Tap Keyboard

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Abstract— the tap keyboard is a device through which typing on any surface is possible. It is a wearable device which enables us to type on any surface. The device contains five extensions for each finger and a sensor is used to sense the value through the movement of the finger. At the initial stage, the user will be provided with the typology application. Due to this application, user is able to learn all the values necessary for typing. Once user is familiar, it will be easy to use this device. The device is also flexible which means user can set the values according to his ease. Motion plays an important part in this device as the values are to be fetched by sensors through the movement of fingers. This device enables user to type on any surface. It proves convenient and comfortable for user to use this device.

Key words: MCU (Motion Controller Unit), Tap Keyboard

I. INTRODUCTION

The Tap keyboard has a series of embedded sensors which monitors mechanical gestures of an MCU (motion controller unit) in the device which decodes the raw data into finger tap combinations and transmits the resulting character or command by Bluetooth radio.

This Tap keyboard is compatible with all Bluetooth enabled devices which support the HID keyboard standard. This includes iOS and Android phones and tablets, Window and Mac computers, and most Smart TV's.

II. LITERATURE REVIEW

We studied different existing devices that work as Tap keyboard.

A. Tap Strap

Reference: http://www.tapwithus.com/

Tap Strap is somehow similar to tap keyboard. It is wearable strap and processing is done with MCU. The limitation with this strap is it is quite uncomfortable for the user's hand and fingers. For using it, each time the user has to pair the strap with the Bluetooth device.

B. Gizmo Keyboard

Reference: http://www.gizmo.com/KIT/Keyboard

This keyboard scans and decodes 3*4 and 4*4 matrix keypad and output results through a 4 bit port. The limitation with this keyboard is user can enter only limited alphabets and symbols. This device cannot be connected through Bluetooth.

C. Kitty

Reference: http://www.kittytech.com

The KITTY input device from kittytech.com is another design. KITTY stands for "Keyboard Independent Touch Typing." This is a unique kind of glove device which was originally designed for both hands and made to be easy for people who are already good at touch typing. The KITTY tries to emulate the QWERTY muscle movements as closely as possible to work with people already know how to touch type with a real keyboard. As most of the other gloves here, this does not have any mouse control.

D. Clove 2

The Clove 2 is remarkably similar in concept to the Key glove. It uses the same basic touch combination procedure and allows for full customization through software. However, it only supports 1-to-1 touch combinations, and requires the use of toggled modifier keys to achieve most keys (all lowercase letters can be achieved without modifiers though). The most remarkable aspect of this glove to me is its use of a Bluetooth interface that is cannibalized from an existing wireless keyboard. I think I would have more luck with a new dedicated module, especially for adding mouse capabilities, but what the Clove 2's designer has done is pretty amazing.

III. EXISTING SYSTEM

The existing work related to our project is tap strap. This strap also enables typing but the strap is very uncomfortable for the users to wear and operate. Also the tap strap is needed to connect to the human interface device every time we use the strap for typing. This may not prove a convenient way to connect the device every time. The device which we are going to develop does not need to be connected every time we use.The Gizmo keyboard which was developed was also used for typing purpose but through it only numbers and alphabets were possible to type. The KITTY device was developed as glove through which typing was possible but the mouse movements were not possible.

IV. PROPOSED SYSTEM

Our proposed system overcomes all the limitation of the devices mentioned above. The tap device which we are developing does not contain a strap but is a wearable device which has five extensions for each of the finger which is connected to a small driver over hand. This device is highly flexible and user can use it by tapping on any surface. We are also going to use air movements of the fingers as input. There is no need of pairing the device every time when the user wishes to use it. Our Proposed system contains the following modules:

V. MODULES

A. Typology

It contains android application development for the convenience of the user. User will be able to use the tap keyboard with ease. It also makes user familiar with gestures to be used while typing. This app contains floating buttons and when each button is pressed, characters or symbol or numbers appear according to their configuration with button.

B. Connection

The tap device communicates with the concerned Bluetooth devices through Bluetooth radio. The mechanical gestures of fingers or hand are sent to the Bluetooth device where it is decoded into characters. For this communication, we are going to use various sensors.

VI. PROBLEM DEFINITION

The aim of the project is to develop such a keyboard that can be connected using Bluetooth to peripherals. The keyboard can be wore in only one hand and can also be used as a mouse. Typing is made possible by tapping on any surface with fingers.

VII. PROPOSED EXPERIMENT WORK

Our proposed work overcomes all the limitation of all the existing devices. The tap keyboard which we are developing does not contain a strap but is a wearable device which has five extensions for each of the finger which is connected to a small driver over hand. This keyboard is highly flexible and user can use it by tapping on any surface. We are also going to use air movements of the fingers as input. There is no need of pairing the device every time when the user wishes to use it.

A. Advantages

1) Highly Flexible

User can use the device for typing anywhere anytime on any surface. It is comfortable for using.

2) Easy Configuration

No any special configuration is required. Just use Bluetooth for connectivity.

3) Wireless

Device is wireless, so no need of any USB cable thus avoids Complexity of wires.

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In Tap device mouse movements, will be possible. As the user moves his hand or makes gestures the mouse actions will be performed. Moves such as scrolling up, scrolling down, right click, left click, middle click is possible.

When the device is connected to the Bluetooth, HID drivers are automatically installed.

VIII. TECHNIQUES TO BE USED

The techniques used in Tap Keyboard are:

A. Value Match

User does the required finger movement for typing a specific character. When the finger movements are sensed by the sensors, the matrix value is matched with the matrix values that are stored in .dat file in drivers. After matching the matrix value, the character is displayed.

B. HID Drivers

When the device is connected to Bluetooth, HID drivers are automatically installed.

C. Bluetooth Baud Rate Communication

We set the baud rate to observe how much bits per second data is transferred while communicating.

IX. IMPLEMENTATION TOOLS & MODULE DEVELOPED

A. Module Developed

The modules of our project are Typology, Connectivity, Processing. Up till now we have developed our first module 'typology'. Under this module, we have developed an android application that will work as the user manual for the convenience of the user.

By using this android application, user will be able to use the tap keyboard with ease. Initially, until user gets familiar with the finger movements to be used while typing, using Tap Keyboard may be inconvenient and complex for users. The typology module makes user familiar with gestures to be used while typing.

This app contains floating buttons. When each button on the screen is pressed, characters or symbol or numbers appear according to their configuration with button. The finger movements that are configured to each button on the screen are exactly similar to the movements that we are going to use while handling the tap device. This application will help users to understand and be familiar with the finger movements so that the user can handle the Tap Keyboard with ease.

B. Implementation Tools

1) # Arduino

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online.

2) # Sensors

a) Accelerometer

An accelerometer is an electromechanical device that will measure acceleration forces. These forces may be static, like the constant force of gravity pulling at your feet, or they could be dynamic caused by moving or vibrating the accelerometer.

b) Gyroscope

A gyroscope is a spinning wheel or disc in which the axis of rotation is free to assume any orientation by itself. When rotating, the orientation of this axis is unaffected by tilting or rotation of the mounting, according to the conservation of angular momentum. Because of this, gyroscopes are useful for measuring or maintaining orientation.

c) Magnetometer

A magnetometer is an instrument that measures magnetism—either magnetization of magnetic material, or the strength and, in some cases, direction of the magnetic field at a point in space.

3) # Bluetooth Hc05 Driver

The Bluetooth module hc05 is master/slave module.

X. FUTURE WORK

The tap keyboard which we have developed still has some future scope. Our project has some modules that we can extend.

In our current project, we are going to handle the device with single hand. Now we are developing a tap device which is to be worn. The future scope of our project is that we can make a device like a wrist and through the sensor values of movements of veins of fingers typing will be possible. This device can be made by using pneumatics sensors.

XI. CONCLUSION

The project tap keyboard provides ease to the user for typing. The project is designed keeping in view the day to day problems faced by people while typing. Deployment of our project will certainly help the user to reduce the difficulty in typing.

From a proper analysis of positive points and constraints on the component, it can be safely concluded that our system is going to be very beneficial to everyone.

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