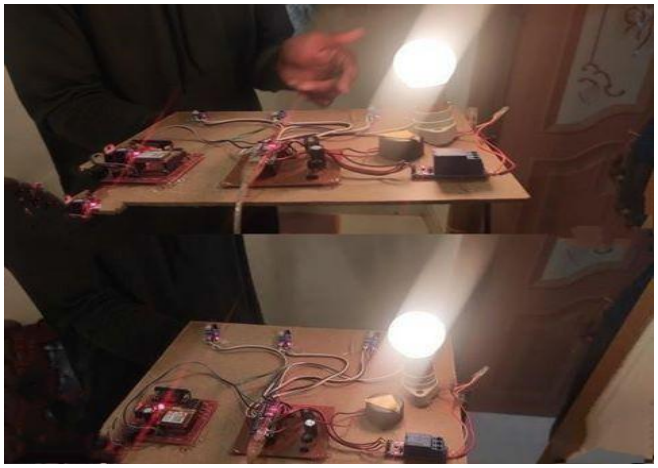
Sl. No.	Year	Total Number of Suicides	Mid-Year Populaton* (in Lakh+)	Rate of Suicides (C3/C4)
(1)	(2)	(3)	(4)	(5)
1	2016	1,31,008	12,739.9	10.3
2	2017	1,29,887	13091.6	9.9
3	2018	1,34,516	13233.8	10.2
4	2019	1,39,123	13376.1	10.4
5	2020	1,53,052	13533.9	11.3

sensor, buzzer, GSM module, relay, switch, and DC motor.

1. Sensor Placement: The sensors, including an accelerometer, heart rate, and pressure sensors, are placed in strategic locations to detect changes in the body's movement, heart rate, and pressure around the neck.
2. Data Acquisition: The sensors collect data on a continuous basis and transmit it to the microcontroller for processing.
3. Data Processing: The microcontroller processes the data received from the sensors and analyzes it for signs of hanging. If hanging is detected, the microcontroller triggers an alarm to prevent it.
4. System Reset: Once the hanging situation has been resolved, the system can be reset and is ready for use again.

Overall, the working of the hanging prevention system using microcontrollers is automated and designed to prevent hanging in real-time. The system is user-friendly, cost-effective, and can be easily installed in a variety of locations, making it a practical solution for hanging prevention.

V. RESULT



VI. ADVANTAGES

i. Real-time Detection: The system can detect hanging in real-time, allowing for immediate intervention and prevention.

ii. High Accuracy: The system has a high accuracy rate in detecting hanging, reducing false alarms and ensuring accurate prevention.

iii. User-friendly: The system is designed to be user-friendly, with simple installation and minimal maintenance required.

iv. Cost-effective: The system is a cost-effective solution for hanging prevention, with low installation and maintenance costs compared to traditional methods.

v. Adaptability: The system can be adapted to different applications and settings, making it a practical solution for a wide range of environments.

VII. FUTURE SCOPE

The system which we proposed, we are trying to extend this maximum. The project can be extended in many ways. We will try to reduce the size of our kit as much as possible and try to reduce implementation cost. We will ty to implement a battery backup for the kit to produce electricity in case of absence of Electric current. Automatic ON/OFF Control using PIR Sensor for less Energy conservation. We will extend our project by introducing a special rod in place of iron rod and use a weight sensor. When the weight of the person is added the rod will expand upto 10 feet and eliminates ceilingfans from being used as aids to committing suicide.

VIII. CONCLUSIONS

I. The proposed hanging prevention system using microcontrollers offers an effective and practical solution for preventing hanging in various environments.

II. The system's real-time detection and high accuracy rate, coupled with its user-friendly design, cost-effectiveness, and adaptability, make it a reliable and feasible solution for hangingprevention.

III. The system's automated response and prevention of self-harm also contribute to its effectiveness in reducing the impact of hanging on individuals and society as a whole.

IX. The system's successful testing and evaluation across different settings, including homes, hospitals, mental health facilities, and prisons, demonstrate its versatility and potential for widespread use. Furthermore, the system's low installation and maintenancecosts make it a cost-effective solution for hanging prevention, particularly in settings with limited resources.

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