

# Smart Campus Using Internet of Things

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**Abstract:** *We are entering in a new era of computing technology i.e. Internet of Things (IOT). IOT is a sort of “Universal Global Neural Network” in the cloud which connects various things. The IOT is an intelligent connection between devices and systems, comprising of smart machines interacting and communicating with other machines, environments, objects and infrastructures and the Radio Frequency Identification (RFID). As a result, an enormous amount of data is being generated, stored, and that data is being processed into useful actions that can “command and control” the things to make our lives much easier and safer—and to reduce our impact on the environment. Every organization such as companies and civil institutions rely upon up-to-date information about people. In this regard, most establishments either use websites, emails or notice boards. However, in most of countries internet access is available to people on systems and their mobile devices, so that the transferring of the information can be much easier and less costly through the internet.*

**Keywords:** smart campus; internet of things; IoT; RFID; smart machines

## 1. Introduction

Being an important part of our education system, teaching boards and notification boards are there right from the start.

The importance of information board is that it can be used in any desired way and can also be used as a learning tool for students. The Student Notice board lists opportunities and information of direct interest to students. Although, primary submissions originate from members of the College, organizations in the immediate vicinity of education campuses are also able to submit notices. Notices will be removed shortly after the expiry duration (for instance after the event or closing date has passed), or one calendar month after posting if a date has not been supplied. Notices are posted at the discretion of the Student Notice board administrator.

The concept of smart class education is indeed a blessing to the students of the 21st Century. It can be imagined that how beneficial it would be to remember something that is taught visually to us rather than the one that is read through pages after pages. Smart classes use all interactive modules like videos and presentations and these visually attractive methods of teaching becomes appealing to students who are already struggling with the traditional method of teaching in a classroom. In fact, smart classes are almost like watching movies as sometimes, animated visuals are used to teach a point. This kind of visual is both eye-catching and young students can easily relate with them. This is because the audio-visual senses of students are targeted and it helps the students store the information fast and more effectively. And then, there is the advantage of utilizing much of the time wasted earlier in drawing or preparing diagrams on board. Smart boards have all these information in memory and can be presented during the time of class lectures and thus, the time saved can be used in more important things.

Unlike old teaching boards, Digital Teaching Boards are much better as they come with a lot of benefits for both teachers and students.

## 2. Methodology

### A. Working

The basic idea behind making a smart campus is to lighten the burden from the shoulders of both faculty and students. Use of Internet of things makes the job way too easier and cost effective. For the Smart Notice Board, the user just has to carry a Bluetooth enabled smartphone or device which is capable of transmitting data over Bluetooth. The Bluetooth Module connected to the Smart Notice Board will receive the data, decode it and display the content on the LEDs present on the Notice Board. The Bluetooth Module used is HC-05.

- HC-05 BLUETOOTH MODULE It is a class-2 Bluetooth module having serial port profile, which can configure as either master or slave. A drop in replacement for wired serial port connection, transparent usage. We can use it simply for a serial replacement connection between MCU, PC and to our embedded project etc.

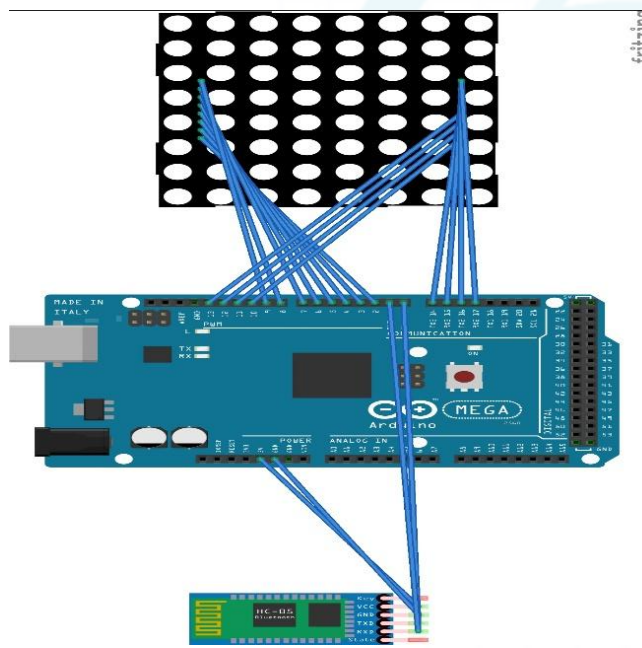
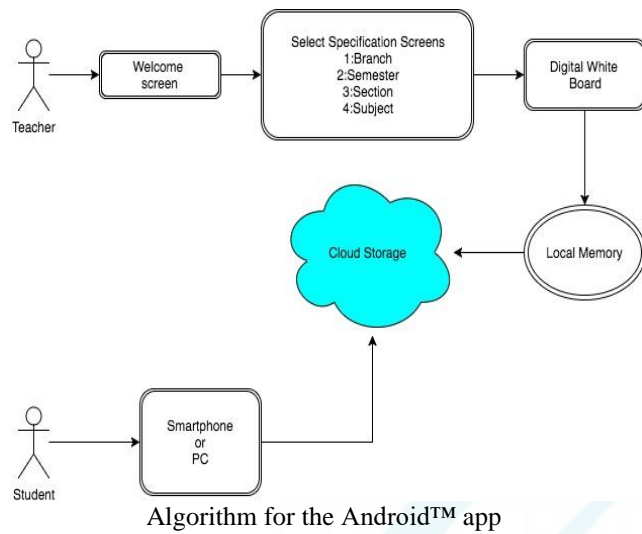
### HC-05 Specification

- 1) Bluetooth protocol: Bluetooth specification v2.0+EDR.
- 2) Frequency: 2.4 GHz, 15M band.
- 3) Modulation: GFSK (Gaussian frequency shift keying).
- 4) Emission power < 4dBm, Class-2.
- 5) Profiles: Bluetooth serial port.
- 6) Power supply +3.3VDC 50mA.

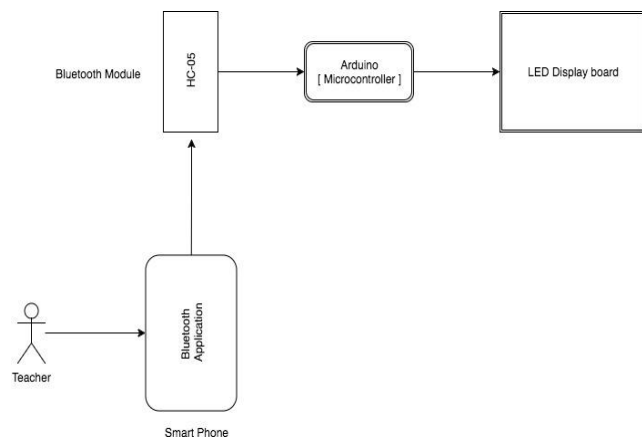
The Smart Teaching System uses a totally different approach. It includes working on Android™ Platform while using the concept of Internet of Things. Basically, A Smart Teaching Android app is fabricated using the concepts of Android Studio and Java. This App is installed on a Smartphone or a tablet. The Tablet can easily be connected to a classroom projector during a lecture using a MHL Cable. The Teacher just has to scribble the entire Lecture on the Android app installed on the Tablet. Once the lecture is over. The teacher just has to save the Scribbled content and end the session. The Scribbled data will be backup up on cloud and then can be accessed by

any student on any day. Thus making sure no student misses any important Lecture. The data can be accessed by any student from anywhere through the Dropbox™. Thus making sure no one misses anything ever.

**B. Block Diagrams & Algorithm**



Circuit Diagram of Smart Notice Board



Block Diagram of Smart Notice Board

**3. Software Module**

For the Smart Notice Board, The open source Arduino software (IDE) makes it easy to write code and upload it to the board. It runs on windows, Mac OS X, and Linux. The environment is written in java and based on processing and other open source software. This software can be used with any Arduino board.

For Smart Teaching System, the basics of Android Studio and java are used. The use of repositories from Github and Xda are used while making the Android App. The basic knowledge of android is enough to make the basic app which can perform the required function.

**4. Initialization Process**

The Smart Notice Board is interfaced with the smartphone via Bluetooth link between the Smartphone Bluetooth and the HC-5 Bluetooth module. The User opens an application of the smartphone and pairs the smartphone with the HC-05 module. Once connected, the user types the notification to be displayed in the app and presses “SEND”. The notification is then transmitted to the notice board which decodes the data upon arrival and displays the notification on the notice board.

The Smart Teaching System however, uses a different approach. The user has to connect the display tablet to a projector in the class via a MHL cable link and open the Smart Teaching Android App. Once opened, the user has to select the Stream and Semester before starting a session. Once the lecture is finished, the user presses “SAVE SESSION” and closes the session. The entire session data is synchronised on the cloud on Dropbox. The student can then access the data from anywhere through the Dropbox application.

**5. Conclusion**

The SMART teaching and notification board is a one-stop resource for students needing research, technology, or writing help, specifically aimed at the research needs of undergraduate students. The usage of this new technology must be encouraged in the current education system. The smart campus provides the students as well as teacher to learn through new techniques and too in a different and interesting manner.

We have already seen the wide application of internet of things. In this work we will present a model of IOT based E-Advertisement system for the applications of Shopping malls & other organizations. This proposes model will replace the advertisement system in big shopping complex like Big bazaar, Reliance Fresh etc. Even we can maintain the humidity inside the big shopping malls without any Human efforts. Also we can use this prototype system for the educational organization or Railway stations. This prototype model we will implement using virtual components in Proteus 7.1 software.

## References

- [1] A. Zanella, N. Bui, A. Castellani, L. Vangelista, M. Zorzi, "Internet of Things for Smart Cities", IEEE Internet of Things Journal, vol. 1, no. 1, pp. 22-32, February 2014. J. Clerk Maxwell, A Treatise on Electricity and Magnetism, 3rd ed., vol. 2. Oxford: Clarendon, 1892, pp.68–73.
- [2] Laurynas Riliskis, "A New Revolution is Underway", XRDS, vol. 22, no. 2, pp. 9-10, December 2015.
- [3] Vinton G. Cerf, "Prospects for the Internet of Things", XRDS, vol. 22, no. 2, pp. 28-31, December 2015. R. Nicole, "Title of paper with only first word capitalized," J. Name Stand. Abbrev., in press.
- [4] Gartners 2015 Hype Cycle for Emerging Technologies Identifies the Computing Innovations That Organizations Should Monitor, [online] Available:  
<http://www.gartner.com/newsroom/id/3114217>.
- [5] Huo Chen, J. Song, K. Wagner, G. Harold, E. Cotilla-Sanchez, "Integrating synchrophasor technology with the Oregon State University campus smart grid project", 2014 IEEE Conference on Technologies for Sustainability (SusTech), pp. 125-129, July 2014

