SMARTPHONE BASED HOME APPLIANCES CONTROL SYSTEM

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ABSTRACT

In this paper, a Smartphone based home appliances control system is elaborated. In this system, we have taken the touch input from Smartphone and pass it to LabVIEW software through the Bluetooth. Software developed in the LabVIEW processed this data to control the cursor movement. Through the cursor, we can control the switches on the front panel of devised software which control their respective appliances.

Keywords: Arduino, LabVIEW, AndroVIEW, VISA, LIFA.

I. INTRODUCTION

Today, in Modern world, when life is no less than a science-fiction movie, everything seems to be futuristic and fascinating with everyone thinking what could be next? Today, when all science fiction are becoming alive, we are making another one. We choose LabVIEW to accomplish this. LabVIEW software is ideal for any measurement or control system, and the heart of the NI design platform. Integrating all the tools that engineers and scientists need to build a wide range of applications in dramatically less time. LabVIEW is a development environment for problem solving, accelerated productivity, and continual innovation.

II. LABVIEW

As stated above, LabVIEW controls the cursor movement. But it also controls the switches used to control appliances. As appliances can't be directly controlled by desktop computer, we have been used a controller (i.e. microcontroller) to control the appliances. In our case , we use Atmega32 to interface it with Desktop computer, we used Arduino board. Now the question is WHY WE USE ARDUINO? The answer to this question is that Arduino can be easily and efficiently controlled by LabVIEW through the LIFA(LabVIEW Interface For Arduino) .The LabVIEW Interface for Arduino (LIFA) Toolkit allows developers to acquire data from the Arduino microcontroller and process it in the LabVIEW Graphical Programming environment. It uses VISA to implement hardware interfacing.

III. AndroVIEW

AndroVIEW is an android app developed by Felipe Porge. It can send touch data in the form of integers ranging from x=0-692 & y=0-331.This app can also send Smartphone sensor values like accelerometer, proximity sensor, pressure senor etc. But we are using only touch values [1]. These touch values are first analyzed using point by point VI to generate a sweep function. These sweep functions control the cursor movement across the

screen. Using these touch values, we created buttons at bottom for left click and right click just like a laptop touchpad.

Fig. 1: AndroVIEW App

IV HARDWARE

We used Smartphone as our Primary hardware for Input due to following advantages:

1. Everyone owns it. So no need to purchase any extra hardware.
2. You don't need to carry any extra hardware.
3. It is stylish.

For controlling appliances we use Arduino UNO as stated above.

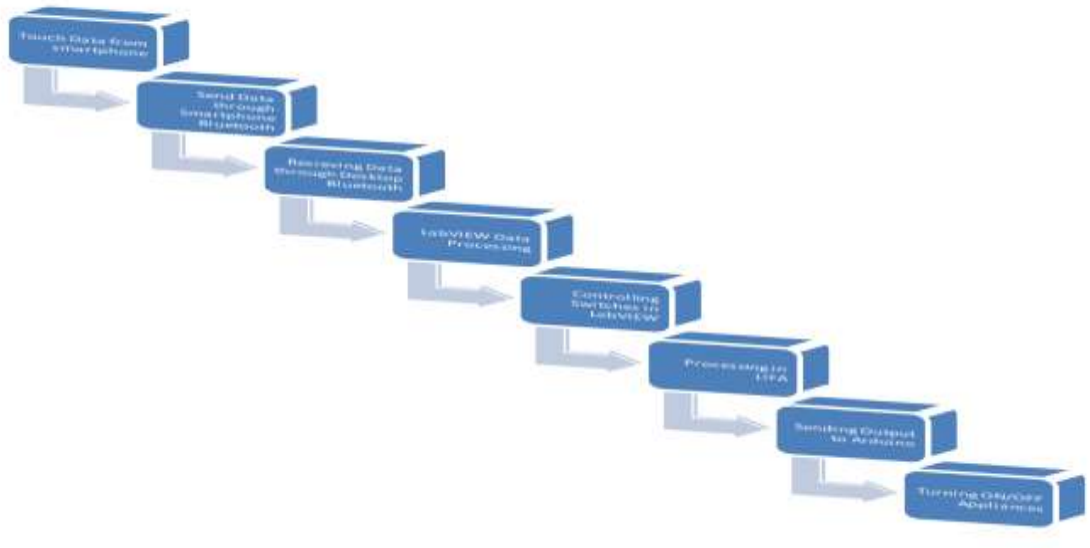

Fig. 2: Block diagram of Proposed System

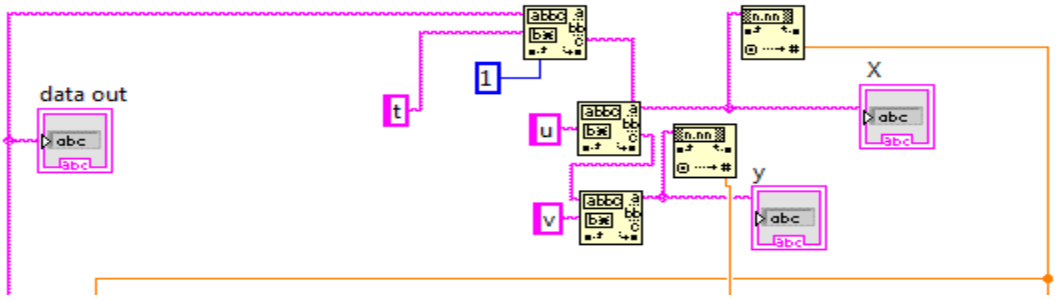

Fig. 3: Match Pattern String Comparison

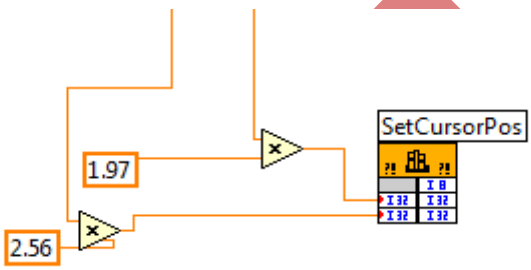

Fig. 4: SetCursorPos

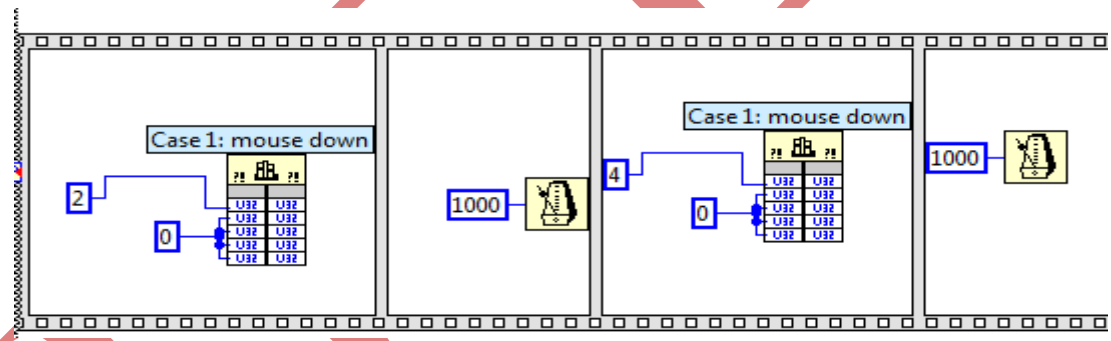

Fig. 5: Implementation of code in LabVIEW

V CONNECTING SMARTPHONE TO LABVIEW

In proposed system, we have used Bluetooth of our phone to connect to the LabVIEW via AndroVIEW app. The VISA read function helps us to connect the Smartphone bluetooth via inbuilt read function in VISA. As the data from Smartphone is coming in strings, first we have to separate the strings and decode each string. Match Pattern in LabVIEW is used to separate out all the strings. In this, we have been taken the real time values which are given a multiplication factor 1.97 and 2.56 respectively for x and y coordinates. We have put a condition that whenever we reach the y>300 when starting form 0 then all the values after that will be taken as left click. Now for the working of left click, we have put a case structure that holds four events in which 1st the mouse is pressed and wait and then it lifts and wait. This continues case creates a Left Click Whenever our y>300 [2].

Setcursorpos function detects the values being passed and set the position of our desktop cursor to that particular coordinates.

Various functions of LabVIEW & basic components used in proposed system

1. **SetCursorPos:** This Set Cursor Position VI sets the position of the mouse cursor on the screen programmatically. The VI uses the Call Library Function Node to call the Windows SDK [3] function SetCursorPos.

   You can modify the Set Cursor Position VI to position the mouse cursor programmatically in LabVIEW. In this example, select the horizontal pixel position of the cursor using the **x position** control. Use the **y position** control to select the vertical pixel position of the cursor

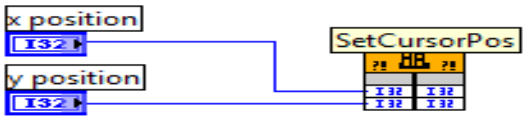

Fig. 6: SetCursorpos VI

2. **Match Pattern Function:** Searches for **regular expression** in **string** beginning at **offset**, and if it finds a match, splits **string** into three substrings. A regular expression requires a specific combination of characters for pattern matching.

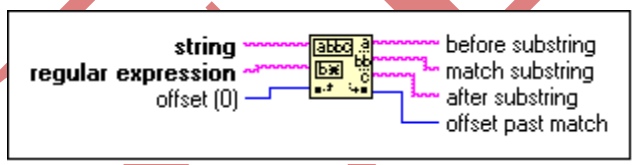

Fig. 7: Match Pattern VI

3. **Relay**

Relays are amazingly simple devices. There are four parts in every relay;

- Electromagnet
- Armature that can be attracted by the electromagnet
- Spring
- Set of electrical Contacts

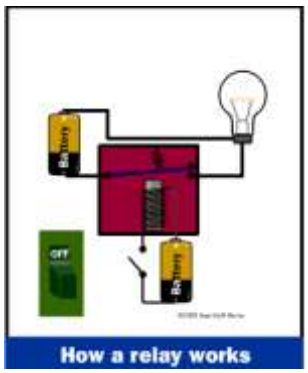

Fig. 8: How relay works

VI CONCLUSION

We have proposed a system which can wirelessly control the home appliances which can expand from a single switch to an entire building. It would act as a base for controlling a system wirelessly through Smartphone.It can updated with latest technology to send real time info, video feed & long range.One of the best features of LABVIEW is that it not only acquires various kinds of data and inputs from devices but also plots and presents us in a very interesting manner.

Future Scope

Our System can act as a base or prototype for other designers who will not only enhance the hardware & software but also modify it for various applications which will in turn help the mankind. It is the future of Smart home . It can used to turn off devices without moving an inch. You can control your Desktop computer, surf internet, watching movie etc. We used Bluetooth for communication. It can further upgrade to WiFi and GSM to increase its range. Also controller can further upgraded to increase its number of pins and appliances it can control.

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