

# Voice Sensing Technology

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**Abstract-** The Voice Sensing Technology is the part of AI (Artificial Intelligence). Artificial Intelligence evolves certain technologies which takes input as a speech and give the proper output as required. There are number of technologies already running in market in present. In software field, the most popular application is Google Search Engine, it also uses the voice sensing technology to search anything. In the Voice Sensing Technology, firstly it matches the Pattern and then convert the pattern into proper Binary Format and at last it changes the binary format into proper output as you want search, give some instruction to perform specific task and all. This paper covers about the evolution and applications of voice sensing technology.

**Keywords-** Pattern Matching, Voice Recognizing Technique, Conversion(Pattern To Binary, Binary to Proper Output), Artificial Intelligence.

## I. INTRODUCTION

Sensing is the term which can be understood by feel just like smelling something, tasting something, etc. by which we can take some logical results that defines the categorization of the felt thing. Every living thing has its own sensing power which gives them some speciality to identify, categorize and understand about many things.

There are two types of sensing in the present world to understand. On the first hand, we know about **Living Sensors** which are related to our sense organs like: - Ear, Eye, Nose, Skin and Tongue. On the other hand, we will discuss about the Sensing Technologies which are used in technical world and in computer science world as well.

The present researchers and developers work on developing sensing technologies that performs many sensing terminologies to give the exact logical output that have some differences from general recognitions.

Now we'll discuss sensing technologies that are introduced by Artificial Intelligence.

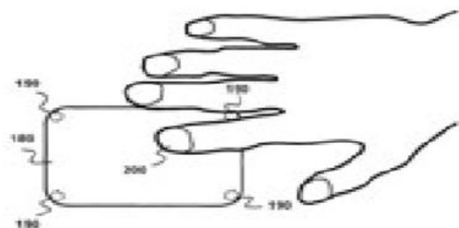
## II. SENSING TECHNOLOGY

Sensing Technology is the term which is defined & determined by Artificial Intelligence in computer science world. There exists many sensing technologies introduced in present era. It takes the input, recognizes it and sense it then gives the proper output as required by the user and also performs various operations in technical area.

## III. TYPES OF SENSING TECHNOLOGIES

### A. Touch Sensing Technology

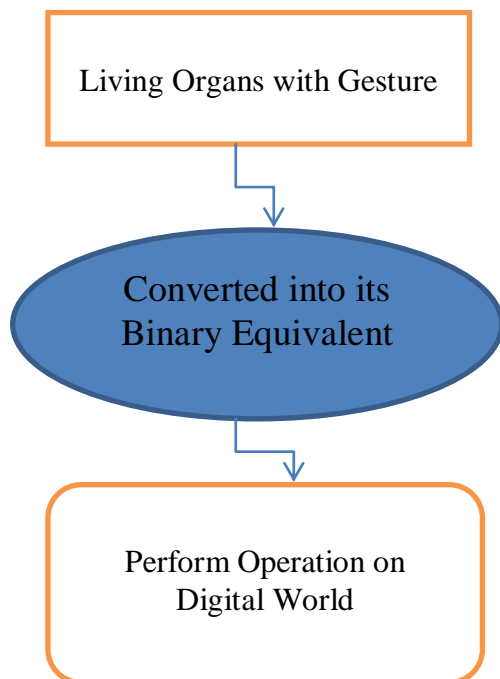
The Touch Sensing Technology is the most common example that works on touch gesture. In this technology, the sensors use some technological terms which take the input as we touch and give the proper output. In touch sensing technology, we use optical layer that takes the print of the touched part as input and convert it into its equivalent digital unit which is unique. In the present time, there are wide uses of touch sensing technology. The best example of touch sensing technology is **BIOMETRIC**.



### B. Gesture Sensing Technology

This technology is also the part of sensing technology that senses the gestures of living things and performs the various operations as they are designed to react. The gesture sensing is common phenomenon that is performed behind any of sensing technology related to living things. When any of the living part is used as sensing for technical world, it works with gesture compatible digital unit. The artificial intelligence defines the difference of any living part with respect to gesture. It defines every living part is different from its binary equivalent (digital unit) which is understood by gesture digital unit. That's why every sensing technology which is related to living organs also performs the gesture sensing terminologies because without this it is only recognition of living organs.

The logical diagram of this phenomenon is as follows -



### C. Retina Sensing Technology

The retina sensing technology is the part of Biometric in which the computer scans the retina of living thing and senses it with its converted digital unit. As we have discussed above that every living organ has its own uniqueness that's why its digital unit is also different and it will perform various task in computer science world according to its digital unit.



### D. Voice Sensing Technology

This type of sensing technology uses the voice of living beings as input and produces the desirable output with some proper logic. Voice (as input), in computer science, is widely used in present era for voice recognition but when it recognise the voice and sense it and gives the

proper output with the answer of why, how and etc., it's called voice sensing technology.



#### IV. INTRODUCTION TO VOICE SENSING TECHNOLOGY

##### A. What Is Voice Sensing?

Living Beings does the voice sensing by his hearing sense organs but in technical area, the logic which takes the voice inputs and gives the proper output after sensing the voice is called Voice Sensing. In other words, we can say that Voice as input in computer science is widely used in present era as voice recognition but when it recognise the voice and sense it and gives the proper output with the answer of why, how, what etc., it is called **Voice Sensing Technology**. The voice sensing technology uses voice recognition inputs which is different from others that is defined by gesture sensing technology because every voice has its special gestures that gives it a uniqueness. To perform this task, firstly we need to understand the voice recognition technology.

##### B. Voice Recognition Technology

In voice recognition technology, the computer recognises our voice by converting analog signals to digital signals. As we know, the

converted digital signal is in the form of binary that's why computer can easily understand this type of binary inputs.

##### C. How It Works?

Every voice has its own energy and this energy is called sound energy. And every energy travels with its own wavelength, frequency, and phase in media so when any voice is reached at any **Audio-to-Digital-Converter (ADC)** device, it activates and starts to convert analog signal to digital that can be understood by the computer. On the other hand, when we need to convert digital signals to analog signals, it requires **Digital-To-Analogy-Converter (DAC)** device that generates the digital signals in audio form.

#### V. PROBLEMS IN VOICE RECOGNITION SYSTEM

The most common problem that arises in voice recognition system is that it can never sense the voice i.e. it was not be able to give the answer of "**who is speaking, how is he/she speaking & many more**". That's why the need for voice sensing technology arose in market to give some advancement in Voice Recognition.

**So now the question arise that "what is voice sensing technology?", "why it is useful in present era?", "who can use this?", "how it evaluates in present world?"**, all these are discussed as follows:

#### VI. BROADER VIEW OF VOICE SENSING TECHNOLOGY

There have been many technologies developed to recognize the voice inputs and perform the various operations. In this era, we can find a wide area to compare and distinguish because today we have talent all around. That's why there are both type of Voice Recognition Technologies present as in software and also in hardware but we face some advance area problem which describes to sense the voice

inputs to provide more security and give some advancement to move in future world.

Before sensing any of voice input, it'll require recognizing that particular voice, that's why the parts which are used to recognise the voice are also the parts of voice sensing technology.

So firstly we'll discuss about the technology which works with hardware devices.

#### A. *HARDWARE PARTS OF VOICE SENSING TECHNOLOGY*

The hardware parts of voice sensing technology has generally two sides, first, by which it takes the input as voice and produce the output from its another side. Some hardware parts are introduced earlier like telephone, gramophone, mice etc.

##### a. *TELEPHONE*

The best and foremost example of Hardware Part of Voice Sensing technology is the Telephone. It was invented by Alexander Graham Bell on March 10, 1876. Telephone is the primary device for Voice Sensing Hardware Technology which is known by all nowadays. It takes the voice inputs and changes it into binary format by which this type of audio data is transmitted electronically and also performs the proper functionality and at receiver side this binary bits change into audio (voice) format.



##### b. *MIC*

Mike is also the example of voice sensing hardware technology. Through mike, we give voice as input and it change into binary bits and perform various tasks like modifying voice, recording voice, etc.



##### c. *VOICE SENSING ALARM*

The Voice Sensing Alarm is also the part of voice sensing hardware technologies which works for security purpose. Now it is very useful in various business areas like Bank, Corporate Company, Jewellers etc.





*d. KINECT VOICE COMMANDER*

This technology used for accessing any of applications in our local T.V. also used with our PCs. This performs output operations in many of entertaining areas.



*e. WALKIE-TALKIE*

Walkie-talkie is the half duplex communication model we can say that it's also the part of Voice Sensing technology because it takes our Voice inputs to transfer it.



There are lots of Voice Sensing Hardware devices and gadgets which have been used for long era, which are being used in modern world also as we know.

*B. SOFTWARE TERMINOLOGIES USED IN VOICE SENSING TECHNOLOGIES*

There have been many logics used to develop Voice Sensing Technology in Software terms. Nowadays, Java, .Net, and other languages provide the solution to develop any of voice sensing software. Before working on any such type of software, it'll need to recognize voice which is possible by Mic type of devices.

To develop the software that can sense the Voice Inputs, we need to understand some terms which provides the logic of voice sensing technology and these are as follows:-

*a) PATTERN MATCHING*

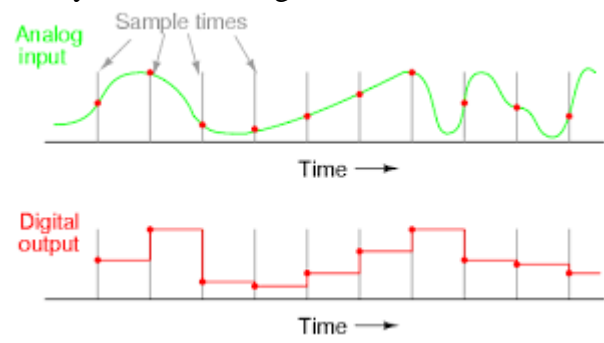
This is first logic behind any software that senses the Voice Inputs is Pattern Matching. In this, we match the voice pattern which enters as inputs. Every voice (sound) have its equivalent wave, we take these rays and matches the pattern through which it travels. As voice is

recognized by recognition device like Mic, it is automatically converted into binary bits. This binary bit have it equivalent graphical path. With the help of this graphical path we match the pattern to converting a proper binary input.



*b) CONVERTING TO BINARY*

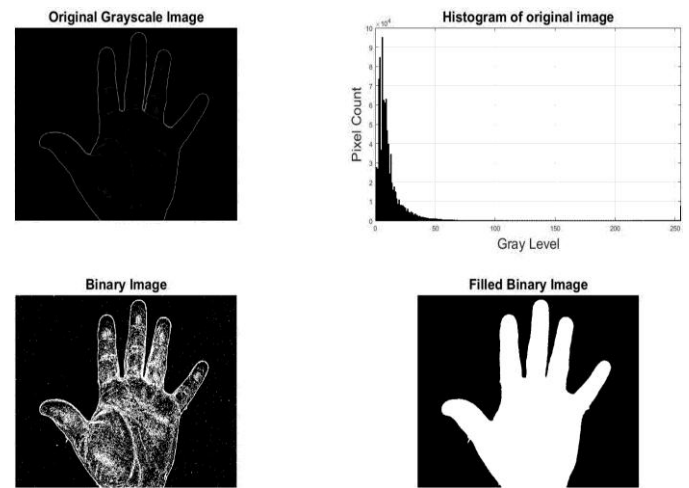
When the first task of pattern matching is finished then that particular pattern is converted into its equivalent binary. As voice is recognized, it'll use its graphical representation to convert it into binary. The graphical representation is the only way to understand how any software convert voice (sound) into binary as shown in figure.



*C. BINARY WITH GESTURE*

Now yet another important part of Voce Sensing Technology is to determine binary with

gestures of living thing because every living thing has different type of gestures that's why its pattern that matches graphically is totally different. We can see, this pattern is unique for others so its equivalent binary is also different; it can be seen with the help of **Graphical Representation of Voice Recognition.**



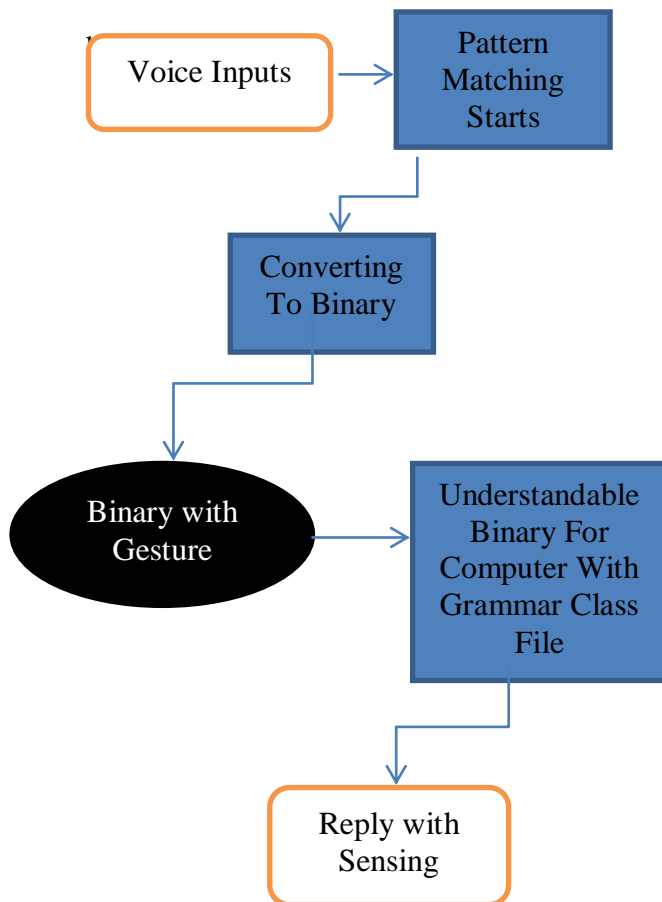
*D. CONVERTING BINARY TO UNDERSTANDABLE LANGUAGE FOR COMPUTER*

As voice input is converted into its equivalent binary, a computing device uses it to compute everything but for making this binary bit understandable for computer, it uses **Grammar Class File** which has the logic of converting into a binary language that can be understood by the computer. Now, this new binary performs various computing operations which are desirable. And we use this binary for repetition of voice, to search something, etc.

*E. REPLY WITH SENSING*

When above tasks completed by any computing software, it'll give the reply with sensing

because now, computer is not only understanding recognition of normal voice but also it'll understand binary which is equivalent to voice with its gesture. So it will perform such type of operations that are not performable by other voice recognizer.



#### F. SCOPE OF VOICE SENSING TECHNOLOGY

- *Security*

The Voice Sensing Technology can be used in security area. With the help of Voice Sensing Technology we provide exact voice of the person to Authenticate Services like to identify Authenticate Entry.

- *Organisation*

At the side of Organization, we use this sensing technology to perform various organizational computing tasks like to sense the voice of employee and also for customer. This will also provide confidentiality also.

- *Student*

Student can also use this sensing technology to give the proper presentation view. On the other hand where they can't reach, after studying Voice Sensing Technology they'll able to enhance it for future use.

- *Communication*

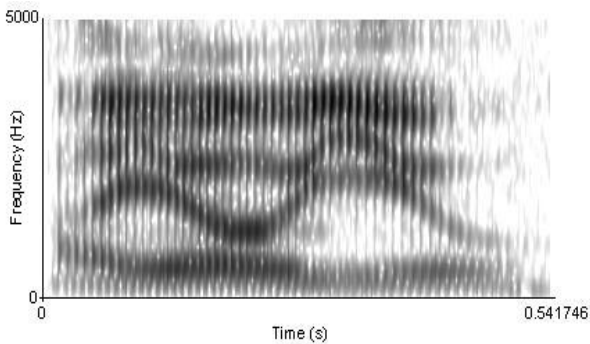
If we use this Sensing technology, it will provide confidentiality for people as to who is exactly communicating with us.

#### G. LIMITATIONS OF VOICE SENSING TECHNOLOGY

There are some limitations of using Voice Sensing Technology which are as follows: -

- *Effect Of Noise*

The voice sensing technology is affected by noise. Due to it, the Voice Sensing Software does not able to understand exact binary of voice.



- *Same Voice (Mimicry OF Voice)*

When a person has the ability to mimic other person, at that time, the converter of Binary with Gesture goes confused and at that time, it gives the ability to theft to use that particular task as confidential.

- *Defected Vocal*

If the Authenticated and Confidential user's Vocal have some error, this Voice Sensing Technology rejects that person as unauthenticated.

#### H. FUTURE SCOPE OF VOICE SENSING TECHNOLOGY

The Voice Sensing Technology has a wide scope in future. Every Sensing technology has

its future to be enhanced. So, Voice Sensing Technology does also have the opportunity to be enhanced by future developers because we live in an era in which every day is a new challenge. People, nowadays, has less time and a lot of work to do so, if we can have a full control on performing day-to-day tasks, our life would become a lot more easier which is possible with the help of Gesture Based Technologies which includes Voice Sensing Technology too.

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