



# ADVANCED PRECAUTIONARY & SMART ALERT SYSTEM FOR CONTAGIOUS DISEASES USING MICROCONTROLLER APPLICATIONS

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## ABSTRACT:

As in our day-to-day life, every one of us are affecting with some Infectious Disease. Human body temperature is of great interest in medical practice and diagnosis. The normal human body temperature range is usually between 36.5 °C and 37.5 °C (97.7 °F – 99.5 °F). A person's body temperature depends on his/her age, exertion, infection, the time of day, the subject's state of consciousness, activity level, and emotional state of the subject. Fluctuations in the human body temperature indicate a variety of diseases such as hypothermia, hyperthermia and cardiac arrhythmias. Temperature is a vital parameter in determining a person's health condition and plays

a primary role in diagnosing the problem. Using the Fever Click LM35 sensor and liquid content sensor, a person can measure his body temperature and respectively body dryness detecting easily. In cases where the patient is unable to meet the doctor or requires frequent monitoring, He / She could monitoring his body temperature level to the doctor anytime using the body temperature and liquid content sensor through LCD (liquid Crystal display). The Respiratory Sensor is used to check the Respiratory level in our body. To obtain values from the sensor and send it to (16x2) LCD Display is being utilized.

**KEYWORDS:** Smart card, Body Temperature Sensor, Tongue dryness Sensor, Respiratory Sensor.

## INTRODUCTION

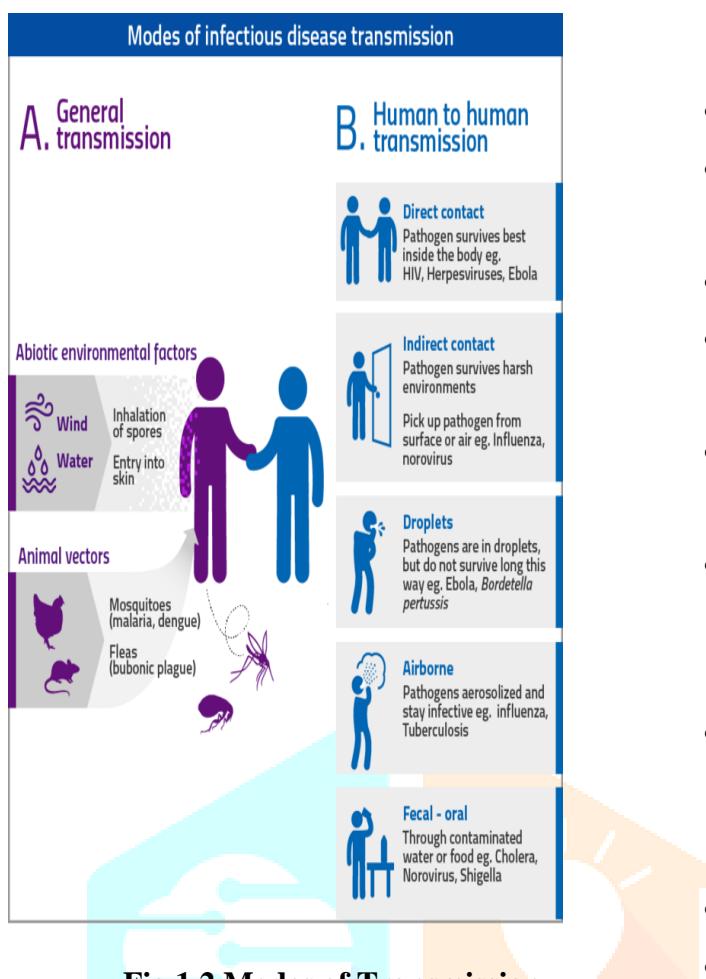
Diseases which are caused by the presence of some microorganism, i.e. virus, bacteria etc. These are not normally found in the body; they are also capable of causing some infections on our body<sup>[1]</sup>. Only some will cause infectious diseases and they are contagious. These can spread from person to person, through the direct contact etc. Most of the Infectious perspective causes the various disease which are microscopic in size<sup>[2]</sup>. There are various different types of perspective cause, they are Bacteria, Viruses, Protozoa (protist), Fungi, Helminths (animals). One of the example, The Respiratory tract infection, and the pain will not only be in throat, the symptoms are felt all over the body. Some of the Acute Contagious disease are caused by the presence of influenza virus. The symptoms and sign may vary for each infectious disease<sup>[3]</sup>. But common symptoms can be Fever, Diarrhoea, Fatigue, Muscle aches and Coughing. Maximum number of infectious diseases are minor complications. Only few can result in major complications like Pneumonia, AIDS and Meningitis – they can even be a life-threatening, usually the infections is composed of various three factors – Pathogen, Host and Environment.



**Fig 1.1 Spread of disease through hands**

At present as every one of us know the world is suffering with Corona virus, many countries are affected by this corona virus. Almost many are being affected. There is no medicine to cure it, many people were died<sup>[4]</sup>. To minimize this, all are requested to stay in home called lockdown to avoid the spread of infection. The infection can be spread through the direct contact, it can be infected by shaking the hands with the infected person, or during when the infected person cough or sneeze without closing their mouth using hands or tissues, or masks etc.<sup>[5]</sup>. So it's better to prevent ourselves.

It is our duty to be safe and alert, nowadays we couldn't guess who is being affected so some preventive measures should be taken to get rid of harmful diseases. This new invention will help the society to identify the condition of an individual's health, whether there are being infected or not.



**Fig 1.2 Modes of Transmission**

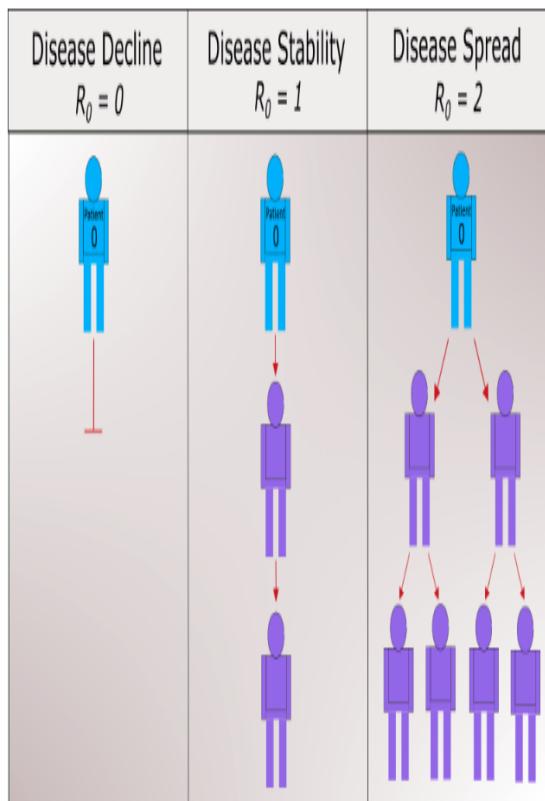
At recent time, we all know that humans are affecting with many health issues, one of the reasons can be the presence of foreign bodies in human body which can cause infectious diseases<sup>[6]</sup>. The Foreign bodies are entered into body by the natural orifice into hallow organs<sup>[7]</sup>. It may be inserted into the body accidentally or intentionally. They are swallowed<sup>[8]</sup>. They can become lodged or stuck in various parts of the body. Such as ears, nose, eyes, stomach and airways. If they irritate, they will cause inflammation and scarring, they can cause infection. We may inhale or swallow a foreign body. It is more common to see in children<sup>[9]</sup>. This can be used in public places like Schools, Colleges, Offices, Hospitals, and so on. General awareness programs should be conducted by all the schools to teach the children's about the preventive measures. Always hygienic adds a good point to avoid this kind of disease.

## PREVENTION:

- Wash your hands often, have a Hand Sanitizer,
- Always maintain a social distance to those who have cod and cough.
- Keep your surrounding clean and hygiene.
- Try to cover your nose and mouth using mask or cotton cloth.
- Avoid to touch your Nose, Eyes and Mouth with Dirty or unwashed hand.
- Always remember to cover your mouth and nose with a tissue or inside your elbow when you are coughing and sneezing.
- Monitor your health daily.

## SYMPTOMS:

- Fever
- Cough
- Tiredness
- Shortness of breath or difficulty breathing
- Muscle aches
- Chills
- Sore throat
- Runny nose
- Headache
- Chest pain
- Pink eye



**Fig 1.3 Spread of diseases**

## MATERIALS AND METHODS

### HARDWARE REQUIREMENTS

- Respiratory sensor
- Body temperature sensor
- Tongue dryness sensor
- Microcontroller
- Power supply
- LCD display

### SOFTWARE REQUIREMENTS

- **Operating System** : windows
- **Programming Tools** :Android Studio, Arduino IDE

### HARDWARE COMPONENTS

#### RESPIRATORY SENSOR:

The respiratory sensor is a touchy circumference sensor worn utilizing a simple fitting high strength

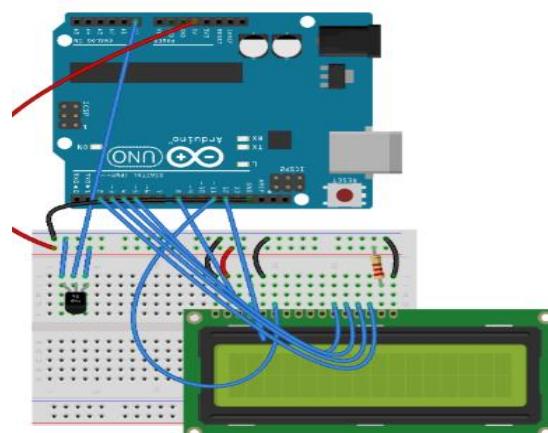
woven versatile band fixed with a length movable webbing belt <sup>[10]</sup>. It identifies chest or stomach extension or constriction and yields the breath waveform. The required program is feeded and the output is obtained.



**Fig 2.1 Respiratory Sensor**

#### BODY TEMPERATURE SENSOR:

This sensor permits you to gauge internal heat level. It is of extraordinary clinical significance to gauge internal heat level <sup>[11]</sup>. The explanation is that various illnesses are joined by trademark changes in internal heat level. In the course of specific illnesses can be observed by estimating internal heat level, and the proficiency of a treatment started can be assessed by the doctor. The process of the sensors accessed according to particular program which is feeded in it.

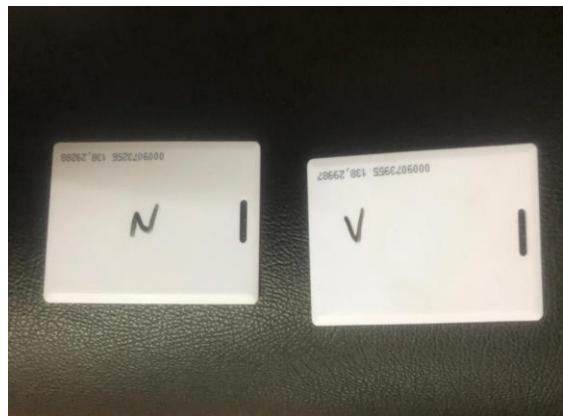


**Fig 2.2 Body Temperature Sensor**

## SMART CARD:

Smart card is build using the microchip. IOT applications are working in it. using IOT applications patients parameters are feeded in smart card, those parameters will detect and identify the changes in human body and it will give an alert .Smart will be in visible connectivity so we can use it for any parameter that is for external source also. It doesn't have any separate connectivity.

In microchip we have already inserted gsm sim so that it will give any time alert according to the network access.

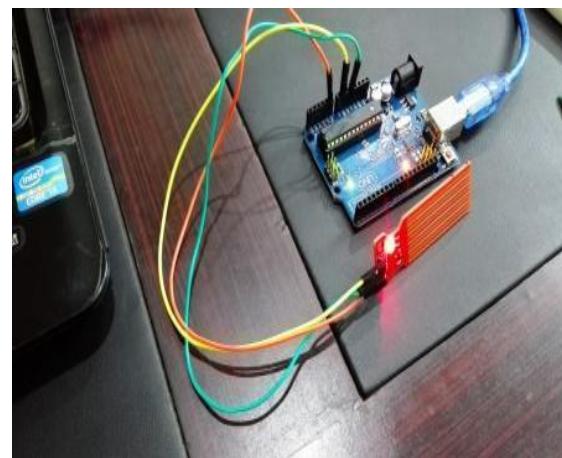


**Fig 2.3 Smart Card**

## TONGUE DRYNESS SENSOR:

An implantable tongue sensor or trigger gadget is uncovered for detecting and checking physiological parameters and giving a receptive incitement to patient <sup>[12]</sup>. The gadget incorporates a fundamental upper circle part conveying at least one miniaturized scale biomedical sensors for detecting numerous physiological parameters and at least one incitement terminals for making animating sensations in the tongue, a lower tongue plate part that incorporates a battery for driving gadget hardware and a locking system for securing the gadget when it is embedded, and a middle of the road get together including a focal

tongue bar part and directing cylinders for entering a tongue and interfacing the upper plate with the lower plate<sup>[13]</sup>. The gadget contains a remote transmitter for transmitting information from the gadget. The process of the sensor is accessed according to the particular program feeded in it.



**Fig 2.4 Tongue Dryness Sensor**

## MICROCONTROLLER:

Arduino Uno is a microcontroller board dependent on the ATmega328P (datasheet). It has 14 advanced information/yield pins (of which 6 can be utilized as PWM yields), 6 simple sources of info, a 16 MHz fired resonator (CSTCE16M0V53-R0), a USB association, a force jack, an ICSP header and a reset button. It contains everything expected to help the microcontroller; essentially associate it to a PC with a USB link or force it with an AC-to-DC connector or battery to begin <sup>[14]</sup>. You can tinker with your Uno without stressing a lot over accomplishing something incorrectly, most dire outcome imaginable you can trade the chip for a couple of dollars and begin once more.



**Fig 2.5 Microcontroller**

## LCD DISPLAY

LCD (Liquid Crystal Display) is a sort of level board show which utilizes fluid gems in its essential type of activity. LEDs have a huge and changing arrangement of utilization cases for shoppers and organizations, as they can be normally found in cell phones, TVs, PC screens and instrument boards<sup>[15]</sup>.



**Fig 2.6LCD**

## POWER SUPPLY:

A power supply is an electrical gadget that provisions electric capacity to an electrical burden. The essential capacity of a force supply is to change over electric flow from a source to the right voltage, flow, and recurrence to control the heap<sup>[16]</sup>. Therefore, power supplies are once in a while alluded to as electric force converters. Some

force supplies are discrete independent bits of hardware, while others are incorporated with the help of apparatus that they power. Instances of the last incorporate force supplies found in PCs and shopper gadgets<sup>[17]</sup>.



**Fig 2.7 Power Supply**

## SOFTWARE COMPONENTS:

### OPERATING SYSTEM –WINDOWS:

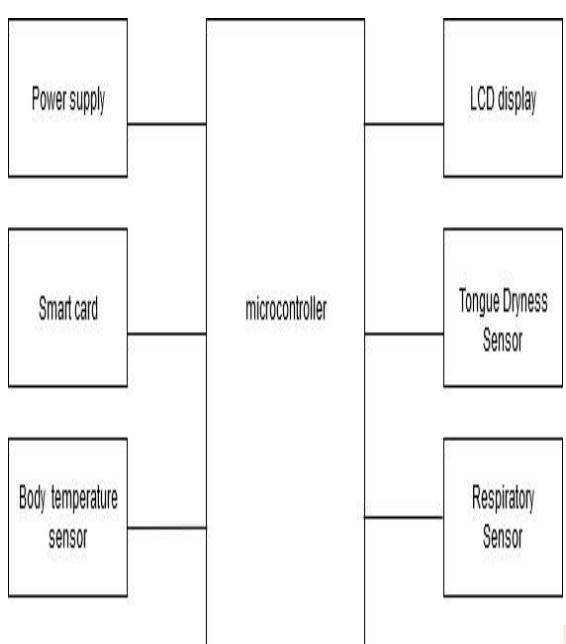
Windows is a progression of working frameworks created by Microsoft<sup>[18]</sup>. Every form of Windows incorporates a graphical UI, with a work area that permits clients to see documents and envelopes in windows<sup>[15]</sup>. For as long as two decades, Windows has been the most broadly utilized working framework for PCs<sup>[19]</sup>. The system software is feeded in the system and the output is obtained.

### PROGRAMMING TOOLS:

#### ANDROID STUDIO, ARDUINO IDE:

Android Studio is the authority coordinated advancement condition (IDE) for Android application improvement<sup>[20]</sup>. It depends on the Intelligent IDEA, a Java coordinated improvement condition for programming, and consolidates its code altering and engineer instruments. The program is feeded in the system.

## BLOCK DIAGRAM

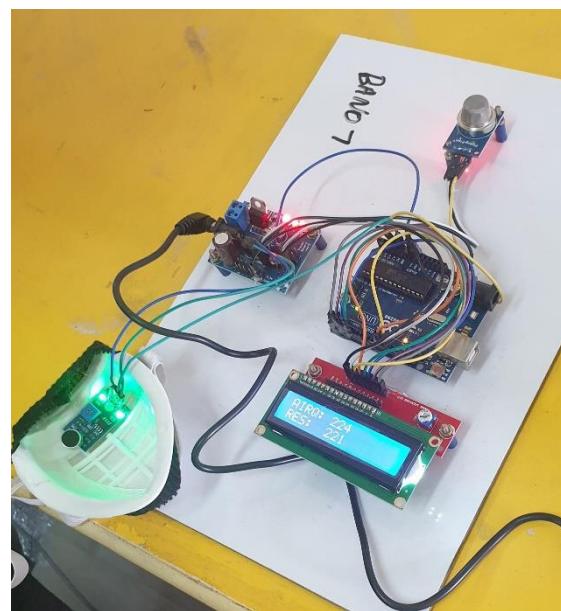


**Fig 3.1 Block Diagram**

## WORKING

The circuit is connected as per the block diagram. In Smart card the general monitoring parameters are programmed(feeded). The Body Temperature sensor is used measure the Body Temperature rate. The Tongue dryness sensor is used to check the dryness of the tongue. The Respiratory sensor is used in the form of blower, so the person are requested to blow when required, the respiratory rate can be noted. The LCD display, displays the output of the circuit. A buzzer is used, which indicated the presence of foreign bodies in Human.

## PROTOTYPE



**Fig5.1 complete module**

## RESULT

In this proposed system, the body temperature level, Tongue dryness and the Respiratory level is measured by corresponding sensor. The particular person temperature can be studied and set the maximum value for buzzer which indicate when there is any changes in the human body. It prevent the environment to be safe and avoid the spreading of infectious disease through cough, Sneeze etc. If the buzzer alerts then the person is requested to visit the nearby hospital and take some preventive measures. The Output is obtained through LCD Display.

## CONCLUSION

The purpose of this paper is to prevent and alert the presence of infectious disease in Human body. Various sensors like Body Temperature sensor, Tongue Dryness sensor and the Respiratory Sensor are used to measure the corresponding levels. When there is a change in any of the above levels then the buzzer will alert the surrounding to take some precaution in prior to avoid spreading

of infectious disease which is caused through coughing, Sneezing etc..

## DISCUSSION

The main aim of the paper is to identify the presence of infectious disease in our body. The body temperature is measured, tongue dryness sensor is used to find the dryness level in our body and the value is displayed in the LCD. If there is presence of infectious disease, then the buzzer gives the alert sound to the surrounding environment. So this will us to avoid the spread of infections.

## FUTURESCOPE

We are planning to make this module as a wearable device including some new applications in future. So that all the humans can wear this when they are in public places which can also be a safety alert device.

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