Real-Time Cloud Based Smart Digital Notice Board

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Abstract: **The Real-Time Cloud Based Smart Digital Notice Board aims to modernize the way information is shared in educational institutions and other organizations by transitioning from traditional notice boards to a digital, web-based system. This system allows notices to be displayed on LED screens, controlled remotely via the web, and updated in real-time. Administrator can post, edit, and delete notices through a simple user interface, with added functionalities such as priority setting and scheduling for important notices. The use of Raspberry Pi enables seamless integration between the software and display board, ensuring automated, timely updates**.

I. INTRODUCTION

1.1 Convenient and Easy to Use

The Real-Time Cloud Based Smart Digital Notice Board is designed to address the limitations of traditional notice boards in educational institutions and organizations. Conventional methods of displaying important information rely on printed circulars or static boards, which are often time-consuming to update and may go unnoticed by many. Additionally, the need for physical handling and maintenance of notices leads to inefficiencies and delays in communication.

In contrast, a digital notice board allows for dynamic, real-time updates that are more visually engaging and easier to manage. Information is displayed on an LED screen, and notices can be updated remotely via the internet. This system is highly efficient as multiple notices can be displayed at once using a scrolling feature, ensuring that all relevant information is visible to the intended audience. The platform is user-friendly, allowing administrators to easily add, update, or delete notices with just a few clicks.

1.2 Event Management

Organisations and communities that need to plan events and interact with attendees and stakeholders may find the platform particularly useful. It provides a number of services, including collaboration with event staff and participants, event advertising, and certain updates. Additionally, enabling organisers to pursue registration, participate, and provide recollections and notifications optimises event administration. This platform improves overall coordination, minimises human labour, and maximises efficiency by taking the place of conventional event planning techniques.

II. LITERATURE REVIEW

1. Web-Based Centralized Notice Board Platform

A literature review on web-based centralized notice board systems with event management highlights the evolution of digital platforms designed to improve information dissemination and event coordination. These systems have been developed to replace traditional notice boards, offering real-time updates, notifications, and remote accessibility. Key features include user-friendly interfaces, mobile responsiveness, and cross-platform compatibility, which allow users to access notices and events from multiple devices, such as desktops, tablets, and smartphones.

Early implementations focused on improving communication efficiency by eliminating the delays inherent in physical notice boards. Over time, advanced features such as event categorization, filtering options, and automated notifications were introduced to help users easily navigate and locate relevant information. The integration of event management tools enabled users to organize, schedule, and manage events, with features like venue booking, registration, and attendee management.
Recent advancements include the incorporation of analytics tools, allowing administrators to monitor user engagement and assess the effectiveness of notices and events. Personalization features have also been added, enabling users to filter content based on preferences, enhancing the relevance of the information. The system's integration with social media platforms and other institutional software further extends its utility, making it a versatile solution for modern organizations.

2. Web application based digital notice board

A literature review on the "Web Application Based Digital Notice Board" system reflects the shift from traditional, paper-based notice boards to more efficient and environmentally friendly digital signage solutions. Digital notice boards, implemented through technologies like Raspberry Pi, web applications, and cloud storage, are becoming increasingly popular in educational institutions and public spaces. These systems eliminate the need for manual paper notices, reducing waste and human effort while offering real-time updates.

The key innovation in such systems is the use of cloud-based storage and web applications for content management. Administrators can easily create, edit, and schedule notices remotely, with updates displayed instantly on digital screens such as LED or LCD monitors. Technologies like HTML, CSS, and JavaScript enable responsive, user-friendly interfaces, while the back-end development, often handled through JavaScript frameworks like jQuery, facilitates seamless communication between the user and the digital board.

In addition to reducing paper usage, these digital notice boards offer greater flexibility in content delivery, supporting text, images, and videos. They also provide more control over notice scheduling and accessibility, ensuring that important information reaches users instantly and efficiently. This approach enhances communication within institutions, making notice management more sustainable and effective.

3. Interactive Digital Notice Board

The "Interactive Digital Notice Board" system leverages the Digital Signage (DS) method to enhance information dissemination, addressing challenges like environmental pollution and paper waste associated with traditional notice boards. Digital notice boards have emerged as a viable alternative in places like hospitals, schools, and airports, offering rapid and systematic content delivery through dynamic interfaces. By utilizing Wi-Fi technology, content can be updated remotely from a centralized server, eliminating the need for localized control systems.

In this study, an interactive digital notice board system is developed, incorporating deep learning for age classification to enhance accessibility for older adults. When users above a certain age are detected, the system adjusts the font size to facilitate easier reading. The system's architecture includes features such as time, date, weather updates, and announcement notifications, managed through a web interface by authorized personnel for content security. The use of wireless technology allows for flexible, real-time content updates.

This system highlights the growing role of Internet of Everything (IoE) technologies, providing a scalable, efficient, and user-friendly method for content management. Future research can explore further enhancements in DS systems, such as improved user interaction and expanded content customization options.

4. Pushing the Digital Notice Board toward Ubiquitous Based on the Concept of the Internet of Everything

The integration of digital notice boards into Internet of Everything (IoE) environments offers new possibilities for ubiquitous communication, especially in contexts such as smart campuses and transportation hubs. The "Pushing the Digital Notice Board toward Ubiquitous" system proposes an interactive message exchange architecture based on the Message Queuing Telemetry Transport (MQTT) protocol. This system enables users to post messages to various digital notice boards and social media platforms through a publish/subscribe model, providing a flexible and dynamic content management experience. Unlike traditional notice boards that are constrained by location, this IoT-ready system allows users to send messages from any authorized device, offering greater versatility.

Several studies have explored the use of single board computers (SBCs) like Raspberry Pi and Arduino, as well as GSM, ZigBee, and Wi-Fi for building digital notice board systems. These systems focus on addressing issues such as user interface design, connectivity, management, and security. The proposed system introduces an advanced interaction model, allowing users, boards, and data to communicate seamlessly, promoting real-time engagement with notices.

5. Iot Based Smart Notice Board

The IoT-based Smart Notice Board system replaces traditional paper-based notice boards with a digital, automated solution that uses wireless technology for fast and remote data transfer. The primary objective

of this system is to create a reliable and efficient electronic notice board connected to a cloud server. By integrating the ESP8266 Wi-Fi module with an AT89S52 microcontroller and Arduino Uno, the system allows users to update notices remotely via a dedicated website. Messages are transmitted to an LED display in real-time, reducing the manual effort involved in updating physical boards.

This system leverages Wi-Fi for seamless connectivity, allowing authorized users to write and rewrite messages from anywhere in the world, thus improving efficiency and accessibility. The UART protocol facilitates data transmission from the Wi-Fi module to the microcontroller, which updates the LED board accordingly. The system also includes a buzzer for notifications when new messages are received, ensuring timely information delivery.
The implementation of this IoT-based notice board reduces the need for paper, contributing to eco-friendliness, while also minimizing the costs associated with printing and labor. Future enhancements could include moving displays with variable speed and expanded applications in public spaces such as malls and highways.

III. THEORY

3.1 The Manual Wooden System

Traditional wooden notice boards are commonly placed in key locations across various university departments. These boards display paper-based announcements, such as competition details, seminar schedules, test results, and other important updates. However, this method is inefficient, as notices must be frequently updated, replaced, and managed manually. Failure to do so results in outdated, redundant, and cluttered information.

Additionally, wooden notice boards lack digital processing capabilities, making it difficult to organize, update, and remove notices in a timely manner. The need for constant paper replacements also leads to inefficiencies in communication and resource usage. Figure 1 illustrates a typical notice board within a university department.

Figure 1: Wooden notice board showing posters and student marks.

3.2 Proposed System

an online e-word board with occasion control is a digital platform that enables the posting and viewing of announcements, with a number one awareness on occasions. It acts as a centralized hub for event-related updates, information, and facts within a particular network or corporation.

The platform's event management functionality allows users to seamlessly create, prepare, and promote occasions for more performance. Key functionalities include ticketing, scheduling, and automatic reminders. through integrating occasion management with the e-observe board, customers can get right of entry to all relevant

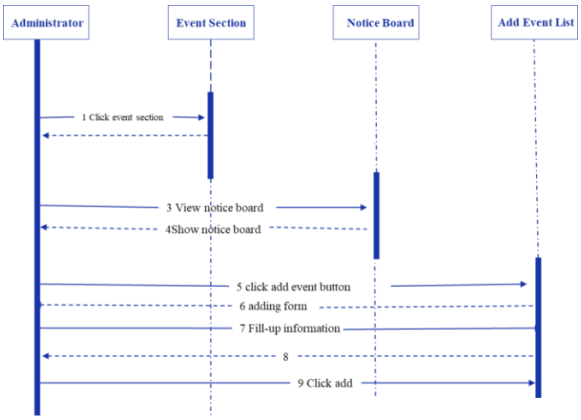

Figure 2. E-Notice Board Diagram.

statistics in one place, streamlining event making plans and coordination.

It serves a specific organization or community by providing a single site to post news, information, and anything else pertaining to the specific event. Users can effortlessly make, schedule, and market events with the event management tool, which makes planning easier.

Key features might encompass aspects like event registration, ticketing, scheduling, and automated reminders, all designed to boost organization and foster engagement. To ensure usability, the platform should incorporate intuitive navigation, search functionality, and notification alerts. additionally, sturdy safety features are critical to protect consumer statistics and prevent unauthorized get entry to.

In addition to offering a simplified method for event promotion and coordination, an online e-notice board with event management improves communication and information exchange. Evaluating its success involves tracking user engagement, event attendance, and revenue generation. These insights help refine the platform's features and improve planning for upcoming events.

IV. EXPERIMENTAL METHOD/PROCEDURE/DESIGN

There are several crucial processes involved in developing and testing an online notice board for event management. First, you need to set clear goals and objectives, then figure out what users really need. After that, it's all about designing and building the platform. Once that's done, you'll conduct thorough testing and validation to make sure everything works smoothly. Finally, it's crucial to keep the system updated and well-maintained. This proposed solution aims to provide a solid way to manage events and share information, specifically tailored for a certain audience. With a focus on being user-friendly, secure, and packed with features, This system is intended to serve as an efficient communication tool for institutions and organisations, enabling them to interact with stakeholders more effectively.

4.1 Analysis of Proposed system

• User authentication and access control: Both of these are crucial. Users must register and log in in order to access the system's features. To ensure that users can only view and alter the content they are permitted to access, we have implemented access control mechanisms.

- Notice board: Users can browse and search the system's notice board for different announcements and notices. Organising notices by department or topic makes it easier for users to find the information they need.
- Notice creation and management: Users have the ability to create and submit new notices, including those with a title, description, and category. Additionally, if needed, they can edit or remove their notices.
- Event management and creation: It enables a user to construct and oversee events, including their description, date, time, and place. In addition to receiving alerts and reminders, users can register for events.

Website managers have the ability to track indicators such as user engagement, event attendance, income earned, and more. Reports can be produced, and this provides information on user behaviour and website performance. Data is gathered in order to keep an eye out for any possible issues that could aid in their resolution.

This calls for the use of techniques like firewalls, encryption, and frequent security assessments.

4.2 High-level Representation Analysis

- User authorisation and authentication.
- Define user permissions and roles.
- Create a notice board with login and user registration features.
- Create a posting function for alerts and announcements.
- Give notice categorization and labelling.
- Provide search, filter, and sorting features for notices.

Event administration includes:

- Creating an event with a date, time, place, and description;
- Creating high-level event categories and tags
- The ability to register users and inform them of events

Security measures include:

- Encrypting and safeguarding user data
- conducting frequent security assessments and updates;
- Frequent audits for the upkeep and integrity of websites.

4.3 Use Case Diagram

The system illustrates how players interact with one another using the use example diagram for an online notice board having event management capabilities.

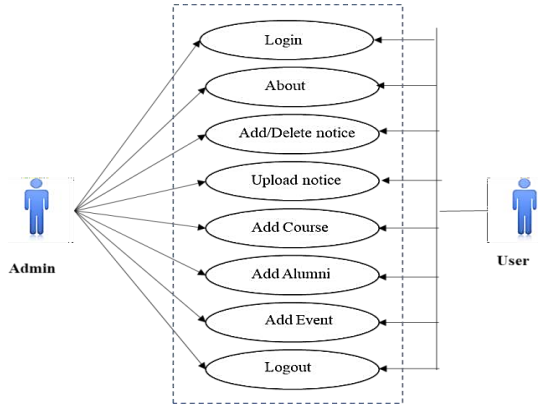

Figure 3. Use case Diagram.

Use cases must be placed on the right portion of the use case diagram, with the actors (The administrator and User) on the left. Diagram lines showing the relationships between the actors and use cases link them together. Only the User actor would take part in the Register/Login use case, but both the Administrator and User actors would be linked to the Create Notice and View Notice use cases.

4.4 Activity Flow Diagram for Admin

The administrator workflow for an event management system on a web-based notice board uses diagrams to present the sequences of management actions they conduct. Each operational step receives a box in the activity diagram that connects to other operational steps through directional lines. The diagram shows flow direction through arrows while each box contains descriptive labels regarding performed activities. After successful authentication the administrator sees a dashboard that provides performance metrics and user engagement data of the website.

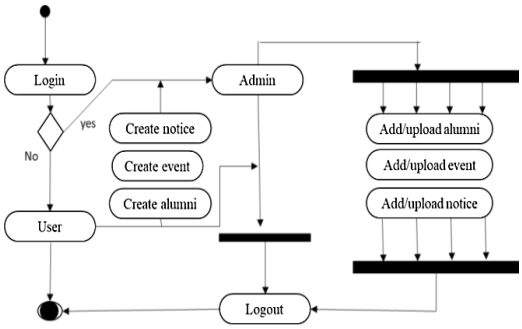

Figure 4. Activity Flow Diagram for admin

V. RESULTS AND DISCUSSION

The core function of the proposed system focuses on developing a Digital notice board for message transmission from users over the internet combined with user-friendly interface design to show notices based on specific date and time for simple notice board usage by users. System features two sections named as sender while the other part is receiver.

Through the wireless network sender transmits essential valuable information's. The sender needs to enter the specific web address to access Digital notice board. The system uses username and password security protocols to block unauthorized web address access. A user cannot access the digital notice board after attempting a wrong combination of username and password. The system opens up the web address along with information submission area after receiving proper user credentials.

This web address allows users to connect through either personal computer or mobile phone. Through this program the sender will automatically access web addresses. Text files and image files transmit through the cloud system after entering the web address.

Cloud serves as a method to store and access data together with programs through the Internet instead of saving data on a computer's hard drive. The processor implements the web address for cloud data retrieval that is currently embedded during programming. The application shows messages delivered through the monitor after it receives them. Users have access to deleting functions as well as modification options through our web link. Users can erase image or notice files on the cloud by selecting the appropriate links found on the web page.

We have the ability to delete and modify text messages according to our own needs at any time. After deleting the messages from the cloud, it will automatically be deleted on the display after a short delay.

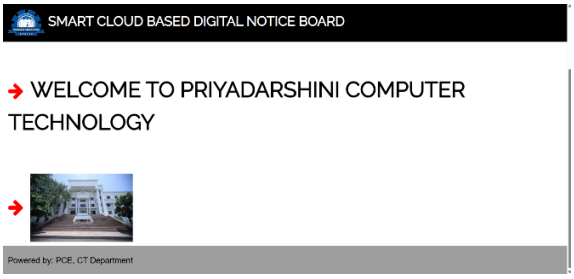

Fig 5: User Digital Notice Board UI

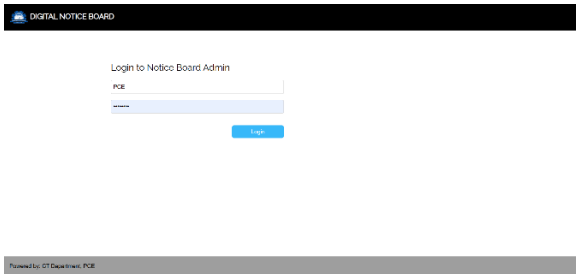

Fig 6: Admin Login Screen

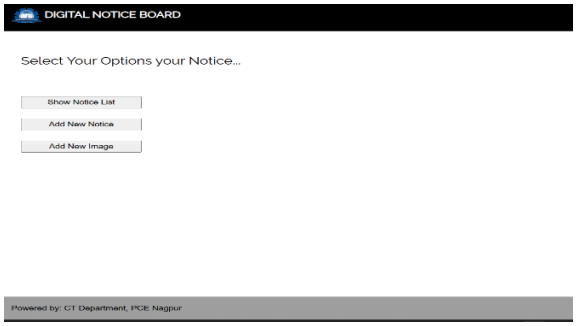

Fig 7: Screen For Admin to Select Notice Type

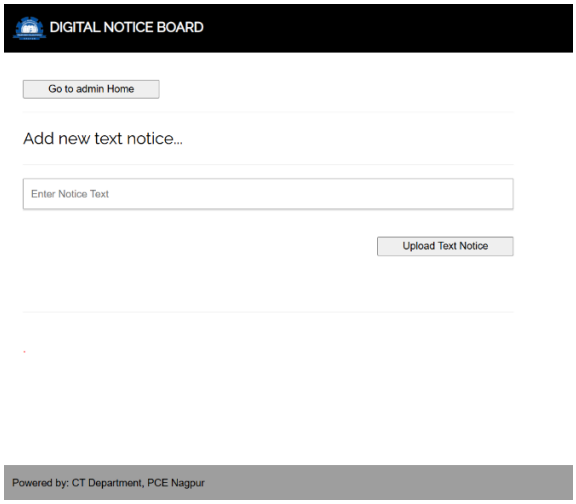

Fig 8: Screen For Admin to Add New Text Notice

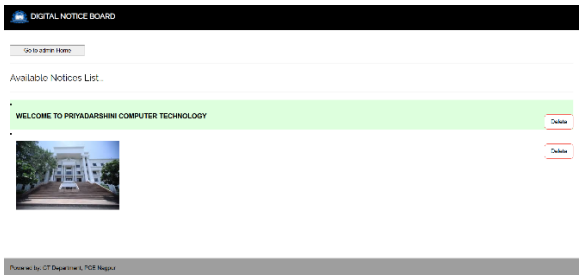

Fig 9: Screen For Admin to Check Live Uploaded Notice Status

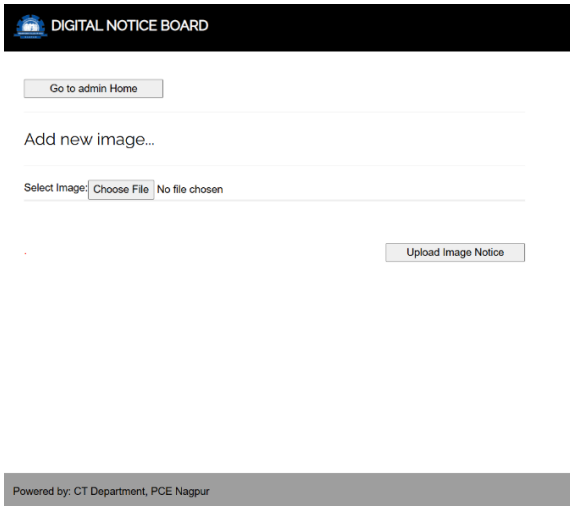

Fig 10: Screen For Admin to Add New Image Notice

With high-definition displays, real-time content updates, and seamless integration, you can showcase advertisements, information, alerts, notices, and entertainment with stunning clarity and precision. This system leverages cutting-edge technology to replace traditional paper-based notice boards with interactive and dynamic digital displays. Key features include customizable templates, a cloud-based/in-premise solution, and robust security, ensuring your content is always updated and protected. Enhance your brand visibility, attract more customers, and improve communication with our versatile and reliable Display solution.

VI. CONCLUSION AND FUTURE SCOPE

The suggested Real-Time Cloud Based Smart Digital Notice Board is a complete solution made to assist organisations and educational institutions in effectively managing events and notices. Administrators and users may easily browse through the platform's many components, such as the notice board, course catalogue, former students blog, and event management module, thanks to its user-friendly layout. With the ability to filter and group notes by program, department, or kind, the calendar-based notice board guarantees easy access to crucial announcements. The course area offers organised facts on the courses that are offered, such as schedules, faculty biographical information, curriculum details, and admission requirements. With integrated scheduling and registration tools, the event management module, on the other hand, makes it easier to plan and advertise events like conferences, seminars, workshops, cultural events, and sporting events. By giving alumni a forum to discuss their

accomplishments and experiences, the alumni blog encourages participation and fortifies their bond with the school.

The system could be improved in a number of ways going forward to increase its usability and functionality. As analytics and activity tracking could offer insights into the notices and events that are most seen and liked, personalisation options could be added to present notices and events according to individual preferences. Furthermore, social network integration with sites like Facebook, LinkedIn, and Twitter would make it simple for users to post updates. To ensure smooth data flow and integration, the system can also be made compatible with other systems in institutions, like Student Information Systems (SIS) and Learning Management Systems (LMS).

The platform's real-time data availability improves user experience by guaranteeing prompt access to pertinent information and allowing organisations to gather insightful data from stakeholders and consumers. Future decision-making can be informed by this data, which can also be used to enhance event planning and improve content. The online e-notice board with event management has the potential to become a vital instrument for effective communication, teamwork, and event planning inside organisations and educational institutions if its features are continuously enhanced and expanded.

REFERENCES

[1] A. R. Thakur and P. N. Chatur, "Design and implementation of digital notice board using Raspberry Pi," 2016 International Conference on Computing, Analytics and Security Trends (CAST),Pune,2016, pp. 50-53. doi: 10.1109/CAST.2016.7915123

[2] S. J. Sinha and S. K. Singh, "Design and implementation of digital notice board with automatic display control," 2015 IEEE 2nd International Conference on Telecommunication and Networks (TEL-NET),Noida,2015,pp.162-165. doi:10.1109/TEL- NET.2015.7354376

[3] M. K. Islam, K. M. A. Islam, A. Ahmed and S. Saha, "An online notice board system for educational institutions," 2018 4th International Conference on Electrical Engineering and Information Communication Technology (ICEEICT), Dhaka, 2018, pp.1-6. doi: 10.1109/ICEEICT.2018.8477178

[4] M. A. R. Sumon, M. K. Hasan, A. K. M. S. Islam and M. S. Hossain, "A web-based digital notice board system for educational institutions," 2017 International Conference on Electrical, Computer and Communication Engineering (ECCE) Cox'sBazar, 2017, pp.679-682. doi: 10.1109/ECACE.2017.8293885

[5] R. Singh, N. Singh and N. Mishra, "Web based digital notice board system for educational institute," 2016 International Conference on Information Technology (ICIT), Bhubaneswar, 2016, pp. 161-165. doi: 10.1109/ICIT.2016.7563201

[6] R. Patel, P. Patel and N. Patel, "Online notice board system for educational institutions," 2016 International Conference on Electrical, Electronics, and Optimization Techniques(ICEEOT),Chennai,2016,pp.3402-3406.doi: 10.1109/ICEEOT.2016.7755323

[7] S. Gupta, S. Jha and S. Kumar, "Design and implementation of web- based digital notice board system for educational institutes," 2018 International Conference on Recent Trends in Information Technology (ICRTIT), Chennai, 2018, pp. 1-6. doi: 10.1109/ICRTIT.2018.8428602

[8] A. R. Chandra, P. N. Kanakaraju and S. S. Wagh, "Web-based digital notice board system for academic institutions," 2019 International Conference on Electrical, Electronics, Communication, Computer and Optimization Techniques (ICEECCOT), Mysuru,2019,pp.73-76.doi: 10.1109/ICEECCOT47582.2019.9065945

[9] M. L. Pandey and B. K. Panigrahi, "Web-based digital notice board system for educational institutes," 2015 IEEE International Conference on Electrical, Computer and Communication Technologies (ICECCT), Coimbatore, 2015, pp. 1-4. doi: 10.1109/ICECCT.2015.7226106

[10] Prasad, S. K., Sahoo, S. K., & Sahoo, S. (2018). An Intelligent Notice Board System Based on IoT. 2018 IEEE International Conference on Power Electronics, Drives and Energy Systems (PEDES), 1-6. https://doi.org/10.1109/PEDES.2018.8707717

[11] Muaaz, M., Ahmad, W., & Nisar, K. S. (2017). Design and Implementation of Web-Based E-Notice Board System. International Journal of

Computer Science and Mobile Computing,6(8),77-84. https://www.ijcsmc.com/docs/papers/August2017/V6I820179.pdf

[12] Srivastava, N., & Bhatt, S. (2017). Web-Based E-Notice Board System with Search and Notification Features. 2017 International Conference on Communication and Signal Processing (ICCSP), 1111-1115. https://doi.org/10.1109/ICCSP.2017.8286598

[13] M. R. Islam and M. R. Chowdhury, "Design and implementation of an online notice board system," 2015 International Conferenceon Electrical Engineering and Information & Communication Technology (ICEEICT), Dhaka, 2015, pp. 1-5, doi: 10.1109/ICEEICT.2015.7307482.