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SMART DISPLAY USING RASPBERRY PI -4

Prof. B.V.R.V. Prasad, Professor, ECE, NRI Institute of Technology, Andhra Pradesh, India
[2] G. Sai Teja,[3] K.Hari Priyanka, [4] B. Durga Surendra, [5] B. Karthik Chowdary
B.Tech. Student, ECE, NRI Institute of Technology, Andhra Pradesh, India

ABSTRACT

The system is about a remotely managed digital advertising system designed considering raspberry pi python programming and characteristics. The digital advertising display system designed is based on various methods of using LED matrices Display LCD panel, single screen, and multiple screens as well as other display derives. Those are as efficient as possible to provide advertising and information to people in public areas which area that does not convenient to build- up the other types of any hoardings display advertisement board. And over the past decade the display technologies have seen major advances in resolution and drastic cost reductions. The proposed system aims to substitute another controller interface system with Raspberry PI which will not only drastically reduces the cost involved but also will help achieving quality of services as the system will consume a smaller amount of power also. In this digital advertising system using raspberry pi model the screens are divided in to region and layers and also used multiple screens for displaying the big size advertising purpose and the contents on the screen is made up of several images files and the main goal of this project are broadcasting display information and remotely control it. The broadcasting information such as Text notices, Images and video information which are applicable for road highways, subways, buses and bus station, train and train station, shopping malls, city squires, hospital, conference hall, colleges and schools for displaying notice for student information and displaying all institutional information for visitors and this same application in industry for displaying notices or useful information which has wand to giving employees.

Keyword: - *Broadcasting information, Display technology, LCD Panel, RaspberryPI*

1. INTRODUCTION

Advertising methods includes traditional way and digitally modern ways. Every business wants to grow and develop a strong customer's base. Therefore, advertising or promoting a business is the key for achieving growth. Traditional advertising includes print advertising such as newsletters, handbill, newspapers, big hoardings, flyers, magazines, and other media like Radio, Television broadcast and outdoor advertising. The advertising media, through traditional way is usually more expensive than other advertising techniques. The digital advertising systems can run on simple hardware facilities which are based on continuous moving images on the display screen. The digital advertising is the name of distributing digital content to different points over central headquarters. The displaying information in the form of still images that is same like poster advertising and the moving images means same like advertising in the form videos. It is generally used for attention in heavy traffic points and internal information distribution. And the simple advantages of digital advertising solutions are; reducing expenses, being easy to reach huge amount of peoples, integrating citizens with up–to–date technologies.

In existing systems, after studied about the various methodologies, related advertising messages on different display panel by interfacing, various microcontrollersand also studied about, how to access the whole system from remote distance places. Inthe previous display technology, it is needed to change the display panel, which is usedfor displaying advertising messages and for e- notice board; it's also difficult to changethe

input data in program memory. The many displaying technology difficult tointerfacing system the various complication for programming and reprogramming display information and the main thing is that, implementation cost of whole system ismainly high and it also required more power. It has highly requirement of energy. At present, when information must be updated in a notice board, it must be done manually. If the same messages if the person wants to display in main center of cities means he has to go, there with laptop and changes the message by connecting in to pc these system problems face mostly in previous technology. The LED-based moving- message displays are used for indoors or outdoors advertising system but most of the time in display panel, singlerows or columns of LED panel having a problem due to some internally damages. Thattime whole panel not showing proper messages or images clearly as a output part, so we see that the most of the time current technologies facing many such problems relatedreprogramming facilities, display clarity, and difficult to interface externally, power related problems and most important part is that the lack of system smartness. So we are trying here to develop the advertising system that can help us to solve such facing problems in very smart manner.

II. LITERATURE SURVEY

The main goal of digital advertising technology is the proper information at the proper time, for the proper mass. And reducing expenses, being easy to reach a huge amount of people, integrating citizens with up–to–date technologies, dynamic and effective advertisement, being easy to deliver information when it is necessary Main usage purposes of this system are corporate communications, corporate messaging, corporate announcements, advertising and promoting products, entertainment, public information systems such as news, headlines, weather, and menu information such as digital menu boards with information on pricing, also use in schools and colleges for informing student through Notice Board[3]. Over the past decade the display technologies have seen major advances and drastic cost reductions. It has Heavyweight, cumbersome, and power-hungry CRT screens have essentially vanished from the scene and made way for ultra flat LED, LCD and plasma panels in all sizes and resolutions.

Introduce the model for displaying notices in colleges on digital notice board by sending messages in form of SMS through mobile. This is a wireless transmission system which has very less errors and maintenance [8]. The hardware board contains microcontroller AT 89c52 at the heart of the system. The microcontroller is interfaced with GSM Modem via MAX232 level convertor. It is used to convert RS232 voltage levels to TTL voltage levels and vice versa. The EEPROM is used to store the timings and a message to be displayed hardware also contains a real time clock DS1307 to maintain track of time. A 16x2 Character LCD display is attached to microcontroller for display. Microcontroller coding will be done using Embedded C and Kiel. PC Coding will be done using Visual Basic. Multiple Users are authorized to update notices on the digital notice board by providing them password. Researchers also use a PC with an administrator for monitoring the system. The Wireless communication has announced its arrival on big stage and the world is going mobile [4].

This remote control of appliances is possible through Embedded Systems. The use of “Embedded System in Communication” has given rise to many interesting applications that ensures comfort and safety to human life, the proposed to design a model where the message to be displayed is sent through a SMS from an authorized transmitter [5]. The toolkit receives the SMS, validates the user, and displays the desired information after necessary code conversion. Also, the global advertising landscape has seen a dramatic transformation over the past decade [10]. While the traditional print advertisements in newspapers and magazines have witnessed a decline that threatens the existence of some print news media outlets, market

share and interest in interactive advertisement on web, mobile and other innovative media the advent of affordable, interconnected, high-definition flat digital displays have enabled content providers, including advertisers, to replace static screens by timely targeted content delivered to the audience. For developing some of GSM based applications we need to have some commons peripherals including GSM MODEM, SIM, microcontroller, LCD (Liquid crystal display), power supply and some connecting wires.

III. SYSTEM OVERVIEW

Proposed a System for solving, all the previous system problems whichare most of the time faced in previous technologies, we developed new technology by using Raspberry pi4 module. The proposed system is based on the designed consideringRaspberry Pi python programming language and interfacing of various required externally module such as Wi-Fi module f, 3.5" interfacing LCD display screen and theaudio system is connected through 3.5 mm audio jack, which is available on theraspberry pi for the user listening purpose. The system is made-up of interfacing raspberry pi module with 3.5-inch LCD display screen for display purpose. The Wi-Fi model relates to raspberry pi for wireless accessing system. In this system the use of display which is interface with Raspberry pi model must be change as per the required application of the system users. The various application of file transfer protocolis freely available on internet and then selects one such application which is suitable forsmart phone. The rapist's application, used for the uploading video or image file.

The contents on the screen are made up of several images' files and in the form of videoformat, the main goal of this project study is broadcasting display information and remotely control. Generally, here, we advertise in a smart way using Raspberry pi by centralizing all the advertisements data by giving credentials to the subscribers. Itisthe modern era of advertisements Digital advertising run on simple hardware facility based on continues moving images like videos. It contains distributed manner have different points over headquarters, generally used for distributing important information to the public like heavy traffic etc. This type of information is easy reach large amount of people with less cost. Nowadays IOT is main research area in enablingmachine advertising; it has several attention-grabbing opportunities and challenges.

Ourmain objective is to foster a server which is administrated by the user to display in an indoor advertisement and make use of a time scheduling approach to auto play the needed ads for a specific time interval.

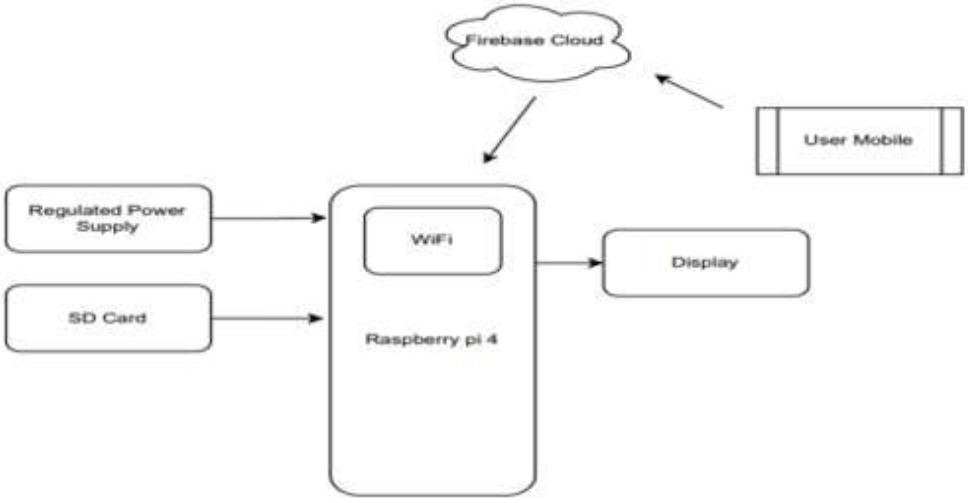

Figure 1: Block diagram of Smart Display Using Raspberry Pi 4

The block diagram of a Smart Display using Raspberry pi 4 processor represented in figure 1. The function of different blocks of smart display explained below.

Raspberry-pi: The raspberry Pi low cost, credit-card sized computerthat plugs into a computer monitor or TV. It's capable of doing everything you'd except a desk top computer to do, from browsing the internet and playing high-definition video, to making spread sheets, word-processing.

Power supply: Raspberry Pi activated by power supply around 5v

LCD Screen: It is used for displaying the video.

SD Card: A 32 GB SD card contains the Raspberry Pi's operating system. This card gives you additional storage space for your favorite photos and videos.

User Mobile: To display the content on the screen, we use Telegram bot in telegram app which allows us to send image and videos from our android device to raspberry pi and FFD app which is created by using MIT app inventor to send messages through this mobile app to the raspberry pi screen.

Firebase cloud: The cloud is just a metaphor for the internet for storing and accessing data and programs over the internet.

Firstly, we'll connect the device with power supply and then RaspberryPi screen will be on. Then there will be wi-fi button on the screen, where we'll be connectingit with our mobile or WIFI network. And finally, by using fire base cloud we can display texts, images, and videson the screen through mobile apps.

IV. RESULTS

The implementation of proposed display using Raspberry pi 4 at different levels described below with figures 1 to 16. This proposed display tested for one educational institution with principal/ faculty level logins. The messages sent by the Principal/ Faculty of various departments using FFD app.

Displaying Text Using FFD App:

- By entering the message through this application that must be sent and then display in therespective output window.
- By entering the message in their respective allocated spaces, by clicking the send button,after five seconds it will automatically display in the output screen.
- For example, the messages given in the form of text in this application and then the FFDinterface screen will be shown in Figure 2.

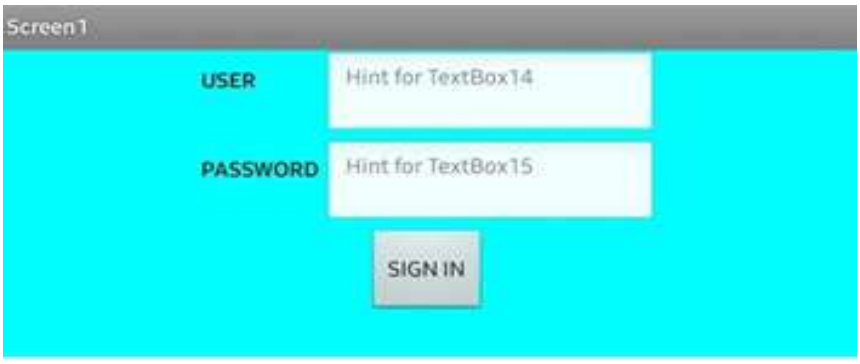

Figure 2: FFD Interface Screen

- By using FFD app we have displayed text.
- Here we can clearly see messages from different departments at the same time.
- Everyone can send messages through this app.

If principal wants to convey a message, then then the user name is "PRINCIPAL" and password is nri123.

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Only principal can send messages in flash notice and can also send messages to every department. And no one has right to send messages in flash notice.

Figure 3 shows the principal sir login screen of FFD App in mobile. As the principal sir is only one who can give messages to each department and gives flash messages too. As sir gives messages to each department in the respective blank spaces allocated for each department. Principal Sir clicks to send button after giving messages to each department and give message in flash notice too. After this process Messages are displayed on the Raspberry pi screen.

Figure 3: Principal's FFD screen

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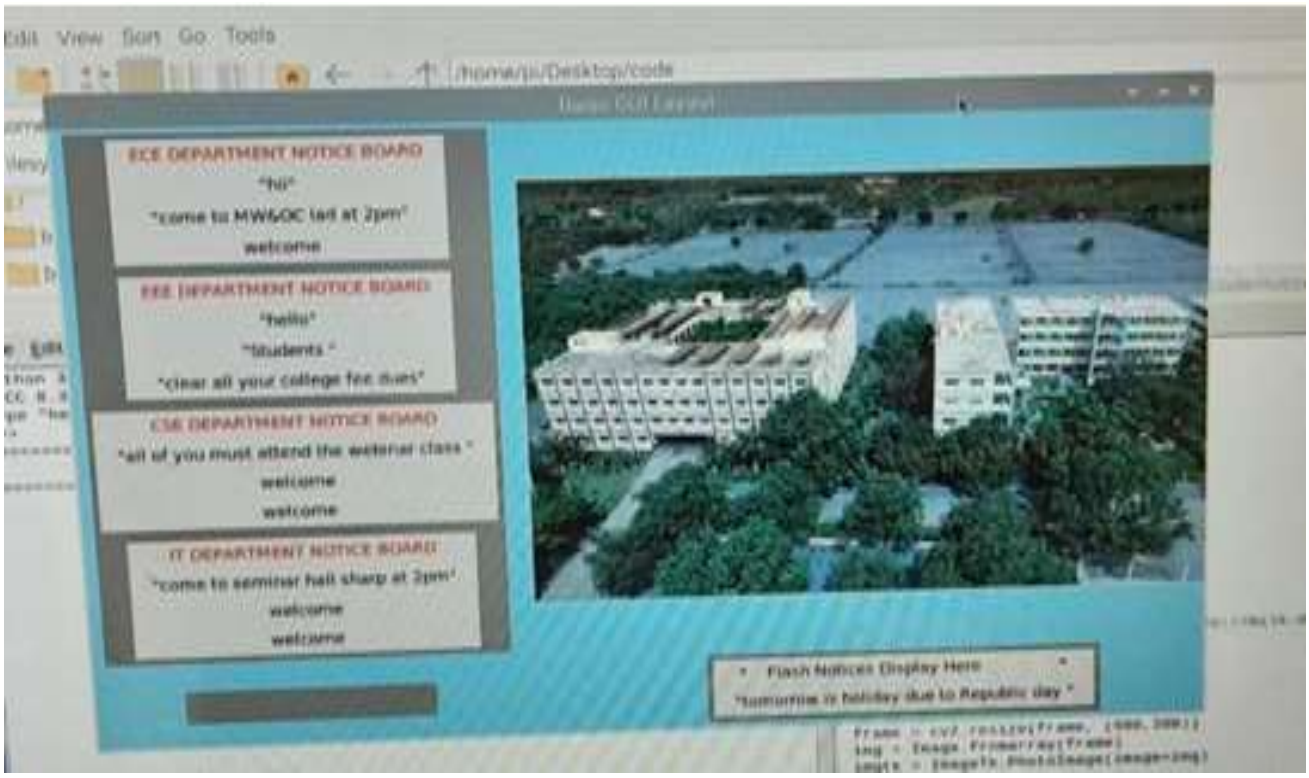

Figure 4: Principal's Output Screen

By giving the above input messages in FFD app for each department as well as flash notice. Figure 4represents the principal sir image message screen.

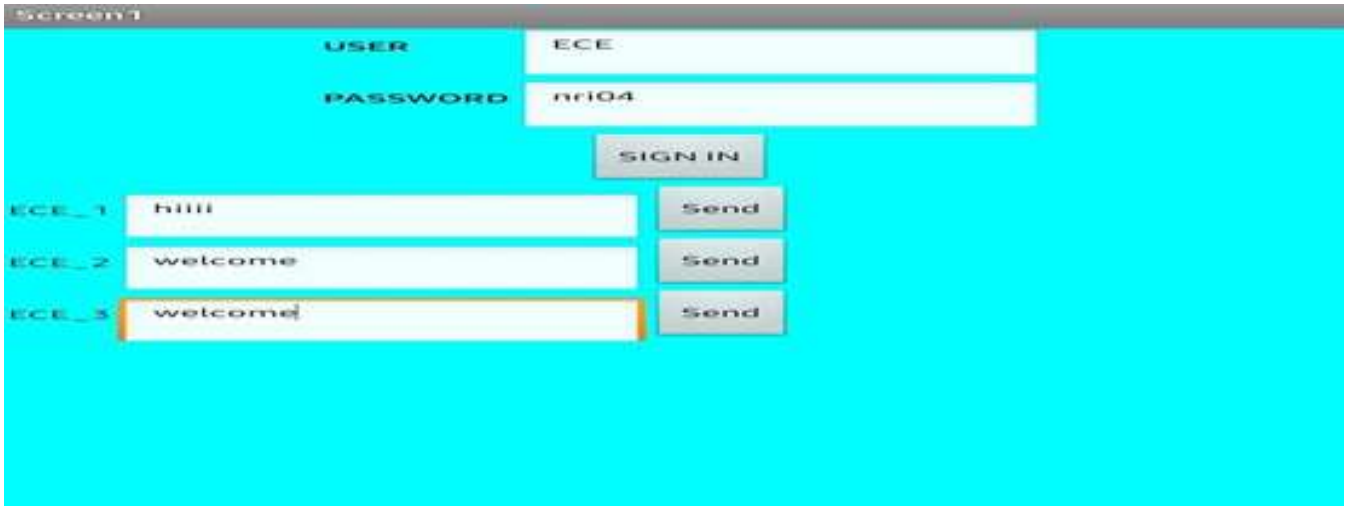

Figure 5: Faculty's FFD Screen of ECE Department

`Figure - 5 shows input given by faculty of the ECE department. In this login username and password to be entered to get in to send message to the concern department classes that will be displayed in the smart display of dedicated ECE part of screen. The messages are typed in the respective message box.

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Figure 6: M essage sent by ECE Faculty displayed on display screen

Figure 6 shows the output of the given input by the ECE department faculty. Messages are either given by faculty of ECE department or Principal Sir. After giving the messages "hi", "welcome", "welcome" in the respective blank space allocated for the ECE department, messages are displayed on the display screen.

Figure 7: Faculty's FFD Screen of CSE Department

Figure 7 shows input given by their faculty of the CSE department. Where here the user name is"CSE" and password is "nri05". And messages are typed in the respective message box.

Figure 8: M essage sent by CSE Faculty displayed on display screen

Messages are either given by faculty of CSE department or Principal Sir. After giving the messages "welcome", "welcome", "welcome" in the respective blank space allocated for the CSE department, messages are displayed on the display space allocated for the CSE department; messages are displayed on the display screen. Messages are displayed on the left top of the screen.

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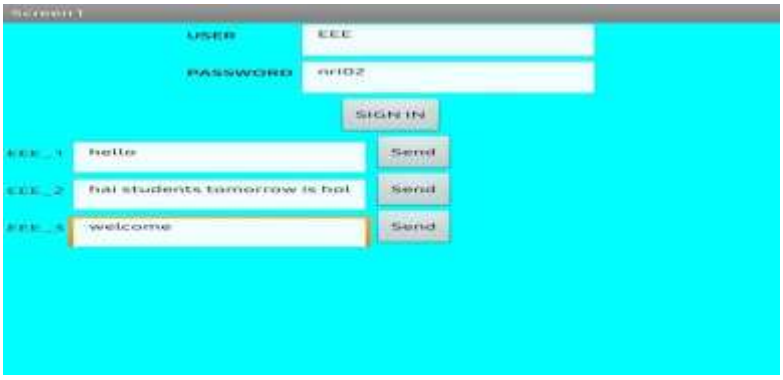

Figure 9: Faculty's FFD Screen of EEE Department

Figure 9 shows input given by their faculty of the EEE department. Where here the user name is "EEE" and password is "nri02". And messages are typed in the respective message box.

Figure 10: M essage sent by EEE Faculty displayed on display screen

Figure 10 shows the output of the given input by the EEE department faculty. Messages are either given by faculty of EEE department or Principal Sir. After giving the messages "hello", "haii students tomorrow is holiday", "welcome" in the respective blank space allocated for the EEE department, messages are displayed on the Raspberry Pi screen. Messages are displayed on the left top of the screen.

Figure 11: Faculty's FFD Screen of IT Department

Figure 11 shows input given by their faculty of the IT department. Where here the user name is "IT" andpassword is "nri01". And messages are typed in the respective message box.

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Figure 12:Messsage sent by IT Faculty displayed on display screen

Figure 12 shows the output of the given input by the IT department faculty. Messages are either given by faculty of IT department or Principal Sir. After giving the messages "welcome", "welcome", "welcome" in the respective blank space allocated for the IT department, messages are displayed on the Raspberry Pi screen. Messages are displayed on the left top of the screen.

Figure 13: Input form of Displaying video

Figure 13 tells about how the image input will be the given through the bot. Firstly we will open the telegram app and then will open our created bot NRIIT from where we can send videos and images. Then we will click on button right corner pin symbol where it shares our gallery videos and images. Then we have to select and send our required image and video that needs to be displayed on the screen. Then telegram bot start to process and leaves us a message that video downloaded. Then it takes 5seconds to display the video because a program runs behind it. As video displayed on small raspberry Pi screen, to view that in big screen we use VNC viewer. This helps us to watch in the big screen. Where the video is displayed.

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Figure 14: Output of Displaying video

Figure 14 shows the output video for the given input. By running python program, as this video is displayed on raspberry Pi screen with the help of created telegram bot and in order to view this output in laptop or desktop screen we using VNC viewer.

Figure 15 Input form of displaying image

Figure 15 tells about how the image input will be the given through the bot. Firstly we will open the telegram app and then will open our created bot NRIIT from where we can send videos and images. Then we will click on button right corner pin symbol where it shares our gallery videos and images. Then we have to

select and send our required image and image that need to be displayed on the screen. Then telegram bot start to process and leaves us a message that image downloaded. Then it takes 5seconds to display the image because a program runs behind it. As image displayed on small raspberry Pi screen, to view that in big screen we use VNC viewer.

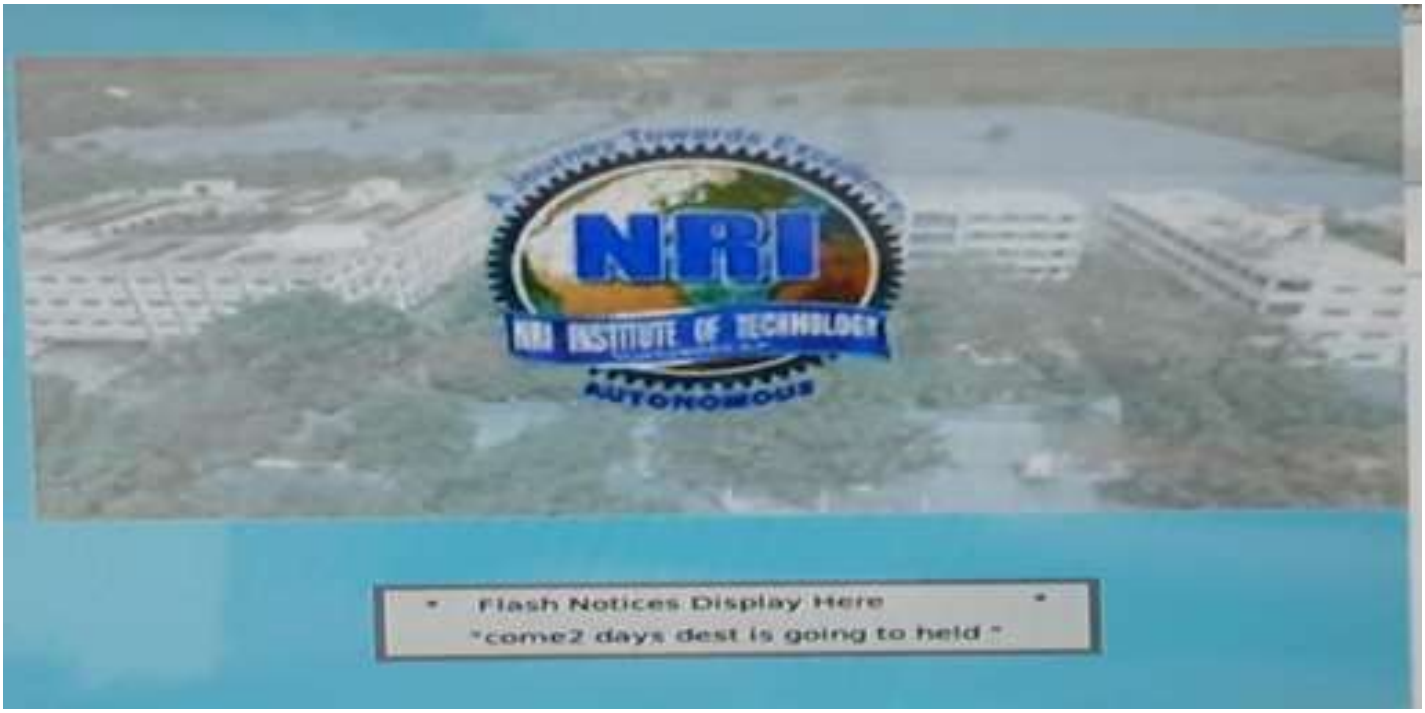

Figure 16: Output form of Displaying image

Figure 16 shows the output video for the given input. By running python program, as this image is displayed on raspberry Pi screen with the help of created telegram bot and in order to view this output in laptop or desktop screen we using VNC viewer.

V. CONCLUSION

The work on "smart advertising technology using remote controlled raspberry pi" has been successfully designed and tested it by uploading and deleting of the still images and the moving images files that is in the MP4 format and also remotely access it by using Wi-Fi network from remote places. The aim of this thesis is to design and implement a digital advertising system that is remotely accessible and manageable very smart manner. The technology with Python has been implemented together on Raspberry Pi and web server to achieve the desired result. The content management system of the digital advertising of still and moving images is designed with focus on managing the content distribution on the public transport industry. In this system each display screen can be remotely managed and controlled via web interface. The approach of controlling the display system via a web interface over the internet could be useful for implementation of other similar applications that require remote access and monitoring. It has been developed by integrating features of all hardware components and software used. The presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit. Secondly, using highly advanced ARM11 raspberry Pi4 B+ board and with the help of growing technology the project has been successfully implemented.

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