



## A CONCEPTUAL STUDY OF HEARING TOUCH & GESTURES OF HUMAN SKINPUT WITH ADVANCED TECHNOLOGY

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### ABSTRACT:

Skinput is an input technology that uses bio-acoustic sensing to localize finger tips on the skin. When augmented with a Pico projector, the device can provide a direct manipulation, graphical user interface on the body. Skinput represents one way to decouple input from electronic devices with the aim of allowing devices to become smaller without simultaneously shrinking the surface area on which input can be performed. This technology is vision based as it makes use of a camera along with motion sensors to track individual movements. After catching these movements can be translated in real time data. The new enhancement made in cameras with the help of latest programming tools allows this technology for tracking of in depth data which can facilitate to progress gesture tracking. Researchers of this paper are more focused to throw light on the usage of gesture recognition and skinput. In this paper we aimed to propose an enhanced solution that could make human lives much easier.

**KEYWORDS:** Input, Sensors, Skinput, Technology.

### INTRODUCTION

Skinput is an advanced technological solution which deals as an input device on skin surface. Human skin produces different vibrations on different touches with tapping at different places. Skinput is a mechanism which converts human skin into touchscreen. The reason behind is the skin has various neurological functioning like stretching, shrinking, pulling etc. This fundamental behavior of skin can be used to recognize the gesture. This fundamental aspect can be used as a new interaction space. Skinput is well known concept which acts as a mobile input system as it delivers the contents on the human skin surface by tapping. In this fast growing world this aspect is still unexplored and researchers of this paper are intended to provide insights on various possibilities of the communication/interaction with the skinput. The keen interest of researchers is on comprehensions of Skinput technology which is more appropriate for the human body which deals with acoustic transmission. This acoustic transmission helps the skin to be used as an input media. This methodology delivers all time available, portable, and on-body finger input system. To deal with this communication many devices can be used and the best suitable is Bio acoustics.

### WHAT IS BIO ACOUSTICS?

Bio acoustics is the study of sound waves within human body. Basically energy is propagated on tapping at any location of the skin viz. arms, limbs, palm etc. It uses sensor based technology and machine learning programs which identify and sense the actions and converted into wave form.

### **PRINCIPAL OF SKINPUT:**

As discussed in above section of this paper skinput allow human to tap their skin to control the applications from their mobile devices. To deal with these principal it uses number of sensors which determines the location of tapping on the human skin. The major concern of the researcher's in this study is to highlight on human arm and palm as a input. Different parts of the body generates different vibrations and it totally depends on the features of those body parts like bones, muscles etc.

### **RELATION BETWEEN BIOACOUSTICS AND SKINPUT:**

There are plenty of technologies available which can be used as a solution for skinput. The main aim this paper is to highlight the usage of bio acoustic device as a skinput.

Bioacoustics has potential to utilize the human skin as an input device where human can operate their mobile device by tapping the skin organ like arm , palm etc. This will allow the human to operate the applications from mobile device viz. one can play media files and also can manage it by clicking play ,pause , reverse, forward options through skin. In short this skinput technology allows human organs to work as a virtual keyboard. In this contest the present paper has taken into consideration Arm and Palmas an input devices

### **COMPONENTS USED FOR BIO-SENSING AND ACOUSTIC INPUT IN SKINPUT:**

The components used in skinput technology make it work as per human desired.

The skinput system basically consists of:

1. Arm band:
2. Pico Projector
3. Bluetooth connection

#### **1. ARM BAND**

The armband used in the skinput contains the series of sensors and embedded Pico-projector. The arm band provides attractive GUI along with all modern features to navigate within different menus. Below figure1 shows the overall structure of arm band and figure2 is displaying the output on palm and hand.



Figure 1: Armband Device

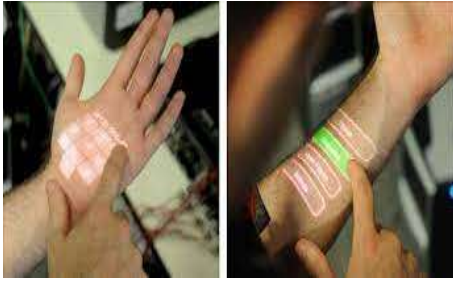


Figure 2: Palm and Hand Display

## 2. PICO –PROJECTOR:

Pico projector is a small size, portable projector mainly used in gadgets. It is battery operated device. Pico's project the digital images onto viewing surfaces. Image menu display and digital key board forearms of a person can be display with the use of pico-projector in the skinput. Simply by tapping on our forearm skin's we can make calls or send a message. The basic feature of Pico –Projector is to project the app process through arm. Pico Projector contains three parts:

The system comprises five main parts: the battery, the electronics, the laser light sources, the combiner optic, and the scanning mirrors. First, the electronics system turns the image into an electronic signal.



Figure 3: Combiner Optics

- **Laser Light Source :** It helps to detect the menus on skin
- **Combiner Optics:** the combiner optics combines different light sources into single path representing a palette of colors. The image is formed pixel by pixel and then it will be projected.
- **Scanning Mirror:** Scanning mirror scans the beam in a raster pattern. The laser light sources are red and blue laser diodes and a second harmonic green laser.

## CONNECTIVITY COMPONENTS:

### BLUETOOTH:

Bluetooth helps to transfer the information between device and skinput. The main use of these components is to provide the connectivity and propagate the signal to transfer the information.

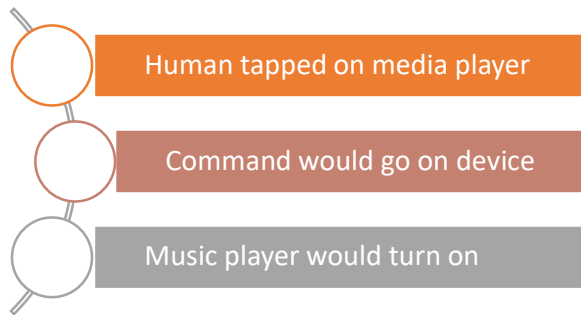


Figure 4: Example of Bluetooth working

**Skinput Workflow:**

The following are the steps for skinput:

Step 1: It uses the different audio and video sounds emitted when we tap various parts of our

Step 2: The acoustic detector in the armband respond to certain bands of sound frequencies.

Step 3: Different combinations of the sensors are activated.

Step 4: The system could use wireless technology like Bluetooth to transmit commands.

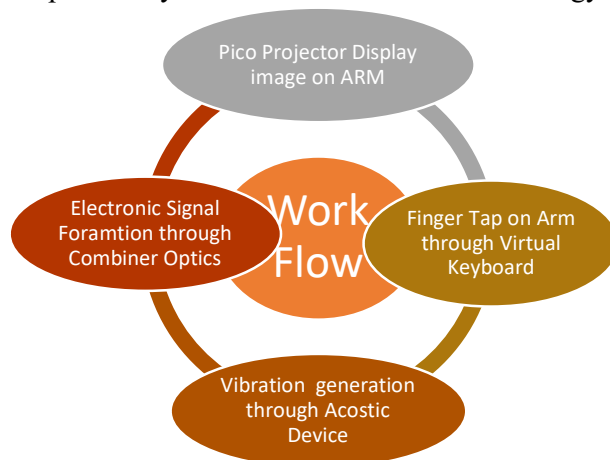


Figure 5: Skinput Workflow

**ADVANTAGES AND DISADVNTAGES:**

**A. Advantages**

- Ease the human efforts.
- Can be worked without keypad
- Strong GUI and no direct interaction with the device.
- Readable font size for the instructions.

**B. Disadvantage:**

- Readability can be reduced in case of skin incision.
- Social distraction can be increased.
- May cause sever health problems with high usage.

**FUTURE ENHANCEMENT:**

More the technological solution more will be the causes. Hence, there is need to balance the hazards on the health which may cause due to heavy usage of skinput technology. So,

researcher's of the present paper would like to suggest a technology which can deliver a sensible but hazard free solution towards this. It is also recommended that the skinput technology can be more versatile with IOT.

### **CONCLUSION:**

In this paper, researchers have focused on use of the human body as an input surface. Further the study is focused on elaborating an innovative approach towards the bio-acoustic sensing array implemented in armband which will detect finger taps on the arm and palm. The study has covered major Components used for Bio-Sensing and Acoustic Input in Skinput. In the continuation of the study researchers have also provided insights on work flow of skinput. This study is concluded with advantages and disadvantages.

Researchers of this study strongly believe that adaption of presented advanced technology will be really helpful for greater and smoother communication with devices which will provide ease in work.

On the same front researchers would also suggest considering the harmness which may cause due to heavy usage of this technology.

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