IJIRR

International Journal of Information Research and Review
Vol. 05, Issue, 09, pp.5705-5710, September, 2018

# REVIEW ARTICLE

## SIXTH SENSE HAND GESTURE PROJECTION SYSTEM FOR HIGH SECURITY AND SAFETY IN ATM

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**ARTICLE INFO**

***Article History:***

Received 20th June, 2018
Received in revised form
17th July, 2018
Accepted 12th August, 2018
Published online 30th September, 2018

***Keywords:***

Sixth sense,
ATM.

**ABSTRACT**

Automated teller machines in their modern form have been around for almost 50 years. And, given that ATMs represent an apparently unattended box packed with cash, criminals have been keen on them for all that time. But attacks on cash machines – to steal not only money but customer data too – have been increasing significantly in recent years. How can they be stopped? ATM Security has always been one of the most prominent issues concerning the daily users and the not so frequent ones as well. While the ATM is used in large amount in the commercial banks and postal savings to deposit and draw conveniently and praised by the users, but dispute cases and financial crimes about it are increasing day by day. This paper emphasizes on the hypothetical, yet very possible scenario of an individual's ATM machine Security with a low but Efficient cost hardware system. Our proposed model uses certain factors which would be monitored right from the initiation, to the end of the respective transaction. We have proposed a sixth sense Atm which uses No touching of any objects but by just using your gestural interface it lets us do the normal operations of ATM authentication system. Also it uses a High alert security system for reducing or eliminating ATM thefts.



## INTRODUCTION

If you've been standing in a queue to withdraw money from an automated teller machine (ATM), here's something you need to be cautious of. The keypads of the machine may be loaded with bacteria from spoiled food to parasites that may also cause sexually transmitted disease (STDs), researchers say. Automated teller machine (ATM) keypads represent a specific and unexplored microhabitat for microbial communities. "Our results suggest that ATM keypads integrate microbes from different sources, including the human microbiome, foods, and potentially novel environmental organisms adapted to air or surfaces," said Jane Carlton, Professor at New York University, US. "DNA obtained from ATM keypads may therefore provide a record of both human behaviour and environmental sources of microbes," Carlton added. The researchers in June and July 2014 took swabs of keypads from 66 ATM machines from Manhattan, Queens, and Brooklyn, in the US. Specifically, the most common identified sources of microbes on the keypads were from household surfaces such as televisions, restrooms, kitchens and pillows, as well as from bony fish, mollusks and chicken. Residual DNA from a meal may remain on a person's hands and be transferred to the ATM keypad upon use, the researchers suggested. ATM keypads located in laundromats and stores had the highest number of biomarkers with the most prominent being Lactobacillales (lactic acid bacteria), which is usually found in decomposing plants or milk products. In other samples, the researchers observed the biomarker Xeromyces bisporus, which is associated with spoiled baked goods. In addition, the team found a parasite typically seen in the gut of humans and other mammals, along with a species closely related to the human parasite Trichomonas vaginalis, which can potentially cause STD.However, there is no significant difference was found in the keypads from ATMs located outdoors versus indoors, the researcher noted, in the paper published in the journal 'mSphere.'

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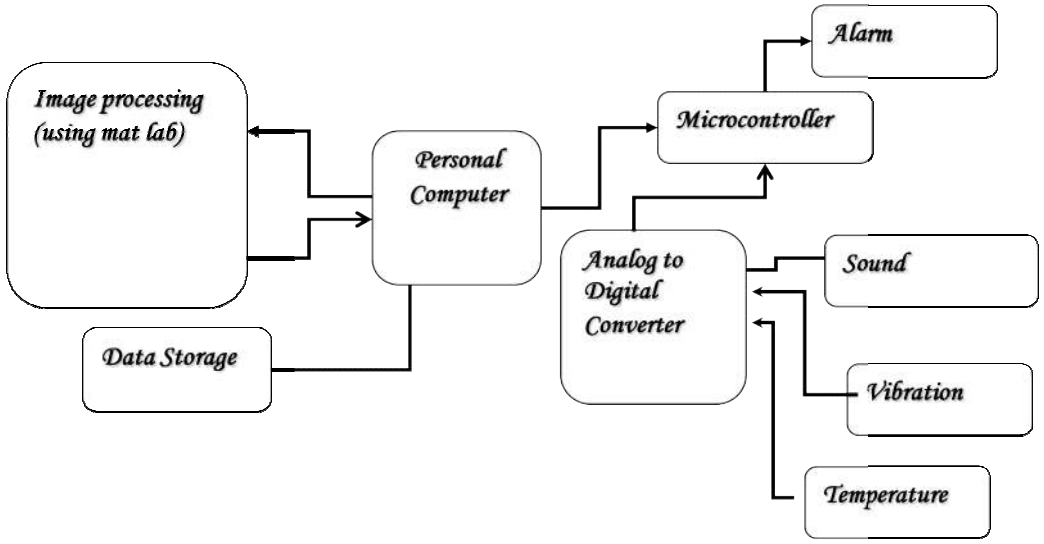
### ATM Thefts

A. **A.The Lebanese Loop:** Many thieves are using external devices to confiscate your card. In this scam, a blocking device (which can be as simple as some film glued to trap ATM cards), is inserted into the card slot of the ATM machine. Unwittingly, you place your card into the machine and enter your PIN. All the while, someone nearby may be watching you enter your PIN number. A very common reaction is to go into the bank to report your confiscated card. Now the thieves jump into action. They remove the blocking device, along with your trapped ATM card and withdraw money from your account. The way the scammers use the Lebanese Loop can vary. Often, once your ATM card is trapped, a "Good Samaritan" will show up and offer advice on how to get your card back. They may suggest that you enter your PIN number a couple of times

**Block diagram**




**B. Card skimming:** Skimmers are devices added to ATM machines to capture your card's information, including your account number, balance, and PIN number. These devices, often mounted alongside a machine and labeled 'card cleaners,' are difficult to notice unless you're looking for them. You may also find card skimmers mounted beside the normal ATM card slot with a sign that says, "slide card here first." Sometimes they are even mounted right on top of where you would normally enter your card. Skimmers can actually collect and store up to 200 ATM cards before they need to be removed by thieves

**C. Shoulder Surfing, Fake PIN Pads, and Even Fake Machines:** Another way to glean your ATM PIN number is for thieves to mount a wireless video camera inside the ATM area. It can look as harmless as a brochure holder. Once the scammers have your number, magnetic strips are easy to make and thieves are able to easily reproduce ATM cards.

In addition to using cameras to collect PIN numbers, thieves have designed fake PIN pads that they place on top of the original ATM PIN pad. Unfortunately, with fake PIN pads, your ATM transaction will proceed normally and you won't know a scammer has stolen anything until it's too late. Thieves have also taken to occasionally putting up fake ATM machines in and around shopping centers and other public locations. Upon placing your card into the card reader, these machines collect your ATM PIN and account information. They do not dispense cash. Rather, a screen comes up that says that the machine is out of money or out of order

**Overview**

**Number of modules:** There are three modules based on theft prevention and security of ATM. They are

Contactless operation based entry module.
Sensor to detect Human Obstacle.
Security of ATM by using GSM.

**A. Contactless operation based entry module:** We use two color bands for contactless operation. Both the color bands acts like a mouse. One of the color band is used for moving the cursor. And the other band is used for clicking the Keypad. The keypad used here is Virtual keypad. Instead of using normal ATM Card, we use RFID (Radio Frequency Identification) Tag. We should maintain a distance of 5cm away from ATM machine. We just show the RFID Tag infront of ATM machine for starting the initial operation of transaction process. The merits of using this module is Prevention of Disease but in existing ATM, more diseases are spreading. Without touching the Monitor, Keypad, the place of inserting the ATM card, we can prevent disease by using Contactless ATM.

**Sensor to detect human obstacle:** There are four sensors used to detect human obstacle. They are

Infrared Sensor
Sound Sensor
Vibration Sensor
Temperature Sensor.

**Infrared Sensor:** IR Sensor is a Digital Sensor. It is used to detect obstacle. The obstacle is the person whoever stands infront of ATM. The IR rays are transmitting and receiving from the IR Sensor. If the output of this Sensor is HIGH, then there is some obstacle. If the output of this Sensor is LOW, then there is no obstacle.

**Sound sensor:** Sound Sensor is also a digital Sensor. It is used to detect the sound more than the certain decibel inside the ATM room.

**Vibration sensor:** Vibration Sensor is a Digital Sensor. It is used to detect when the ATM machine is shaked or moved.

**Temperature sensor:** Temperature Sensor is an Analog Sensor. ADC 0808 is used to convert the analog output of this Sensor into digitized output. It is used to detect the obstacle like fire problem etc.

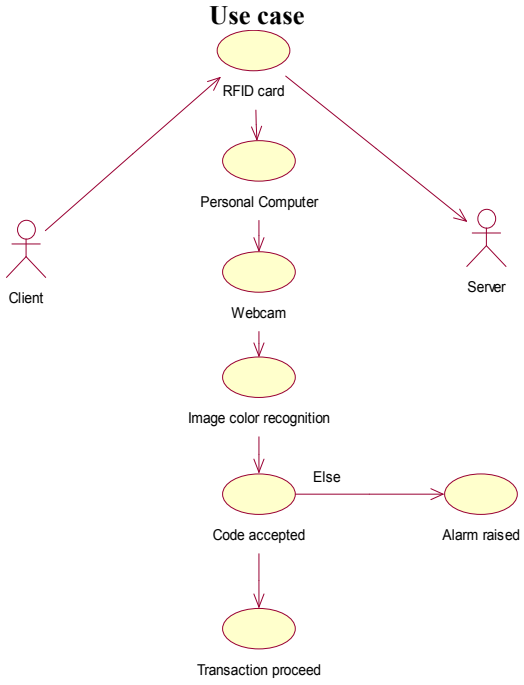
**Security of ATM by usin gsm**

**RFID Card Reader:** Radio-frequency identification (RFID) is a technology that uses communication via radio waves to exchange data between a reader and an electronic tag attached to an object, for the purpose of identification and tracking. It is possible that by 2030, RFID technology will have inserted itself into our daily lives the way that bar code technology wrought unobtrusive but remarkable changes when it was new. RFID technology makes it possible to give each product in a grocery store its own unique identifying number. Compare that to the situation today, with bar codes, where it is only possible to identify the brand and type of package. Furthermore, RFID tags can be read if passed within close enough proximity to an RFID tag reader. It is not necessary to "show" them to it, as with a bar code. Some tags can be read from several meters away and beyond the line of sight of the reader. The application of bulk reading enables an almost-parallel reading of tags. Radio-frequency identification involves interrogators (also known as readers), and tags (also known as labels). Most RFID tags contain at least two parts: one is an integrated circuit for storing and processing information, modulating and demodulating a radio-frequency (RF) signal, and other specialized functions; the other is an antenna for receiving and transmitting the signal. In our project instead of using Smart Card we are going to use RFID card. So that it will be more authenticated no duplicate card will be described like same RFID card.

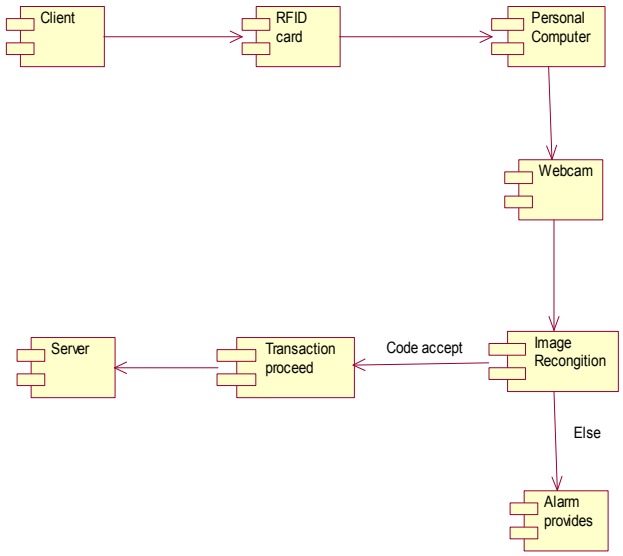
**Camera Interfacing:** Here we are using webcam for gesture recognition. In our project we are going to fix it in top of monitor for preview the password. Person password is given in symbols with some gesture is captured in preview size window and retrieved.

**Image Recognition:** Using web cam the image will be captured and stored at a location. Using .net matlab process will automatically calls the location with the use of color recognition. Intensity of color is mentioned and the image captured through intensity of the color.

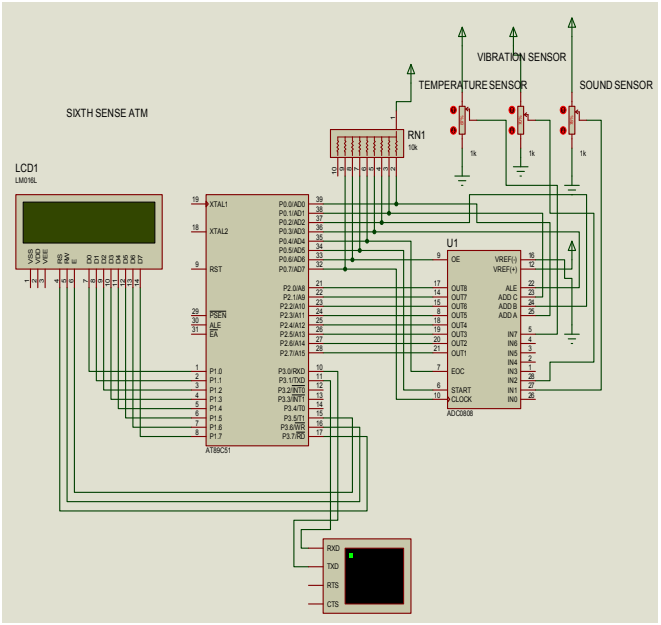
**Use case**



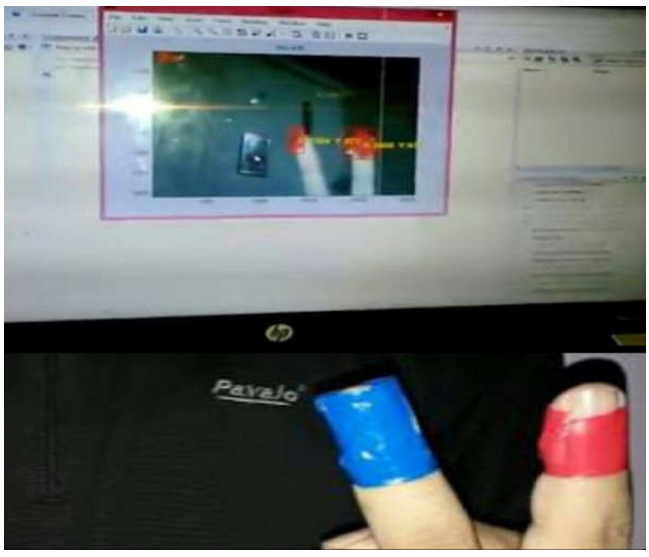

**Component**



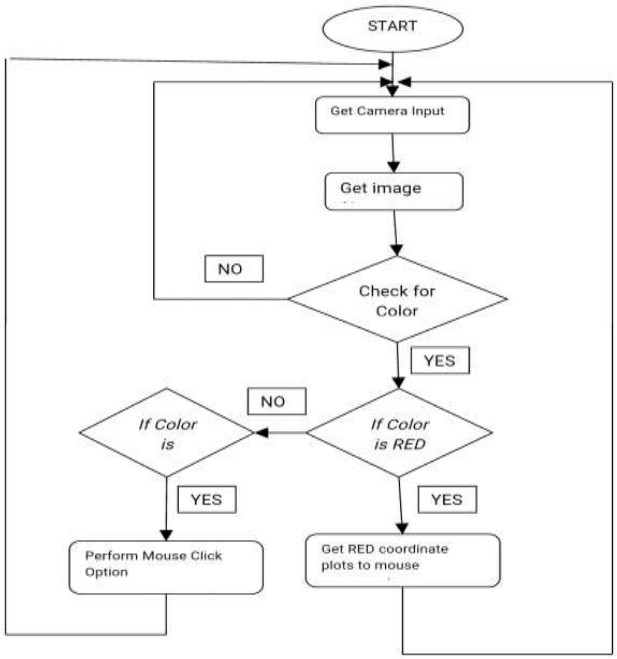

**Circuit diagram**




**Contactless access prototype**



**Matlab program**




## Literature review

The developed interface has the potential to enable people with motor disabilities to interact with a graphic user interface in a natural and intuitive way. The interface was not tested on these individuals, however, but on individuals with bilateral hand amputations and SCIs at the C6–C7 functional levels, who had control of the muscles (FCU, ECR, ECU, and APL) used in this study. However this cannot be used in common applications like ATM.

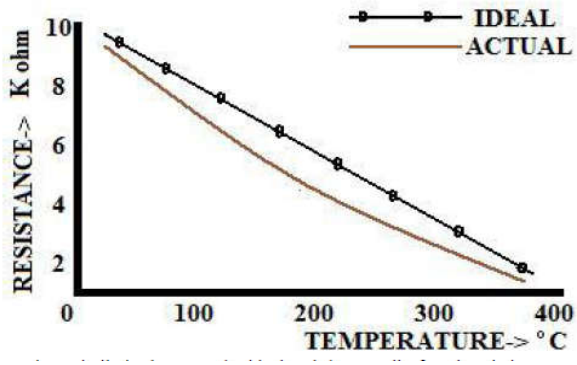
## Security system

**Temperature Sensor:** The innovative part of the proposed model is the Comparison of three types of electronic temperature sensors and selecting the apt one suiting our project. The general working attributes as per their electronic activities and their descriptions in brief are given as follows.

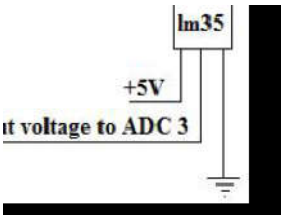
| S.no | Electronic parameter variations observed | | |
|---|---|---|---|
| | Temperature °C | Resistance K ohm | Output voltage V |
| 1 | 20 | 8.5 | 0.21 |
| 2 | 40 | 8.0572 | 0.42 |
| 3 | 60 | 7.5897 | 0.63 |
| 4 | 80 | 7.1222 | 0.84 |
| 5 | 100 | 6.6547 | 1.05 |
| 6 | 120 | 6.1872 | 1.26 |
| 7 | 140 | 5.7197 | 1.47 |
| 8 | 160 | 5.2522 | 1.68 |
| 9 | 180 | 4.7847 | 1.89 |
| 10 | 200 | 4.3172 | 2.1 |
| 11 | 220 | 3.8497 | 2.31 |
| 12 | 240 | 3.3822 | 2.52 |
| 13 | 260 | 2.9147 | 2.73 |
| 14 | 280 | 2.4472 | 2.94 |
| 15 | 300 | 1.9797 | 3.15 |
| 16 | 320 | 1.5122 | 3.36 |
| 17 | 340 | 1.0447 | 3.57 |
| 18 | 360 | 0.5772 | 3.78 |
| 19 | 380 | 0.1097 | 3.99 |
| 20 | 400 | 0.085 | 4.2 |

T measured =t compensation +(VCC* ADC value).

The compensation temperature in the above expression is found out by trial and error method of the measurements made from a known temperature variation test method. The compensation method is coded in the microcontroller so that the compensation is done automatically when the device continuously works.




**LM35 transistor:** The LM35 Transistor type temperature sensors are widely used Industrial sensors as they operate with High precision. They have an integrated-circuit, and their output voltage varies linearly temperature. A constant voltage which is directly proportional to the value of the temperature sensed is obtained. The sensed voltage value is then passed to the ADC. The ADC in the microcontroller converts the analog signal to discrete number of steps that can be easily counted in decimal for display and control manipulation. The LM35 has the advantage over linear temperature sensors. As they are directly calibrated in Kelvin, there is no need for the user to calibrate the Output values. LM35 temperature sensor provides output in the range of -55 to +150°C temperature range with an accuracy .25°C at room temperature.




| S.no | Electronic parameter variations observed | | |
|---|---|---|---|
| | Temperature °C | Output voltage V | Output current µA |
| 1 | 0 | 0 | 0 |
| 2 | 20 | 0.5 | 60 |
| 3 | 40 | 1 | 120 |
| 4 | 60 | 1.5 | 180 |
| 5 | 80 | 2 | 240 |
| 6 | 100 | 2.5 | 300 |
| 7 | 120 | 3 | 360 |
| 8 | 140 | 3.5 | 420 |
| 9 | 160 | 4 | 480 |

The easiest way to do this is to cover up the wires with a bead of epoxy which will insure that the leads and wires are all at the same temperature as the surface, and that the LM35 die's temperature will not be affected by the air temperature. As with any IC, the LM35 and accompanying wiring and circuits must be kept insulated and dry, to avoid leakage and corrosion. The general expression for the temperature output of the thermocouple for the observed is

T Measured=VCC* adc output.

The compensation temperature is not required in this sensor expression because the output of LM35 is the direct step temperature raise. The output analog signal can be digitized and it can convey out the direct temperature equivalent. The sensitivity of LM35 is also similar to that of the thermistor. Hence, the output of this sensor is directly scaled to the temperature readings.

**Vibration Sensor:** The piezoelectric sensor is used for flex, touch, vibration and shock measurement. Its basic principal, at the risk of oversimplification, is as follows: whenever a structure moves, it experiences acceleration. A piezoelectric shock sensor, in turn, can generate a charge when physically accelerated. This combination of properties is then used to modify response or reduce noise and vibration.

y one direction.

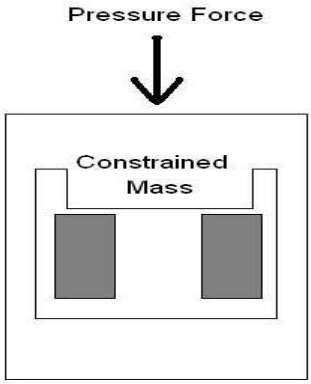


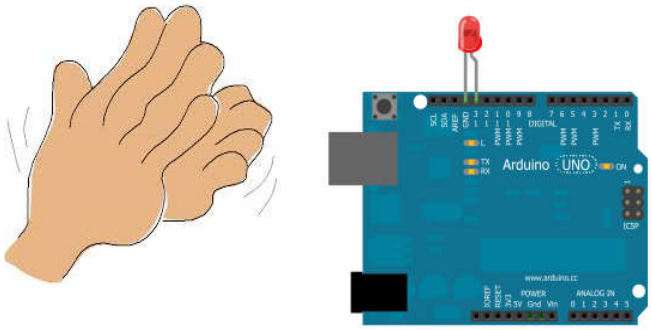

**Figure 1. A constrained mass is allowed to deform the crystal sensor in one axis. This configuration is good for force and pressure**

## Output Graph

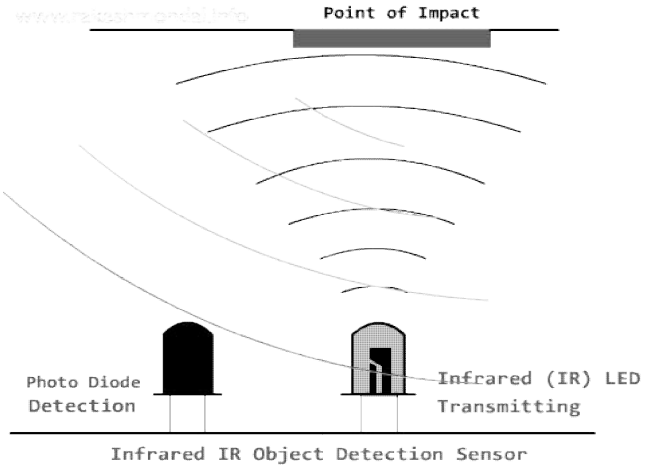
## Sound Sensor

Sound sensors work by detecting differences in air pressure and transforming them into electrical signals. Sound sensors such as microphones usually have built-in amplifiers that increase the strength of the incoming signal. Sound sensors work by mimicking the human body process that involves the ears and signal transmission to the brain. Microphones are sound sensors that convert a sound signal into a voltage or current proportional to the detected signal. They typically have a small diaphragm made of magnets surrounded by coiled metal wire. Sound waves cause the diaphragm to vibrate, which vibrates the magnets and induces a current in the coil. The most common microphones used for music are dynamic, ribbon or condenser microphones. Although microphones are the most recognized sound sensor, electrostatic and piezoelectric sensors are also used to detect sound in applications such as industrial, medical, robotics, and identification and tracking. These sensors can detect sound pressure waves that are not within the audible range, which makes them suitable for a wide range of tasks. For instance, high-frequency ultrasonic sound sensors are used to weld plastics, whereas low-frequency ultrasound sensors are used to inspect less dense materials, such as wood, concrete and cement. Such sensors are not affected by reflectivity, translucence or color, as is the case with light sensors.

## How to Build a Sound Detector Circuit




**IR Object Sensor:** The IR Object Detection sensor module is quiet easy to make. This sensor circuit below is a low cost - low range infrared object detection module that you can easily make at home using IR LED's. The Maximum input Voltage is 5 Volts. We will use a photodiode and IR LED to make a simple circuit. IR led looks like a regular LED that you usually see in Television Remote controls. For now I have added a regular LED to glow as in indicator when something is detected, you can replace it with a buzzer or something else the way you wish. The Main concept is simple, the IR led keeps transmitting IR infrared rays up to some range (there is a potentiometer also in the design with the help of which you can alter the range). When some object comes in the (IR) infrared range, the IR waves hits the object and comes back at some angle, The Photo diode next to IR led detects that IR infrared rays which got reflected from the object and hence works as a proximity sensor. You can read more details about Proximity sensors for more.

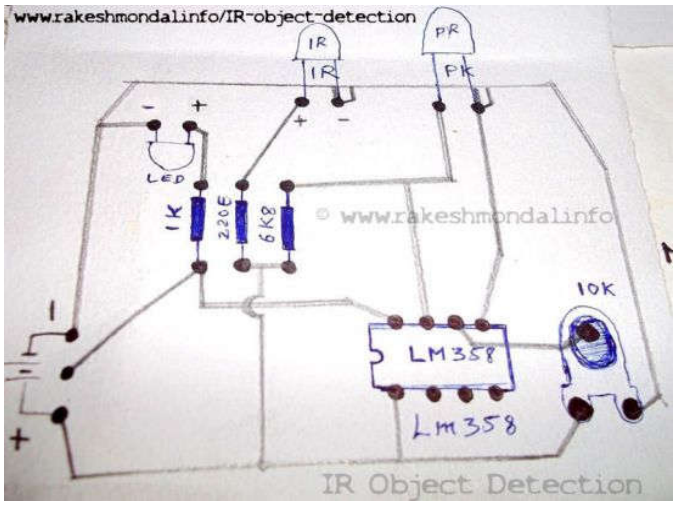


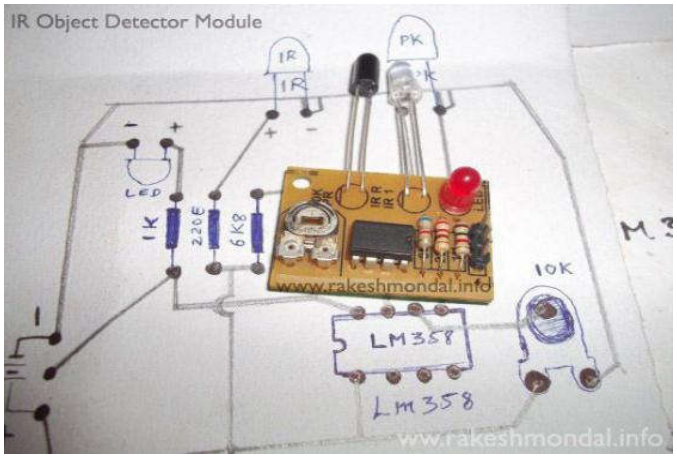
The components required to make this IR sensor can be easily found in any electronic stores and it is quiet inexpensive.

IR Sensor Circuit Module Requirements

1 - IR LED TSFF5210
1 - PR (photodiode) BPV10NF
1 - 1k resistance
1 - 220E resistance
1 - 6k8 resistance
1 - 10k potentiometer
1 - IC LM358

**Infrared sensor Module Schematics:** Following this schematic you can easily make it on a breadboard, I intentionally drew this schematic for this IR sensor this way so that it can easily printed on the copper board in no time if you have some etching solution. For now in this circuit an LED would glow as an example. Notice that there are three pins in the schematic in which two pins are used to provide power to the infrared sensor and the Middle pin is unused, and can be used for other operation. The Middle pin goes high (Logic 1) if the photodiode in this object detection module detects an object, and hence can be interfaced with other devices.




**Conclusion**

This sixth sense gesture system can be implemented in all the ATM machines and this will become a great project if it comes into practice .projection of screen in ATM machines cannot be done since, government can't afford money to change all the machines. In future this can be implemented for better digital INDIA.

**Future enhancement**

In future this project can be elevated to an android based transaction system. This can also be a contact less ATM module. The number of sensors for the security purpose can be increased. Projection of screen in ATM machines may also be implemented in future for better digital INDIA.

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