IOT Real Time-Led Display Board Using Raspberry Pi

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ABSTRACT

Advances in IoT technology pave the way for new solutions that will increase the performance of LED panels. The project was designed to improve messaging by connecting Telegram bot interaction to Raspberry Pi 3. The system is designed to support different file types such as text, images, and video. It does this by using the Raspberry Pi 3's capabilities, including audio selection, LED display board, and camera module. Real-time information is displayed on the LED board for text; Use the camera module and media player for photo and video output. Strong security mechanisms and voice-based text are key features. Telegram bots can give clear feedback on content performance or detect problems before the user like sit. Experimentation and optimization guarantee performance in all situations. By combining text, images, and videos with new features and safety measures, the system has evolved into a poster and user-friendly fire truck that meets many of the customer's needs.

Keywords : Raspberrypi3, IOT, LED

INTRODUCTION

The goal of increasing connectivity and redefining customer needs is at the heart of this change. Raspberry Pi 3's multimedia features, including beautiful videos, compelling photos, and instant updates, keep you connected. This project brings a change in the way information is sent by offering a better way to the traditional newspaper and going beyond simple technological changes. Our project aims to transform newspapers into a rich multimedia platform that not only solves the short comings of the traditional labeling system of traditional newspapers but also offers new possibilities for the integration of media and technology. New standards. Our aim is not just to innovate, but to transform public spaces into more inclusive and accessible spaces where people can rethink the way they communicate. Additionally, the integration

of Telegram bots may be responsible for changing the user's interaction with electronic messages. Unlike traditional command line models, the bot provides an integrated and user-friendly interface that allows people to interact with the system seamlessly. Adding commands such as /image and /video takes communication beyond text, allowing users to customize a variety of different content for viewing. In fact, the transformative power of this partnership forms the basis of efforts to adjust user expectations and adapt to changing communication. Known for its versatility, the Raspberry Pi 3 is at the heart of this revolution by providing a powerful computing platform that can seamlessly integratevarious information systems. This project is more than a step forward;

It computing platform that can seamlessly integratevarious information systems. This project is more than a step forward; It represents a complete change in the way information is presented, beyond the boundaries of traditional newspapers. According to the expansion plan, the aim is not only to advance technology but also to create unified and inclusive public space. The integration of Google Assistant reinforces this commitment, allowing users to deliver text via voice command, and providing access to a wider audience

LITERATURE REVIEW

The evolution of electronic bulletin boards is a hot topic of recent research; Many media focus on improving traditional methods to meet the needs of the time. An important result in this area was found in a project designed to create advanced reports using NODE MCU modules [3]. This update allows users to send messages from the Telegram mobile application, ensuring that the messages have a balanced content. Integration of IoT-based serial port communication systems with the use of personal assistants such as the ESP8266 IoT modem for seamless transmission and display of code is a significant step forward. [4]Another important development is joining the ESP8266 to connect to the broadcast board via HDMI to facilitate wireless communication for mobile applications [5].This wireless connection solves the limitations of traditional methods, paving the way for easier and more powerful communication. Another study using the 8051 micro controller and WIFI module ESP8622 demonstrated the ability of a smart application on a smart phone to send messages and place them on the LED board [6]. This is a shift towards using existing smart devices to improve newspaper performance. A new approach

was found in the system with speakers for announcements, showing the Raspberry Pi module for interacting with LED boards and speakers.

[7]. This integration expands the scope of message boards and allows users with different information preferences to consume information. In a parallel study, the combination of ATMEGA 328 and GSM modules introduced another method where messages are sent as SMS to the SIM card and then displayed on the LED card [8].These different practices reflect continuous efforts to find solutions to improve communication. This proposal is inspired by these advances to integrate Raspberry Pi3 and Telegram robot collaboration to improve the functionality of fire message electricity. The foundation of the Internet of Things is being used to create a system where users can interact with text messages and issue text, image, and video commands. This departure from the traditional communication model is in line with modern trends in the consumption of multimedia-rich content. At the same time, the importance of Raspberry Pi 3 as a computing platform cannot be ignored. Its multimedia capabilities and adaptability to different applications make it ideal for turning your catalog into a dynamic platform. This is according to the general view in recent research that IoT applications are increasingly used as a communication medium between mobile phones and embedded devices [9], [10]. Additionally, the integration of the Telegram bot into the application process adds another layer of customer interaction. The use of commands such as/images and /videos suggests a visual communication approach that recognizes the increasing need forvisual content. This is based on research investigating the integration of IoT applications into home automation and business to reduce human physical activity during machine operation.

[13]. The main theme of the literature review is the constant effort to adapt the text to meet the needs of today's communication. From wireless connectivity to integrated multimedia, every research contributes to the continuous evolution of redefining traditional communication. The project plans to build on these foundations by envisioning a future where electronic reports combine multimedia content with user interaction, creating greater communication and involving the public. In addition to research papers on the evolution of electronic newspapers, recent studies talking about the integration of voice technology, and human-computer expansion have also been published. Large projects have demonstrated the effectiveness of

allowing users to add text via commands by incorporating Google Voice Assistant support into communication [16]. This development adds a layer of accessibility and convenience, appealing to a broad user base that finds traditional text cumbersome. When the plan is implemented in this way, the promotion demonstrates a commitment to promoting communication more effectively and efficiently. This paradigm shift towards a voice-activated strategy is indicative of abroad technological landscape that accelerates seamless relationships and access, thus contributing to the necessary and sustainable time of the strategic system in the contemporary communications ecosystem.

PROPOSED SYSTEM

The aim of our project is to create a social media platform beyond what is mentioned in the reference using Raspberry Pi3.AlthoughwedidnotusetheP10LEDslider panel, itis clear that the monitor's dynamic display provides a wide environment for information distribution. The system is integrated with Telegram using Telegram bots, allowing users to interact with appropriate messages.

Raspberry Pi3 is seen as an important device for storing and monitoring SD card outputs. Telegram bots display text, images, and videos at the command and action of users and messages. These commands are interpreted by a Python script running on the Raspberry Pi 3, which then retrieves the relevant data from the SD card.

Data can be presented in a clear and flexible way thanks to the Python script that uses the SD card and connects it to the SD card. Users use the "/image" command and assign image tags or categories to view images. The Python script enhancesthe visual content of the magazine by saving the affected image from the SD card and displaying it on the monitor.

Similarly, the'/videos' command is used to start video play back of the selected video. A Python script shows the difference between several text files by recording the video from the SD card and playing it on the connected monitor. All content isstored in the middle of the SD card, making it easy to manage and update. Users can modify the output data by editing thedata on the SD card, giving the measly and convenient access to various communication platforms.

The proposal allows for greater flexibility and discussion on social media while also taking into account technological advances. By combining Python scripts, Telegram, and Raspberry Pi 3, messaging is expanded and user interaction increases.

Improved functions and features:

In addition to the main features mentioned in the way of thinking, our advertising website has many designs aimed at improving user experience and engagement.

1. User authentication and authorization: The system includes user authentication to ensure security and prevent unauthorized use. Users must log in with valid credentials before issuing commands to the Telegram bot. This provides additional security and privacy for messaging.
1. Instant update: Using the system support for instant updates, users can instantly send the information to the log. Userscan send commands to content in real-time, be it for an emergency alert, an event announcement, or a routine update.
2. Remote Control: Our system enables users to edit content remotely from any location. Through the Telegram bot, users can send text, image, and video files, saving them to an SD card for scheduling or later use.
3. Interactive content: Users can insert clickable links to the content that is displayed in newsletters that offer interactive content. With this feature, you can send to another site straight from the dashboard, register for events, and access more information.
4. Customizable themes and layouts: Users can select themes and layouts to change the appearance of the report using the "/themes" command. These features can be customized based on content or presentation style.
5. Notification system: By combining text messages with notifications, users can be notified of important updates. Telegram users will receive instant notifications when new content is published so that important messages can be instantly seen by listeners.
6. Collaboration content: The system supports collaboration content to encourage
community
participation. Users can encourage knowledge and social engagement responsibility by using Telegram bots to post content updates or comments.
7. Integration with external platforms: To make food and dynamic content creation easier, our system is designed to integrate with external platforms and APIs. It is possible to get real-time information, weather updates, and information from other online sites from this feature.

By combining these new features, you can create a media conference that provides an interactive, engaging framework andgoes beyond traditional communications technology and user data platform.

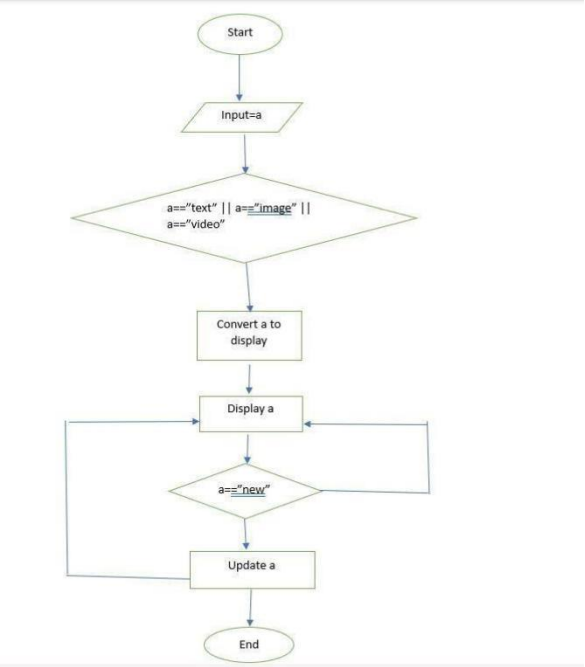

Fig.1:: Architecture of the Notice Board

Use cases for social media dashboard system

1. Educational Institutions:

Scenario: In a college or university setting, newspapers may present important announcements, work schedules, upcoming events, and test reports.

Use Case: Teachers and administrators can improve communication by immediately notifying students of changes, school events, or emergency alerts.

Public transportation stations (bus and train stations):

Scenario: At bus and train stations, newspapers can announce travel updates based on time, shift schedule, and emergency information.

Data usage: Passengers receive instant notifications of delays, cancellations, or important announcements, improving the overall passenger experience and safety.

2. Emergency Alert and Disaster Management: Situation: When there is an emergency such as a natural disaster or public emergency, newspapers may publish important information to the public.

Information used: Release time of evacuation routes, emergency contact information, and real-time updates to ensure people receive important information in a timely manner and ensure public safety.

3. Environment:

Scenario: In the workplace, multimedia messages can be used as an internal communication tool to announce company news, updates, and employee information.

Use Case: Keep employees informed about organizational developments and promote harmony in the workplace.

4. Stores and Markets:

Scenario: In stores or sales centers, newspapers can display advertisements, new product announcements, and programs.

Use Case: Shoppers enhance their shopping experience by receiving instant updates on regular sales, special sales, and upcoming events.

5. Medical:

Scenario: In a hospital or medical center, the board can quickly display health alerts, schedule appointments, and warn about medical conditions.

Use Case: Patients and staff receive timely health information, creating a more informed and connected healthcare environment.

6. Community Hub:

Scenario: In the community hub, the message board system is the hub for local announcements, event calendars, and community news.

Reference information: Residents should be aware of community events, initiatives, and important information to foster a sense of community involvement.

7. Entertainment Centers:

Stage: At theatre, theater, or entertainment venues, newspapers can showcase upcoming shows, buy tickets and advertise artists.

Use Case: Attendees receive instant updates about the show, making it more entertaining and Informative.

These different uses demonstrate the many uses of the multimedia message board system, demonstrating its usefulness in many areas for effective communication and media.

RESULTS AND ANALYSIS

The joint project of Raspberry Pi 3, SD card, monitor, and Telegram for the distribution of text, images, and videos provides various communication platforms. The results and analysis of this project can be summarized as follows: Multimedia Integration: This project successfully integrates Raspberry Pi 3, SD card storage, and monitors to display multimedia content. The versatility of the system allows the display of text, images, and videos, providing a rich and engaging user experience.

Telegram Bot Integration: Integration with Telegram bots is an important connection between users and the system. Userscan send commands like "/images" and "/videos" on Telegram to request specific content. This interaction increases the user's control and modification of the output data.

Python script for data recovery: A Python script run on Raspberry Pi 3 interprets commands received from Telegram and retrieves the relevant data from the SD card. This script ensures the successful execution of user requests and dynamic display of content in the viewer.

SD Card Management: All content, including text, images, and videos, is stored on the SD card, providing a storage that is easy to manage and close. Users can edit, modify, or add content by editing data on the SD card, providing users with a convenient content management process.

Improving user experience : The system offers many features to improve user experience, including securing user authentication, updating real-time data reporting, and remote control operations. These features help increase the usability and accessibility of the system.

Customization and themes: Users can customize the appearance of displayed themes via commands such as "/themes" to achieve personalized presentations. This feature adds a layer of flexibility, allowing the system to adapt to different environments or preferences.

Notification: Integration of notifications

keeps users informed of important updates. Current notification is useful for emergency notifications, reporting events, or routine updates to keep the system running smoothly.

Collaborative content: The system enables community participation by supporting collaborative content. Users can use Telegram bots to post content updates or comments to encourage engagement and social interaction.

Integration with external platforms: The project is designed to integrate with external platforms and APIs, allowing rapid data retrieval. This integration expands the capabilities of the system by supporting functions such as climate change andonline data.

The results of my proposal for a system are reflected in the following figures.

Fig.2:: Photo View of Raspberry Pi

Fig.3:: Output of text Using The Telegram Bot

Fig.4:: Output of Image Using The Telegram Bot

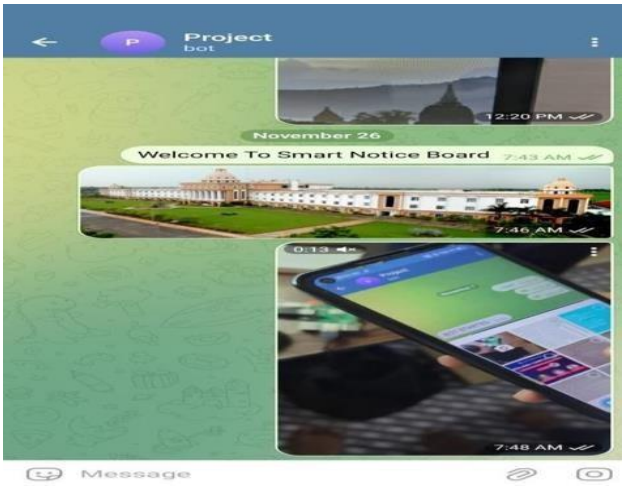

Fig.5:: Photo View of Telegram Bot

CONCLUSION

The development of LED display technology has reached a transformation point, as shown by our IoT - based real-time LED display system with improvements such as Google Voice Assistant support and image display. Our project is based on an extensive survey of the existing literature in the field and shows the convergence of cutting-edge technologies to create a dynamic user-centric information dissemination platform.

The completion of our project represents a major advance in multimedia communications. Raspberry Pi 3, SD card, clock, and Telegram connect together to create a flexible platform that goes beyond traditional communication technology. In today's world, instant updates, great content delivery, and user-friendly features help users communicate better and meet their needs.

The system also switches to different content types such as text, images, and video according to different situations. wanted. Features such as shared content, instant updates, and notification systems create a responsive and engaging environment. Besides daily updates, this is also useful for urgent news such as emergency alerts or emergency announcements.

In addition to content and design, the project's integration with other platforms and APIs adds another layer of functionality and features. Due to its flexibility, the system can be adapted to changes in user preferences and communication. Our work together not only achieves immediate goals but also lays the foundation for further advances and innovations in multimedia communications in the future.

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