Genius Board: Future-proof notice display powered by AI and Raspberry Pi, delivering personalized, engaging content for enhanced communication.

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Abstract: This project is a visionary platform dedicated to fostering vibrant community interactions and strengthening connections among members. Through cutting-edge technology like WebSocket, machine learning, and IoT integration, it empowers administrators to deliver real-time updates, personalized notices, and timely emergency alerts. With features like multi-language support, analytics tools, and gamification elements, the platform goes beyond mere communication to nurture a sense of belonging and inclusivity. By prioritizing user convenience and administrator efficiency, the Community Engagement Hub embodies a commitment to building thriving, interconnected communities with heart and soul. The present invention addresses the inefficiencies and limitations of traditional notice boards by introducing a digital notice board system. In various settings such as educational institutions, transportation hubs, and commercial establishments, traditional notice boards require manual posting of notices, leading to time and resource inefficiencies. Additionally, the reliance on paper as the primary medium for information exchange results in wasteful usage. The digital notice board system overcomes these challenges by leveraging internet connectivity for efficient information dissemination. By transitioning to digital platforms, the system enhances the speed, accessibility, and sustainability of notice board operations.

KEYWORDS: RASPBERRY-PI,HDMI CABLE,MONITOR,SDCARD,KEYBOARD,MOUSE,POWER SUPPLY, PI SIGNAGE ACCOUNT.

INTRODUCTION

In the contemporary world of overwhelming connection, we are so focused on the ease of accessing information. By the virtue of the internet or newspapers, we love keeping ourselves updated and informed. Notice boards are the primary thing in any institutions or public utility places like bus stations, railway stations, colleges, malls etc. Now a days, papers or wired notice board displays serves for the purpose. A specific person is assigned the task for pasting the notice. This not only calls in for extra labour charges as well as consumes a whole lot of time. In the current era where ease of access has always been at the top place in the catalogue of development, need to deliver the message faster is very crucial. This project enables us to communicate without even having someone's contact details or neither needed to have any account with the system hence is better than any online services available till date. The range it provides is its biggest capability. With routers as repeaters, it can service an entire organization located at one place. With furthermore work removing the complexity 'n' no. of classrooms can be delivered with the separate messages to be displayed by having all the tabs representing the classes in only one app. Hence this paper is based on an ingenious rather an exhilarating manner of directing messages to the peers or common folks by employing a wireless electronic display board which is synchronized using an android app.

This project utilizes a Raspberry Pi as the central controller for the LED Display Matrix. The Raspberry Pi interfaces with the Node MCU controller, enabling seamless Wi-Fi connectivity. Through the Raspberry Pi, the system leverages Google Assistant for speech input, enhancing

user interaction. Additionally, the Raspberry Pi manages the display of converted speech input, allowing for dynamic message presentation tailored to the LED matrix layout. With its versatility and connectivity capabilities, Raspberry Pi enhances the project's functionality, making it ideal for various environments such as offices, schools, and government institutions.
IoT

Internet of Things (IoT) is referred as the interconnection of physical objects in the presence of Internet Without the involvement of human. In an IoT ecosystem, devices and objects are embedded with sensors, actuators and communication technologies, allowing them to collect and exchange the data. This interconnected network of devices allowing them to communicate, share information and perform intelligent actions without requiring direct human intervention. The key components of IoT are Sensors, actuators, connectivity, data processing, cloud computing, edge computing.

Model Development Costs:

Developing a wireless electronic display board using a Raspberry Pi as the central controller for an LED matrix, with IoT capabilities. Components include Raspberry Pi, LED display matrix, Node MCU controller, sensors, and software for Android synchronization and Google Assistant integration. Costs vary based on hardware, software development, networking infrastructure, labor, and miscellaneous expenses. Estimated range for basic prototype: ₹20,000 to ₹1,00,000; for commercial use: ₹5,00,000 or more. Detailed cost breakdown and feasibility study recommended for accurate estimation.

Market Access and Pricing:

Market access targets institutions, offices, schools, and government facilities seeking efficient communication solutions in India. Pricing strategies could include tiered packages based on scale, with basic setups starting from ₹35,000 and comprehensive installations priced upwards of ₹7,00,000. Competitive analysis and market positioning crucial for establishing value proposition and capturing target demographics. Marketing efforts should highlight benefits such as ease of use, scalability, and cost-effectiveness compared to traditional notice board systems.

PROPOSED SYSTEM

In today's digitally-driven landscape, piSignage emerges as a pivotal interface, seamlessly integrating with a diverse array of devices to streamline communication processes. Leveraging piSignage alongside Raspberry Pi as the central controller for an LED Display Matrix, this project redefines traditional notice boards. Through piSignage's intuitive interface, administrators can efficiently manage and update information, ensuring real-time communication with minimal effort. This synergy between piSignage and devices like Raspberry Pi enhances accessibility, enabling users to disseminate critical messages across various environments with unparalleled ease.

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The project's architecture harnesses the power of IoT, transforming mundane notice boards into dynamic, interconnected communication hubs. Devices embedded with sensors and actuators are orchestrated through piSignage, facilitating data exchange and intelligent actions without

direct human intervention. By leveraging piSignage's compatibility with a plethora of devices, including Node MCU controllers, seamless Wi-Fi connectivity is achieved, expanding the scope of communication networks. This IoT integration empowers institutions, offices, and public spaces to stay agile and responsive in an ever-evolving digital landscape.

Central to the system's functionality is the utilization of Google Assistant for speech input, augmenting user interaction and accessibility. With Raspberry Pi serving as the conduit for speech-to-text conversion and message display, users can effortlessly issue commands and have them dynamically presented on the LED matrix. This integration not only enhances user experience but also underscores the project's commitment to leveraging cutting-edge technologies for efficient communication.

Scalability and adaptability are inherent features of this innovative communication solution. By employing routers as repeaters, the system can effortlessly cater to entire organizations or campuses, extending its reach and impact. Moreover, with piSignage's versatility, future enhancements could enable tailored messaging for specific environments or user groups, further enhancing its utility and relevance across diverse settings. This holistic approach to communication underscores the project's commitment to innovation and effectiveness in facilitating seamless information dissemination.

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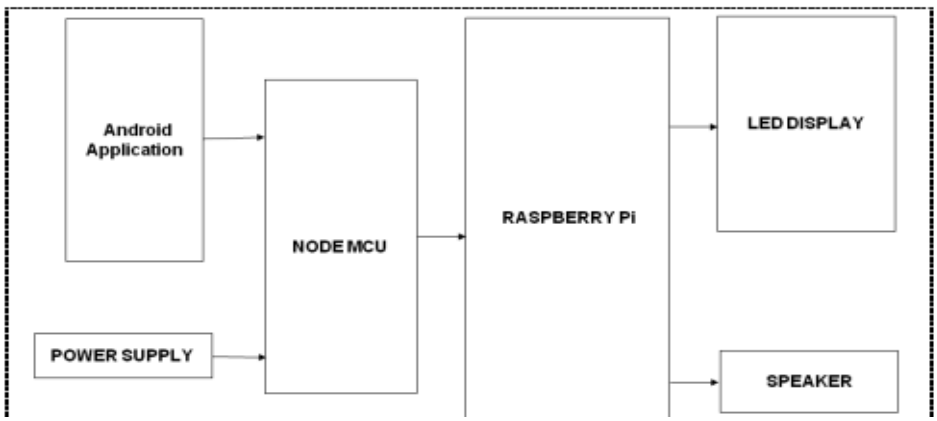

Fig :Block Diagram of Proposed System

System Architecture:

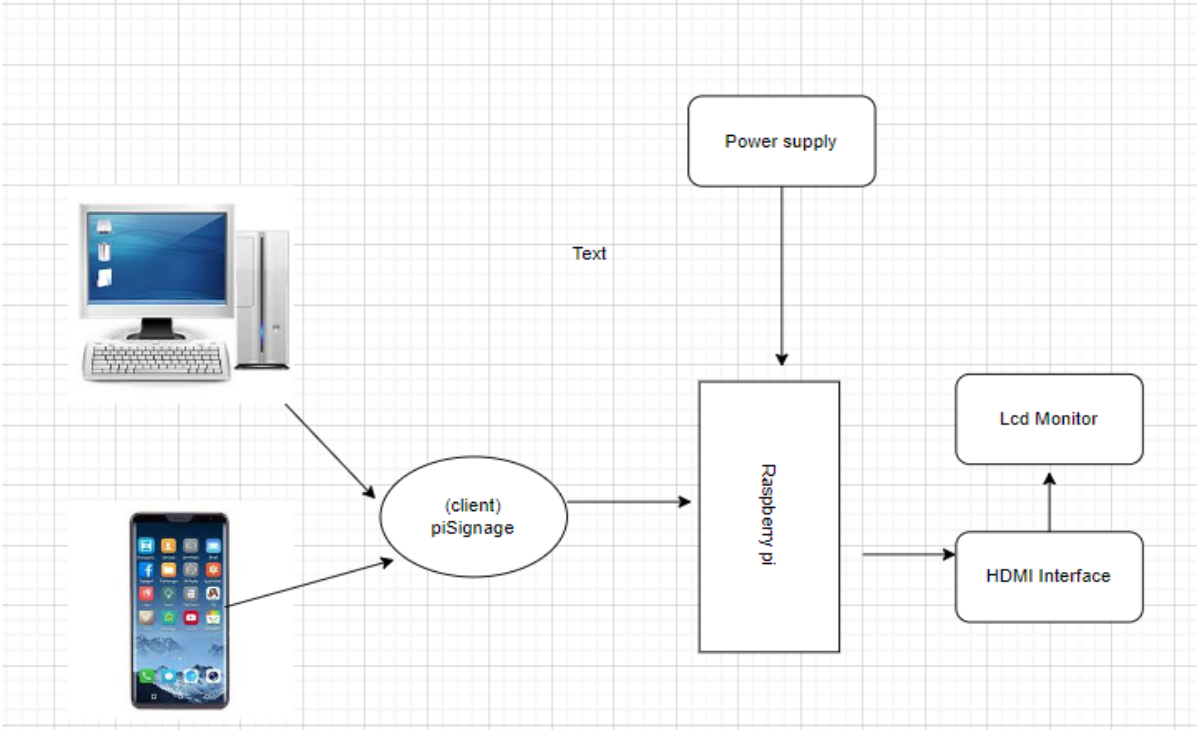

Fig: 3: Proposed System Architecture

In this architecture, the Android app serves as the interface for users to manage and update content displayed on the LED matrix. Through Wi-Fi communication, the app interacts with the Raspberry Pi, acting as both the central controller and a piSignage client. The Raspberry Pi receives commands and content updates from the Android app, managing connectivity, processing speech input from Google Assistant, and controlling the LED matrix accordingly. The LED matrix, in turn, physically displays the content based on instructions received from the Raspberry Pi. This architecture enables seamless communication and interaction between the user's device, the central controller, and the display, facilitating efficient content management and dissemination.

METHODOLOGY

In the field to initialise the project, we define our main objectives creating a cutting-edge notice display system using AI and Raspberry Pi. We aim to make communication easier and more engaging. Next, we talk to potential users to understand what they need. Through interviews and surveys, we learn about their communication preferences. This helps us design a system that meets their needs. First, we talk to users to understand how they use notice displays and what problems they face. This helps us learn what they like and dislike. Then, we create fictional characters called "user personas" based on what we learned. These personas represent different types of users. We also imagine scenarios of how they would use our system. This helps us design something that meets everyone's needs.

The Technologies that we are used are

Raspberry Pi:

The Raspberry Pi serves as the core hardware platform for the notice display system due to its compact size, affordability, and versatility. It provides the computational power needed to run the system efficiently while offering flexibility for various applications and configurations.

AI and Machine Learning:

AI algorithms are implemented to enable personalized content delivery on the notice display system. Machine learning techniques are utilized to analyze user interactions and preferences, allowing the system to tailor content based on individual preferences. Natural Language Processing (NLP) algorithms facilitate speech recognition and processing, enabling users to interact with the system using voice commands.

Cloud Services:

Cloud services are integrated into the notice display system to enhance its functionality. These services, including speech recognition and natural language processing, are hosted on remote servers, allowing seamless connectivity and access to advanced AI capabilities. By leveraging cloud computing resources, the system can offload computation-intensive tasks and scale more easily to accommodate growing user demands.

User Interface Development:

User-friendly interfaces are developed to facilitate interaction with the notice display system. Web technologies such as HTML, CSS, and JavaScript are utilized for frontend development, enabling the creation of intuitive and visually appealing interfaces. These interfaces allow users to navigate content, interact with the system, and personalize their experience effortlessly. Through thoughtful design and usability testing, the interfaces are optimized to enhance user engagement and satisfaction.

Algorithm and where it will be used in the Genius Board project:

1.Natural Language Processing (NLP)

- NLP algorithms analyze and interpret human language to understand user inputs, enabling the system to extract meaningful commands or requests.
- NLP algorithms will be used to process speech inputs from users, allowing them to interact with the notice display system using natural language commands. For example, users can verbally request specific information or actions from the system, such as displaying a particular notice or providing updates on specific topics.

2.Recommender Systems

Recommender system algorithms analyze user preferences and behavior to generate personalized recommendations, enhancing user engagement and satisfaction.

Recommender systems will be employed to personalize content delivery on the notice display system. By analyzing user interactions and historical data, the system can recommend relevant notices, announcements, or updates tailored to each user's interests and preferences. This ensures that users receive content that is most relevant and valuable to them, increasing their engagement with the system.

3. Speech Recognition

- Speech recognition algorithms convert spoken language into text format, enabling computers to understand and process verbal commands or inputs.
- Speech recognition algorithms will be utilized to convert user speech inputs into text format, allowing users to interact with the notice display system through voice commands. Users can verbally request specific actions or provide instructions to the system, such as displaying a particular notice or navigating through menu options. This enhances the user experience by providing a convenient and intuitive interaction method.

4.Classification Algorithms

- Classification algorithms categorize data into predefined classes or categories based on their characteristics or features.

-Classification algorithms will be employed to categorize content and messages displayed on the notice display system. For example, the system may classify notices or announcements into different categories such as "urgent," "general information," or "events." This categorization allows for targeted delivery of content to users based on their relevance and importance,

ensuring that users receive the most relevant and timely information. Additionally, classification algorithms may be used for sentiment analysis to gauge the tone or sentiment of messages, enabling the system to filter or prioritize content accordingly.

CONCLUSION

In a world fueled by connection and innovation, the Community Engagement Hub emerges as a beacon of collaboration and dynamism, revolutionizing the way communities interact and communicate. With a fusion of cutting-edge technologies including WebSocket, machine learning, and IoT integration, this platform empowers administrators to orchestrate real-time updates, personalized notices, and crucial emergency alerts. From multi-language support to gamification elements, it transcends mere communication, fostering a sense of belonging and inclusivity that resonates within every member.

Meanwhile, the Genius Board project epitomizes digital transformation, reshaping traditional notice boards into dynamic communication powerhouses. By marrying Raspberry Pi, AI, and cloud services with the seamless integration of piSignage, it unveils a realm where information dissemination is an art form. Through sophisticated algorithms like Natural Language Processing, Recommender Systems, and Speech Recognition, this project heralds a new dawn of accessibility, personalization, and efficiency in communication. With scalability at its core, it opens doors to boundless possibilities, promising a future where information flows effortlessly, enriching lives and communities alike.

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