

## Security System Based On Smell Sensors

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### ABSTRACT

There are so many security systems exist all over the world. But still there is no system that provides 100 percent security. In this paper we propose a method in which we use body odor to identify a person uniquely. Since one cannot produce body odor artificially it is completely reliable. It allows only authorized persons by comparing their body odor with the previously recorded one. If it does not match then he/she will be caught.

Keywords:- ID, Smell, Security, Sensors

### 1. INTRODUCTION

Security is one of the main things which must be provided not only to human beings but also to certain places like nuclear plant where entries of unauthorized persons are strictly prohibited. Some of the present security systems are identifying persons using their Identification card, voice recognition, face recognition, finger prints recognition and so on.

We believe that all these systems are fully secured and unauthorized persons cannot enter into highly confidential areas. But the fact is these systems can be easily tampered and one can enter into anywhere using advanced technologies.

### II. DISADVANTAGES OF PRESENT SECURITY SYSTEMS

- One of the present security systems involves identifying persons using their Identification cards (ID). This is one of the oldest methods which involves a person at the entrance has to verify each and every person's
- Identification card entering into a building or a particular room. To err is human. Hence on such occasions the result would be a major problem. Also it is impossible to carry Identification cards everywhere.
- Using the same process another method is inserting the Identification card into a machine and the machine in turn recognizes the secret code present and allows the person to enter into a room. But in this method, a person can use an authorized person's Identification card to enter [3]. This is also a problem.
- Personal Identification Number. The PIN is usually a number consisting of four to eight digits. Lesser the number it is too easy to guess. More the number is too difficult to remember. The disadvantage is the some people have difficulty in remembering numbers that are not frequently used and the ease with which a PIN can be observed and therefore used by unauthorized people. The PIN is even less secure than other methods.

- Next method is voice recognition. Speech recognition is the computing task of validating a user's claimed identity using characteristics extracted from their voices. Here each person has to speak a particular phrase, such that the machine will compare the voice with the previously recorded one. It is somewhat advantageous over identification cards, but it has also some drawbacks. Some persons are very good in mimicry. Even they can speak as accurate as other persons. Those persons can imitate the authorized persons' voice to enter into a room. Also an accurate recorded voice of an authorized person can be used to open a door.
- Another one is face recognition. A facial recognition system is a computer application for automatically identifying or verifying a person from a digital image or a video frame from a video source. In this method authorized persons' faces are first recorded. And each time when a person enters into a room, his/her face is compared with the recorded one. If it does not match, the door will not get opened. Due to advancement in medical field, one can change his/her face as exact as another person using plastic surgery. In future, this will be very critical. Because one can even change his/her face 100 percent same as another person because of excellent growth in the field of plastic surgery. This leads to very serious problem [3].
- The most important and the most secured what we think is finger

prints recognition. In this technique one has to place his/her hand(s) in a sensor, which absorbs the finger prints and compares with the previously stored one. Again if it does not match, the door will not be opened. We think this method is 100 percent reliable and safe. But the fact is that this can also be tampered, if one plans to attack the restricted area very severely. It is only 99 percent reliable [3].

- For example, if terrorists plan to attack a nuclear power plant, they may go to any level. They even may detach the hands of an authorized person and place it on the machine to open the door. Also the terrorists may give money or to threat the authorized persons and force them to place their hands to open the door. This leads to very dangerous problem.
- Fingertips are more likely to be dirty than other parts of the body. Dirty fingers can foil the matching process. Dirty fingers also lead to dirty fingerprint readers, which then lead to more poor scans.

Thus all the present security systems are reliable only up to a level. Therefore, we need a security system that must be 100 percent secure and nobody can tamper it.

One such type of security system is identifying body odor of authorized persons which we will see in detail.

### **III. SMELL SENSORS**

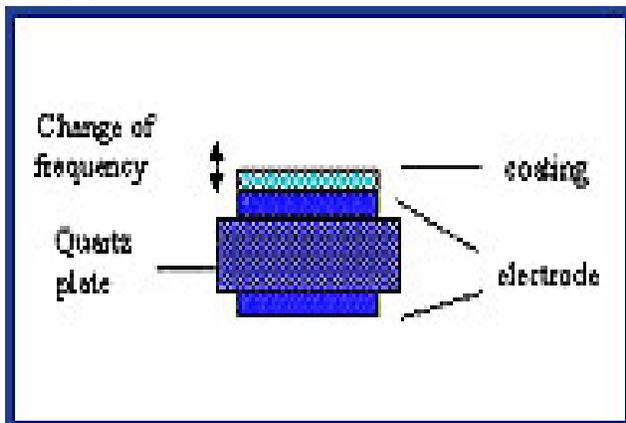
First we define what smell sensors is. Smell sensors are mainly built for the purpose of identifying smell and odor.

Smell sensors usually consists of a quartz crystal with a coating made up of plastic, ceramic, barium carbonate etc. [1]

We know that quartz crystal can vibrate at a particular frequency called resonant frequency. According to Piezo – electric effect an E.M.F is developed across the crystal when an external mechanical pressure is applied [5].

This effect is used in smell sensors. The coating present above the quartz crystal can absorb a particular chemical. Thus when that chemical spreads in the atmosphere, the coating gets more and more weighted. Therefore, it exerts a mechanical pressure on the quartz and thus the quartz begins to generate E.M.F. This E.M.F is used for the purpose of ringing alarm.

The following illustration shows the smell sensors.



### 3.1 ARRANGEMENT FOR SECURITY SYSTEM

In this technique, first we should record the body odor of all the persons who are permitted to enter into a highly confidential area. They are said to be the authorized persons for that place.

Then we have to build a long corridor in front of the confidential room or building. On the walls of the corridor we have to install a large number of sensitive smell sensors which must be capable of recognizing even a less amount of odor.

Then we have to construct a door at the beginning of the corridor.

### IV. OPERATION

As soon as a person enters into the corridor, the sensors installed on the walls try to recognize the body odor of that person. If it matches with the recorded one, then the main door of the room will be opened. Otherwise the door at the beginning of the corridor will get closed and gives alarm to everyone.

This ensures that unauthorized persons cannot walk into the corridor even for a moment.

### V. ADVANTAGES OF USING SMELL SENSORS

At a time, only a single person is allowed to enter into the room. Because the sensors are very sensitive, they cannot recognize a mix of odors.

Since, body odor is unique for each individual, no one can tamper it.

No one can produce an artificial body odor.

No need for an authorized person to do specific things such as placing their hands, showing their face etc. Instead, they just need to walk in the corridor and the smell sensors will automatically recognize the odor.

This method is completely safe, secure and reliable.

## **VI. CONCLUSION**

Thus, we design an efficient method to secure highly confidential and restricted areas. This method will be useful not only at present but also in future.

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