

**ABSTRACT**

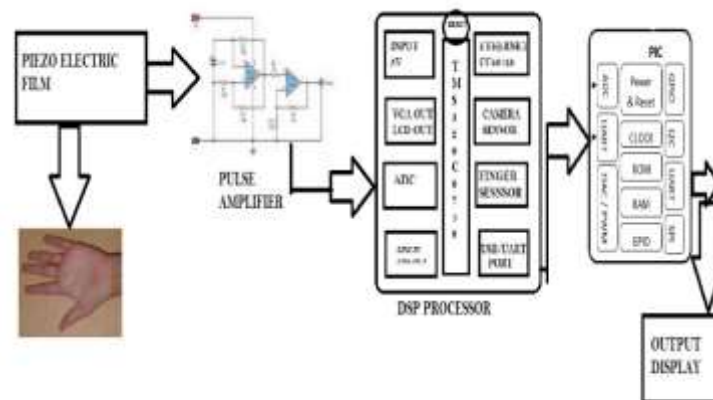
The human body life starts depleting when its starts ageing but in recent scenario people are prone to different disease, the reason for these development of anonymous disease is the lack of awareness in the initial stage of its symptoms. Due to continuous functioning from the day of birth, the organs getting exhaust, this functioning can be regulated by properly lubricating the organs with its energy requirement. If any imbalance occurs in vital flow the active functioning of organs is slow down, this where the illness occurs. Hence, the vital imbalance detector is designed to sense this improper functioning of organs and finally evading people from killer diseases.

**KEYWORDS:** Dsp Processor ,Pic Microcontrollor ,Piezoelectric Strip, MatLab.

**INTRODUCTION**

The whole organs in the body is interconnected, forms the network. When some miscommunication or delay in transmission of signal occurs between organs, leads in improper vital flow. This vital flow should be regulated for healthy functioning of each and every organs. As per “Five element theory”, there are six different position of pulse measurement can be done in right and left wrist, each pulse helps in figuring out the status of particular organ. The distal, middle and proximal position of right hand represents the status of lungs, spleen and pericardium whereas the distal, middle, proximal position of left hand represents the status of heart, liver and kidney. These major organs are interconnected with the sensory organs and other structures of body. In case of any improper functioning of these major organs will be depicted in the auxillary organs and acting as primary symptoms of vital imbalance. This detector is used to detect the improper flow in the very initial stage and preliminary precautions is done thus saving people from future causes and blind people. They face difficulties in their way of communication. To facilitate their communication, system that translates sign language as voice could be helpful. The developed system is the first step towards the final goal of providing assistance to these kind of people.

**BLOCK DIAGRAM**



**THEORY****Different Types of Pulse:****SCATTEREDPULSE:**

[*sanmai*] An irregular pulse, hardly perceptible, occurring in critical cases showing exhaustion of qi. These are cases where the patient is critically ill, perhaps near death; such patients are normally hospitalized (or sent home to die) and their diagnosis is usually well-established. The pulse only tells that the patient is severely debilitated; it diffuses on light touch and is faint with heavy pressure.

**INTERMEDIATEPULSE:**

[*daimai*] A slow pulse pausing at regular intervals, often occurring in exhaustion of zangfu organs, severe trauma, or being seized by terror. As with the scattered pulse, this pulse type is usually only seen in cases where the person is hospitalized or otherwise in an advanced disease stage. It is expected to occur, for example, with those having serious heart disease.

**SWIFTPULSE:**

[*jimai*] A pulse feeling hasty and swift, 120-140 beats per minute, often occurring in severe acute febrile disease or consumptive conditions. This pulse is so rapid (twice the normal speed) that it is easily detected; the acute febrile disease involves an easily measured high temperature and is usually subject of pathogen testing. Consumptive conditions with such high pulse rates are generally under emergency medical care.

**HOLLOWPULSE:**

[*koumai*] A pulse that feels floating, large, soft, and hollow, like a scallion stalk, occurring in massive loss of blood. Massive blood loss can easily be reported. This pulse is felt lightly at the superficial level and lightly at the deep level, but barely felt at the intermediate level. The light pulse is like the flexible scallion material, with a hollow center. It means that there is still some flow of qi at the vessel surface, but not much blood.

**FAINTPULSE:**

[*weimai*] A pulse feeling thready and soft, scarcely perceptible, showing extreme exhaustion. Extreme exhaustion is obvious to both the patient and the practitioner. The pulse, lacking substance, volume, and strength, simply reveals the exhaustion of the body essences. It is weaker than the thready (faint) pulse.

**SURGICALPULSE:**

[*hongmai*] A pulse beating like dashing waves with forceful rising and gradual decline, indicating excessive heat. Excess heat syndromes are rarely difficult to detect, so this pulse type adds little information. The force of the pulse indicates that the condition is pathologically excessive, the gradual decline shows that the syndrome is primarily one of heat (qi excess) rather than fluid excess. The pulse is sometimes described as a "full pulse" indicating the excess condition.

**HIDDENPULSE:**

[*fumai*] A pulse that can only be felt by pressing to the bone, located even deeper than the sinking pulse, often appearing in syncope or severe pain. This pulse is quite extreme, in that one can barely detect it except by applying deep pressure; it gives the sense that the pulse is hidden in the muscles. If there is little musculature, it is as if it is resting on the surface of the bone. The conditions for which it is typical, syncope (fainting) and severe pain, can easily be determined without taking the pulse.

**KNOTTEDPULSE:**

[*jiemai*] A slow pulse pausing at irregular intervals, often occurring in stagnation of qi and blood. Qi and blood stasis represents a traditional diagnostic category that does not have a direct correlation with modern diagnostics. In this pulse, the irregularity and slowness is due to obstruction.

**HURRIEDPULSE:**

[*cumai*] A rapid pulse with irregular intermittence, often due to excessive heat with stagnation of qi and blood, or retention of phlegm or undigested food. This is the excess version of the knotted pulse. It is sometimes called the

"running" or "abrupt" pulse. The rapidity indicates heat and the irregularity indicates the blockage caused by stagnation and/or accumulation.

**LONGPULSE:**

[*changmai*] A pulse with lengthy extent and prolonged stroke. A long pulse with moderate tension may be found in normal persons, but a long and stringy pulse indicates excess of yang, especially liver yang. Particularly in young people, the pulse is felt rather easily across all three finger positions, as is characteristic of the long pulse. The prolonged stroke shows that the vessels are both strong and flexible. A stringy quality indicates a certain level of tension, that corresponds with a liver syndrome. In cases of acute disease, a long pulse will occur when there is a strong confrontation between the body's resistance and the pathogenic factor.

**SHORTPULSE:**

[*duanmai*] A pulse with short extent. A short and forceful pulse is often found in qi stagnation and a short and weak pulse implies consumption of qi. The short pulse seems to deteriorate from the central pulse position towards the two adjacent pulse positions. It strikes the middle finger sharply and leaves quickly. On the one hand, this can represent contraction of the qi, as in liver qi stagnation, or it can represent deficiency of the qi.

**FINEPULSE(OR)THREADPULSE:**

[*ximai*] A pulse felt like a fine thread, but always distinctly perceptible, indicating deficiency of qi and blood or other deficiency states. Although the deficiency can be easily detected by other means, some patients can show an artificially robust exterior appearance, while having notable deficiency. Essence deficiency, the result of chronic illness, can give rise to this pulse type.

**HESITANTPULSE(OR)UNEVENPULSE(OR)CHOPPYPULSE:**

[*semai*] A pulse coming and going choppyly with small, fine, slow, joggling tempo like scraping bamboo with a knife, indicating sluggish blood circulation due to deficiency of blood or stagnation of qi and blood. This has a more irregular pattern than the knotted pulse that also shows stagnation of qi and blood. The severity of the blood disorder is greater. As the knife scrapes across the bamboo, it vibrates and irregularly moves forward, yielding a choppy sensation with brief hesitations or interruptions in movement.

**SLIPPERYPULSE:**

[*huamai*] A pulse like beads rolling on a plate, found in patients with phlegm-damp or food stagnation, and also in normal persons. A slippery and rapid pulse may indicate pregnancy. While use of the pulse to indicate pregnancy is no longer of value (as more reliable tests are readily available), and while this pulse, like the long pulse is often normal (occurring especially in persons who are somewhat heavy), it is a good confirmation of a diagnosis of phlegm-damp accumulation. It is sometimes referred to as a "smooth pulse."

**RELAXED(OR)LOOSEPULSE:**

[*huanmai*] A pulse with diminished tension, occurring in dampness or insufficiency of the spleen. The pulse has a softness or looseness that is due to the weakness of the qi and the obstructing effect of dampness. The dampness differs from phlegm-damp in having no solidity.

**MODERATEPULSE:**

[*huanmai*] A pulse with even rhythm and moderate tension, indicating a normal condition. This is similar to the loose pulse, above (and the Chinese name is the same), except that it has a better tension, showing that the qi is adequate. As a normal pulse, it indicates that the disease condition being treated is localized and has not disturbed or been caused by disturbance of the viscera.

**TENSEDPULSE(OR)TIGHTPULSE:**

[*jinmai*] A pulse felt like a tightly stretched cord, indicating cold or pain. This is similar to the wiry pulse, but not as long. While pain can be easily reported, a cold syndrome is sometimes disguised by localized heat symptoms; this pulse can indicate either exterior or interior chill.

**STRINGYPULSE(OR)WIERYPULSE:**

[*xianmai*] A pulse that feels straight and long, like a musical instrument string, usually occurring in liver and gallbladder disorders or severe pain. This is similar to the tense pulse, but longer and more tremulous. While severe pain can be easily reported, the wiry pulse confirms the liver and/or gallbladder as the focal point of the internal disharmony.

**REPLETEPULSEORFORCEDPULSE:**

[*shimai*] A pulse felt vigorously and forcefully on both light and heavy pressure, implying excessiveness. This pulse gives relatively little information other than that the condition is one of excess; one must further determine the nature of the excess in order to select a therapeutic strategy. This pulse, however, generally rejects the use of tonification strategies, as it indicates that the body resistance is undamaged.

**WEAKPULSE:**

[*ruomai*] A pulse feeling deep and soft, usually due to deficiency of qi and blood. This pulse is similar to the fine pulse, but has a softer quality. Usually, this indicates a weakness of the spleen qi, leading to deficiency of both qi and blood. In the system of pulse taking, it serves as the opposite of the replete pulse.

**SOGGYPULSE:**

[*rumai*] A superficial, thin, and soft pulse which can be felt on light touch like a thread floating on water, but grows faint on hard pressuring, indicating deficiency conditions or damp retention. This pulse is similar to the fine and weak pulses. The thready pulse sensation felt on light touch gives the impression of being easily moved, as if floating on water; hence, it tends to indicate spleen-qi deficiency with accumulation of dampness. It is sometimes referred to as the "soft pulse."

**FEEBLEPULSE:**

[*xumai*] A pulse feeling feeble and void, indicating deficiency of qi and blood or impairment of body fluid. This pulse is similar to the weak, fine, and faint pulses. It occurs when the deficiency of blood is more severe than in the case of weak and fine pulses, but not so deficient as with the faint pulse.

**Rapidpulse**

[*shoumai*] A pulse with increased frequency (more than 90 beats per minute), usually indicating the presence of heat. The rapid pulse is quite a bit more rapid than a normal pulse, and usually occurs only when there is a serious illness and mainly when there is a fever. The pulse can become rapid from activity prior to pulse taking.

**SLOW PULSE:**

[*chimai*] A pulse with reduced frequency (less than 60 beats per minute), usually indicating endogenous cold. A slow pulse may also indicate a person at rest who normally has a high level of physical activity, so must be interpreted in light of other diagnostic information.

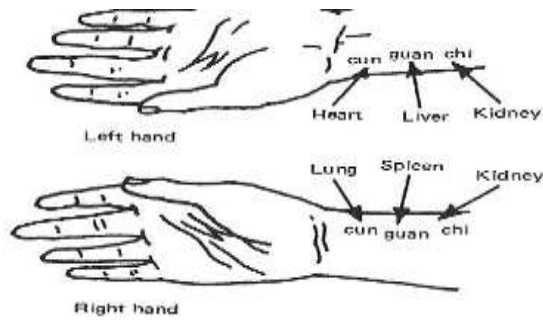
**SINKINGPULSE:**

[*chenmai*] A pulse that can only be felt by pressing hard, usually indicating that the illness is located deep in the interior of the body. The circulation of qi and blood from the internal viscera to the surface is weak; it is usually confined to the interior as part of the body's attempt to deal with a serious disorder threatening the viscera. Sometimes referred to as the deep pulse.

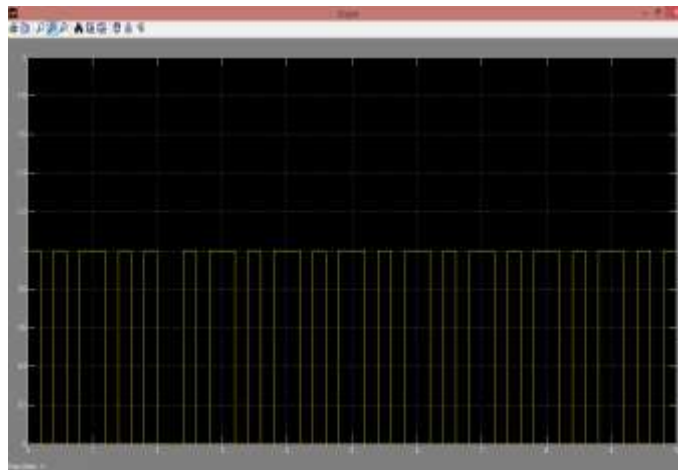
**FLOATINGPULSE:**

[*fumai*] A pulse that is palpable by light touch and grows faint on hard pressure, usually indicating that the illness is in the exterior portion of the body. The circulation of qi and blood is focused in the body's surface to deal with an external pathogenic agent. The internal circulation is temporarily sacrificed to assure that the pathogen is eliminated before it can enter more deeply and cause serious problems at the visceral level. Debilitated patients may show a floating pulse that is feeble, indicating the inability to retain the qi and yang in the interior due to the deficiency of the vital organs.

**EXPLANATION**

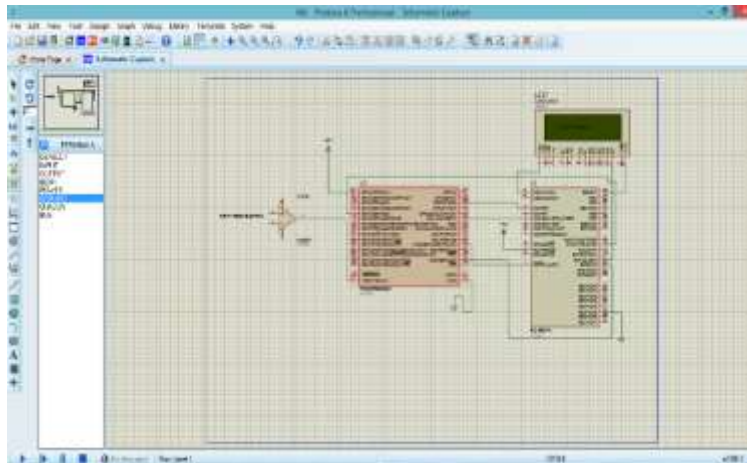


By placing the piezo electric strip or flim on the wrist position, based on the pulse beat which disturbs the piezo electric flim an electric voltage is developed for each gap of pulse beat. The output voltage will be in the form of



**PROTEUS 8.0 PROFESSIONAL:**

It is a simulation software used to test the circuits and output is viewed visually. Highly complicated circuits are easy to test using this software.



### **PIC C COMPILER:**

It is a compiler similar to C/C++ Compiler especially designed for PIC for all Series of microcontroller. It is used to compile the program and checks for errors and creates a object file. That object file is added as source file in MPLAB IDE 8.0 to program to the microcontroller.



### **SERIAL MONITOR:**

It is present in the PIC C Compiler which is used to monitor the values from microcontroller(i.e Output from the MEMS) using serial communication.



### **REQUIREMENTS:**

#### **SOFTWARE:**

- ✚ MATLAB
- ✚ PROTEUS 8.1
- ✚ MPLAB IDE
- ✚ PIC COMPILER

#### **HARDWARE:**

- ✚ PIEZO ELECTRIC SENSOR(IN THE FORM OF STRIP OR FILM)
- ✚ PULSE AMPLIFIER
- ✚ DSP PROCESSOR
- ✚ PIC MICROCONTROLLER

### **MATLAB :**

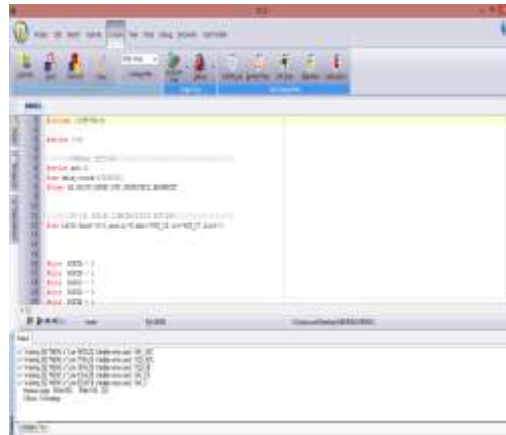
Matlab software used to extract the pulses in a software form and used to analyse the output in theoretical way, the output obtained pulses for heart and lungs.





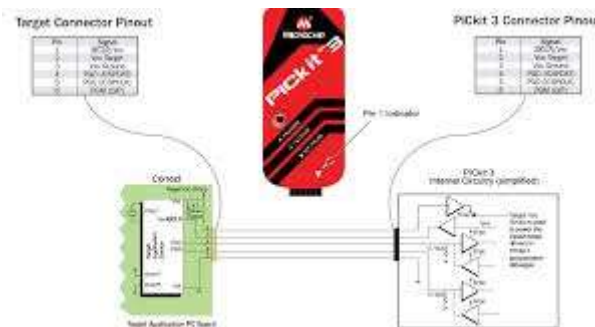
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**PICKIT 3:**

It acts as a driver between software and hardware. It is used to program the user defined coding to the microcontroller.



**MICROCONTROLLER:**

The controller has two modes of operation – training mode and operational mode. In training mode the gesture are made by user and the voltage levels are stored in EEPROM.

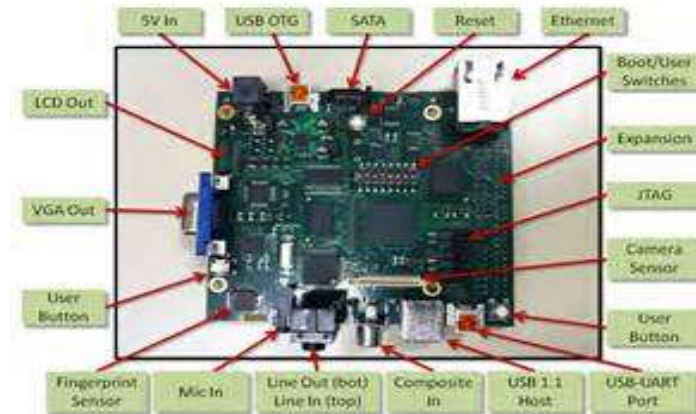
In operational mode the data is being compared with predefined values and the matched gestures are sent to text to speech conversion module. The module consists of TTS block and Speak Jet. The output is processed and heard via a speaker.





### DSP PROCESSOR:

The DSP processor used here is *tms320c6748*, this processor helps to convert the output pulses from the amplifier (input pulse taken from the wrist) is converted into hexa decimal values and sent to the microcontroller, where the type of disease stored for this type hexa decimal the output is displayed.



## ADVANTAGES AND LIMITATIONS

### ADVANTAGES:

- The disease of the patients are known based on the pulse beat where traditional system is converted into modern system with advanced technology
- This modern assist will help to analyse the problem at early stage

### LIMITATIONS:

- Piezo electric strip is costly and hence must be handled with care

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