

Wireless Electronic Teaching Board Using Raspberry-pi

Mr. Niranjan Bhalerao¹, Pawan Sapkale²

^{1,2}BE E&TC Engineering, SND COE, Yeola.

Abstract - In today's world we are moving towards to the digital technologies and getting more response from the people towards digital world. But still in most of schools and collages we are using our traditional black boards where we are using the chalks and which is harmful for human health. By using marker boards we can eliminate that problems but when teachers using the markers they always have to stay near the blackboard when they have to write something or point something, and this becomes more difficult when the teacher is handicap. So these blackboards cannot fulfill the needs of efficient and advance teaching. So many firms are working on developing the technology which gives efficient way to replace the traditional blackboards. In this project we are trying to develop such wireless teaching board and we are using Raspberry-pi as processor. This project will allow teaching by using multimedia wirelessly, teacher has to use their mobile as a touchpad and simply draw on mobiles screen. The requirement of this system is teacher should have the android mobile with a specific application install on it. Teacher will draw or write on his mobile which is encoded and transmitted through Wi-Fi to the raspberry pi module and that raspberry pi is connected to the projector through the HDMI and VGA connectors.

Key Words: Raspberry-pi, Android mobile, Projector, HDMI to VGA connector, Wireless.

1. INTRODUCTION

The proposed system will be controlled by using a smart phone based remote control. We have to design an application from which we connect with raspberry-pi, Wi-Fi and display our files on projector which is connect with Raspberry-pi.

As the old teaching boards has the disadvantage that they produces so much dust through the chalks and teacher has to go towards the black board to explain any point or to write something on board. The teacher can write and draw on blackboard from remote place anywhere from the class. Teacher has mobile as a handheld unit through that unit the data is transmitted by Wi-Fi. At another side there is a receiver and display unit, here the Raspberry-pi is present to decode the received signal and display it on projector. The user can also transmit the multimedia from his mobile storage to display on projector such as graphs, images, ppt, docs files, etc. And as we know that any student can understand anything quickly using the graphics and multimedia and the learning becomes more interesting.

The digital and new teaching technique can definitely increase the interest of student to learn the new thing and to concentrate in lectures. It also make easy for handicap teachers to teach as they can write and draw on the board by sitting at one place.

This technique also reduces the pollution occurs due to dust of chalk.

2. RECENT DEVELOPMENT

In aforetime systems Di WU, Yang Zhang firstly developed the wireless electronic board by using the wireless module nRF2401 of 2.4GHz frequency and computer software at receiver end, and it displayed through projector. They used touchpad for writing purpose. But this system has disadvantage that we cannot store the data and also it always requires computer. This development is completed in 2010.

In 2015 Swati J. Nimkarde had done some modifications is previous system. In this paper they successfully implemented the system which will allow the person to write on the board from a distance (50 meters). We also overcame the shortcomings of traditional chalk-blackboard approach of teaching by replacing it with easy to use portable touch screen device. This design of hand held equipment is build using ARM9 processor S3C2240 which can interface to wireless module and 7 inch touch screen. The data written on the screen is transferred to PC through wireless medium (Wi-Fi).

Ms. Aparna B. Barge, Mr. S. M. Kulkarni had worked on this subject in 2016. In this project, they uses Raspberry pi module as a replacement for PC. They used the raspberry pi at both transmitter and receiving end. The raspberry pi module contains ARM11 processor. Our work is also based on this project.

In 2017 Prof. DR. R.K.Patil, Monika, Rasika Shelar, Smita Jagtap, Tarannum Pathan used raspberry-pi module instead of terminal PC. They used 2 raspberry-pi module at both transmitter and receiver side. At transmitter side a touchpad is connected with raspberry-pi and at receiver side the projector is connected to raspberry-pi and the both modules are connected through Wi-Fi channel. In this technique the user always has to carry the raspberry-pi module with touchpad.

3. Block Diagram

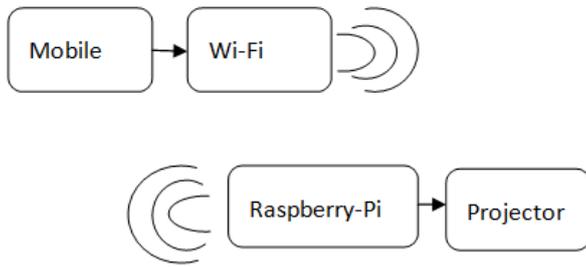


Fig -1 Block diagram of system.

The block diagram consists of 2 sections namely transmitter and receiver sections connected through Wi-Fi module. Transmitter module contains an android mobile phone with “Airdroid” application. The purpose of this application is to create interface between the transmitter section and receiver section through the Wi-Fi channel. It transmits the graphics and multimedia from mobile over the Wi-Fi channel.

At the receiver section the raspberry-pi is present, which is the brain of the system. Raspberry-pi is a very intelligent processor, can also call as minicomputer. An operating system “raspbian” is installed on it. To install the OS it requires a SD card, in that SD card the img file of raspbian OS is uploaded by “Win32 disk imager”.

The transmitted signals from transmitted section is received by raspberry pi as a Wi-Fi signal the mobile phone establishes a network with and raspberry-pi connects that network and decodes the signal. The raspberry-pi has fully compatible with HDMI cable and the HDMI to VGA connector interfaces the raspberry-pi with the projector. So the decoded signal is given to projector and through projector it is displayed.

4. RESULTS



Fig -2 Raspberry-pi Connected to HDMI cable

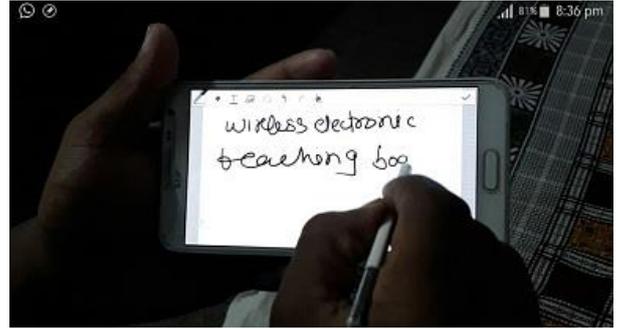


Fig -3 Mobile phone for writing and drawing sketches

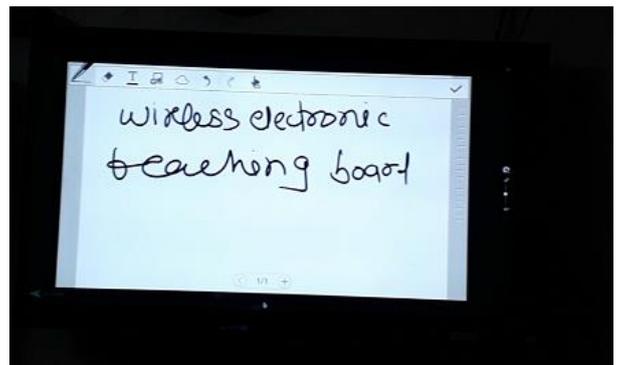


Fig -4 Display/Monitor

The above figures show that how the sketches are drawn on mobiles screen and it is displayed on the projector.

5. ADVANTAGES

1. Provide a new technology in education system which helps to students for better understanding.
2. Reduction in time for teaching and drawing on white board.
3. Dust clean teaching help to teacher health.
4. Increases an interest of students towards to learn the more things.
5. Teacher can save his diagram or graphics for future use.

6. DISADVANTAGES

1. Cost of the system make burden on education system.
2. Trained teacher required for using this system.

7. APPLICATIONS

1. This system useful in school, college, seminar halls, Meeting hall.
2. Company Training rooms.

3. Government notices on LED screen in city or village.
4. Online message and discussion on same display.

8. FUTURESCOPE

1. In this project we can add the feature of letter recognition.
2. By using a proper method like finger print recognition method in the handheld terminal, we can implement the attendance monitoring in the same system.
3. Can provide memory element for showing the different file formats.
4. The proposed system can be efficiently used for the organizations where teacher can teach far distance class from the remote place by adding video calling to the proposed system.
5. By using IOT concept to this project one can increase its range all over the world.

9. CONCLUSION

This system is much efficient than previously developed system as it uses only one raspberry-pi. As we seen, in previous technique they used 2 raspberry-pi modules at both sides so teacher has to carry the touchpad as well as the raspberry-pi also but in our system we are using mobile phone as a touchpad so for teacher it becomes more simple to just carry the mobile phone and write on it.

Using Raspberry-pi instead of ARM boards is efficient as it requires less programming and gives better result.

In this project we successfully transmitted the data from mobile to the raspberry-pi module and displayed it on projector simultaneously. And can also display the multimedia present in mobile and store any sketches or information for future use.

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BIOGRAPHIES



Mr. Niranjan N. Bhalerao
(BE E&TC, SND COE Yeola, Dist.
Nashik, Maharashtra)



Mr. Pawan A. Sapkale
(BE E&TC, SND COE Yeola, Dist.
Nashik, Maharashtra)