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An Application Launcher using A Resistive Touchscreen

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Abstract: The application launcher named Anulpriya allows a user to launch an application at the touch of a panel. Launching any application demands a series of folder traversing using multiple mouse clicks or cluttering the desktop with numerous shortcuts. Anulpriya is aimed at bridging the gap between a touch-screen device and the desktop PC by enabling the users to provide a touch input to trigger the launch of any application of their choice. Handicapped and differently abled persons, often have problems using conventional mouse and keyboards as they lack the required mobility and may not have sufficient endurance to use them for extended periods of time. Our application, offers an innovative alternative for these people to control their desktop. We have assembled a prototype using an ARM CORTEX M3 LPC1768 microprocessor development board and a resistive touchscreen. We have also made use of Serial communication via UART. Future developments and plans for the touchscreen based remote control device are also discussed. The success of any software is determined by its compatibility and support across all operating systems and hardware and so we plan on making our application software Free and Open Source (FOSS).

Keywords: Input Devices, Computer Access, Remote control devices, touchscreen, Serial Communication, Visual Studio, UART

I. INTRODUCTION

In this computer age, there are applications that can virtually do any task a user wants. As the World Wide Web has grown new applications giving access to information as well as providing entertainment have become increasingly available online. Email and instant messaging has become the new communication standard. Computers contribute immensely to a person's quality of living.

To access any of these applications, a user has to first navigate to the folder which has the shortcut and then open the application by double clicking the shortcut. This takes a lot of clicks. This may seem like an easy task for able bodied users but for those users with motor impairments, it seems like a momentous task [7]. To provide them with better access it is necessary to eliminate these mouse clicks. This paper provides a solution in the form of Anulpriya, a touchscreen based application launcher.

The main motivation behind Anulpriya to provide handicapped users with better desktop computer access and create a system that can be used by disabled and able-bodied users alike. Surveys indicate that fewer than 60% of people who indicate a need for computer access devices actually use them and also least 35% of solutions that are purchased are neither used nor adopted [1]. High cost, complexity, extensive customization, maintenance are few of the reasons given for these failures. This shows that there is a need for a low cost simple and low maintenance computer access device. Our project aims to fulfil this need.

II. CURRENT WORK IN THE AREA

Many alternative devices like onscreen keyboards, head switches, voice recognition systems, and augmented devices for communication exist in the market today for easier and faster computer access. But effective working of these systems may sometimes be obstructed. Most devices are very expensive. Others may be requiring extensive configuration or maintenance [1].

Touchpad based computer interaction techniques have been present for quite some time now. Neil R.N. Enns and I. Scott Mackenzie proposed a touchpad based remote control access to Computers [4]. Ajinkya Jadhav and Animesh Rawat in their paper put forth the "Unistroke" technique for using the touchpad as an input device the system [1]. Vishal Rathod, Sumeet Chavan, Akshay Londhe, Ashish Kawade and Prajakta Ugale in their paper proposed a three modules system: GestureWizard (GestWiz), RealTouch, TouchWizard (TouchWiz).They have made use of the predictive algorithms to map input patterns [3]. Synaptics has developed Scrybe which uses touchpads with multi-touch support to open various websites. None of these will work on a desktop PC as touchpads are limited to laptops alone.

The Different forms of interfaces are being used since ages for the convenient and efficient utilization of computing devices. In his article Rick Downs has clearly explained the working of the resistive touchscreen and its use as a human-machine interface [5].

Unlike smartphones that have this functionality, PC needs to have a better and faster alternative to launch applications.

III. DESIGN DETAILS

Launching any application like Notepad or Internet Explorer generally involves clicking on the start menu, then on programs and then finding the corresponding application and clicking on it or alternatively, a user may keep an application shortcut which can be used to launch the application by double clicking on it, on the desktop for easier access. But eventually, the desktop becomes cluttered with too many unwanted and useless shortcuts [1]. Anulpriya provides the perfect alternative for users to launch their applications with a tap on the touch screen.

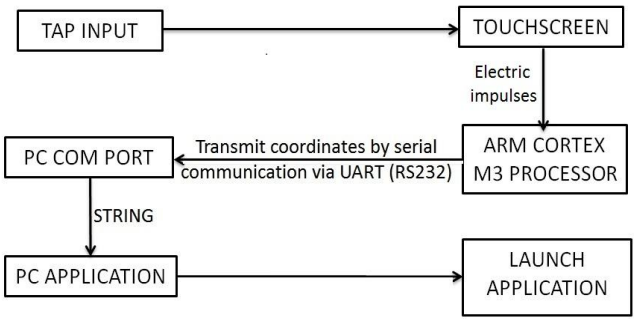

Figure 1. The system flow.

As shown in Fig.1, when the user makes a tapping gesture on the touchscreen, the microprocessor will receive electric impulses from the touchscreen. It will then recognize the touch coordinates and send it to the PC application as a string by serial communication via UART. The PC application will process the string and extract the coordinates. It will then use these numbers to launch the corresponding application.

IV. WORKING

Launching any application is a multistep process involving numerous mouse clicks. This is generally avoided using application shortcuts which are usually placed on the desktop screen. But after a while, the desktop becomes cluttered with too many shortcuts [3].

Anulpriya provides the perfect alternative for users to open their applications with a tap on the touchscreen. When the user makes a tapping gesture on the touchscreen, the microprocessor will receive electric impulses from the touchscreen. It will then recognize the touch coordinates and send it to the PC application as a string by serial communication via UART. The PC application will process the string and extract the coordinates. It will then use these numbers to launch the corresponding application.

This paper discusses the approach as three modules: the user-side hardware, the desktop application and the communication between these two. Let us now discuss the various modules in depth.

A. User-side Hardware

On the user side we have a resistive touchscreen connected to an ARM CORTEX M3 LPC1768 microprocessor. The ARM microprocessor used is a low power and high performance processor that can efficiently deliver real time performance. The ARM development platform is very lucid and easy to use. The resistive screen can be given an impulse by a sharp object which can be the case with prosthetic limbs.

The microprocessor computes the touch coordinates of these impulses and then converts it to a string. If for example the X-coordinate is 20 and the Y-coordinate is 68 then the string is computed as "XC- 20 YC- 68". This string is then sent to the desktop via Universal Asynchronous Receive/Transmit, UART.

B. Communication

The communication and transfer of data between the microprocessor and the desktop PC takes place using serial communication via UART which is a piece of computer hardware that translates data between parallel and serial forms. UART converts the serial bit stream into the bytes that the computer handles. The UART has a buffer for temporarily storing data from high speed data transmissions. It also provides additional circuits for signals that can be used to indicate the state of the transmission media and to regulate the flow of data in the event that the remote device is not ready to accept more data [2]. UART also performs error detection using parity bits on the transmitted stream. UART provides the computer with the RS-232C Data Terminal Equipment interface so that it can talk to and exchange data with the microprocessor.

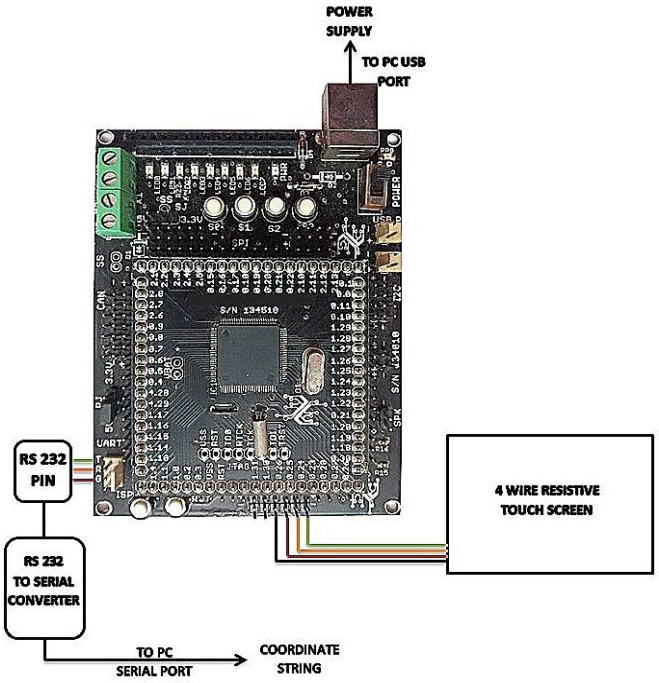

Figure 2. The hardware configuration.

Most modern computers today do not have a RS 232 serial port which is a 9-pin serial communication port (COM PORT). RS 232 serial communication is primary method of making a link between a PC and microcontrollers, quickly and easily. Hence we have used a USB to serial adaptor that provides RS 232 communication port for devices that don't have one. This BUS powered bidirectional Universal to Serial cable offers data transfer speeds of upto12Mbps, works both with Windows and Mac OS and has USB 1.1 specification.

C. Desktop Application

The desktop application created as a part of Anulpriya accepts the transmitted string and converts it into integer coordinates. Using these coordinates, the corresponding application is launched.

Application's main attributes are the communication port, baud rate, parity bits, data bits, stop bits and the state of the communication port. The application interface is designed, coded and built in Microsoft Visual Studio [8].

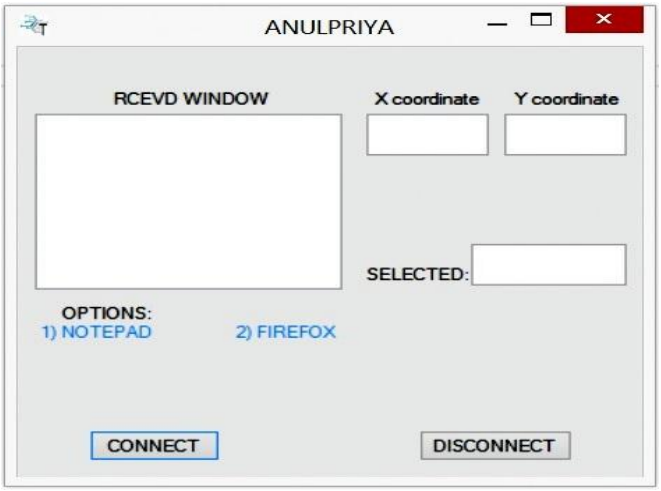

Figure 3. Anulpriya user interface.

The desktop application in Anulpriya functions according to the following steps: ① Set up communication object, communication port and other attributes; ② Set the communication agreement; ③Open communication port, and transmit data; ④Close communication port.

V. REALISING THE COMMUNICATION

A. *PC Communication ports initialization*

```
serialPort1.PortName = "COM6";
serialPort1.BaudRate = 9600;
serialPort1.Open();
```

B. *Receiving string and converting it to integers*

```
RxString = serialPort1.ReadExisting();
xString = RxString.Substring(4,4).Trim();
System.Int32.TryParse(xString, out x);
yString = RxString.Substring(16).Trim();
System.Int32.TryParse(yString, out y);
```

C. *Launching the applications*

```
Process.Start("program.exe");
```

D. *Disconnect and close the port*

```
serialPort1.Close();
```

VI. APPLICATIONS

Anulpriya eliminates the need for dragging the cursor or double clicking on shortcuts. A tap on the touchpad will do both these actions. When a user taps, the application corresponding to the tap gets launched. In future, improving upon this concept will completely eliminate the need of a mouse. Anulpriya saves on time and provides an innovative way to access applications through letter gestures.

Differently abled people cannot use a conventional mouse and keyboard. They may lack required mobility to reach for these devices, sufficient motor control to switch accurately and efficiently between them, or the needed endurance to use them for extended time periods. Anulpriya can help them access computer applications with ease.

VII. CONCLUSION

In Anulpriya, we have described one of the ways in which ease of desktop access can be achieved by using an external resistive touchscreen that is small in size, lightweight, cost effective, and requires minimal maintenance and configuration, giving it a huge practical advantages as an integrated control system over the various different dedicated computer access technologies. While this technique still has room for improvement, this work has paved the way for their future enhancements, and ultimately, better computer access.

VIII. FUTURE SCOPE

Scope for our application launcher is very wide and varied. As of now it can be used to open various applications by dividing the resistive touchscreen into multiple regions on the basis of the X and Y coordinates. Future scope includes a gesture based application launcher where predefined letter or symbol can be given as an input onto the resistive touchscreen to launch any application of choice. The resistive screen can also be programmed to type words into various different applications without accessing the keyboard.

Also using Xbee, Bluetooth or similar technology for wireless communication the device can be made cordless enhancing its portability and usability. This will further aid in increasing the ease of access for a computing device.

With little modifications and enhancements, Anulpriya can completely replace the traditional mouse and keyboard combination in the future for disabled user as well regular users.

IX. REFERENCES

[1] Ajinkya Jadhav, Animesh Rawat, "Converting Computer Touch-pad into an Integrated Input Device", Proc. Int. J. of Comput. Communication Applicat., Vol. 28, Pg.No.10, August 2011.

[2] Ms.Neha R. Laddha, Prof. A. P. Thakare, "A Review on Serial Communication by UART", Proc. Int. J. of Advanced Research in Comput. Sci. and Software Eng., Vol. 3, Issue 1, January 2013.

[3] Vishal Rathod, Sumeet Chavan, Akshay Londhe, Ashish Kawade, Prajakta Ugale, "Touchpad: A versatile Input Device", Int. J. of Comput. Sci. and Inform. Technologies, Vol. 3, 2012.

[4] Neil R. N. Enns (University of Toronto) and I. Scott MacKenzie (University of Guelph), "Touchpad-Based Remote Control Devices".

[5] Rick Downs, "Using resistive touch screens for human/machine interface", Texas Instruments Incorporated, 2005.

[6] Herbert Schildt , "C Sharp, The Complete Reference",1st ed., McGraw-Hill, 2010.

[7] Jacob O. Wobbrock, Brad A. Myers, HtetHtetAung (Carnegie Mellon University) and Edmund F .Lopresti, "Text Entry from Power Wheelchairs".

[8] Qiu Li-hua, Visual basic programming tutorial, Beijing, China: Mechanical Industry Press, 2001.