Interactive Practical Hands on Lab Management Using Live Streaming

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Abstract – In today world, internet has become integral part of our life. Each and every thing today has been connected to internet. Internet is basically a wide area network which allows multiple systems to communicate with each other and allow them to share data. Terms like smart city, smart phone, smart taxi-management, smart-hospital management, etc. are all the by-products of the high speed internet connection over network. Over project revolves around the educational field. In this we are implementing the concepts of networking in order to create a smart education system. We are calling this system "Automated lab". In this multiple clients (student) will be connected over a network with a server (teacher).The network will be private network.

Working: In this a private-small area client server network will be created. Here the server will be teacher' machine and clients will be the various machines of student's. Each student will be assigned with a login id created and managed by teacher. Using this login id, clients will be connecting to the network. Once the connection will made clients can start the study session by simply clicking on the start-stream button provided on the client screen. Once client starts the session, the server/teacher live screen will be stream to all the clients in the network.

The server will have some special privilege like:
-     Creating and Managing the login id of students
-     Monitoring the students/client
-     Limiting the students connection over the network

Keywords- Client Server based LAN connection, Real time video streaming, Smart Environment, Monitoring.

1. INTRODUCTION

Today various types of education systems are present. One such is smart class learning system which uses the hardware tools like projector, smart pens and smart boards with some additional software support. However this system has their own limitations and demerits. They are costly, require high maintenance, and have no monitoring system. As monitoring system is absent there is no way checking whether the students are understanding the problems or not. Only traditional way is what we are left with. The problem discussed in previous slide can overcome by our project "". This is client-server based system over small range private network, where clients are students and servers are teacher. The system will allow teacher and students communication by streaming the live computer screen of teacher over student's computer. An additional feature of monitoring the student screen is provided over server system. Hence teacher can monitor the students active any time during the session. The main aim of our topic is to provide smart education system. In this system the students and teachers both are benefited also the cost of the extra hardware is saved as no new hardware need to be installed.

Here, we are providing an environment for an easy interaction between students and teachers. The teacher's screen is streamed to the student's which due to which they will not gather around teacher. Moreover, the teachers have been provided an additional feature of monitoring any student's screen. The teacher can check whether the student doing the work properly or not. Also an additional chatting system has been provided through which the student and teacher can chat with each other and students can clear the doubt over this.

2. PROPOSED SYSTEM:

Our system will be a client server network where each client will assigned with a login-id.This id will be created and managed by teacher itself. Once the session is started, client and server will both get logged in over the network. Once log-in process is done, the teacher will start the video-streaming of its computer screen, and the students will get the video over their own system. When teacher is done with its video-streaming, students will be needed to perform the actual practical of what they have learnt from the session. The Server/teacher can monitor over the students practical or other activities by simply through an activity log. Activity log will store the information of

currently active students over the network. Information like students log-in id will be displayed over the activity log. Using the information present over activity log teacher can check or monitor over the students current computer screen. While using different reference source like reference paper (published) website, and books we research over the topic of smart education system over particular environment. The research tells about the different ways used in educational field in order to smartly manage the student's education.

Each research topic contributes the valuable information related to the smart education field. The research specifies that only making or planning the education way is not enough. The audience targeted by the project should also know how to use the project according in order to obtain maximum advantage. After the completion of the software, management of the software are also important.
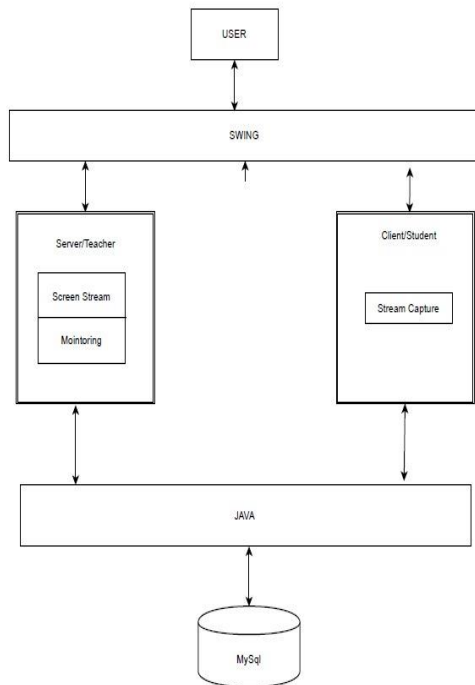

Figure 1 ARCHITECTURE DIAGRAM

Functionality:
1. Registration and Login.
2. Real time Screen casting within a client server based network
3. New and Inspiring way of education
4. Java and swing libraries will be used in order to implement the project.

5. Students/Clients attendance for the practical session can also be obtained.

2. LITERATURE SURVEY:

Various authors have proposed and discussed much advancement in educational field using technology that has helped in improving educational field.

1) Publication : An Interactive Video-Based Learning Environments Supporting Learning Analytics, Author::1st Kleftodimos Alexandros, 2nd Georgios Evangelidis
Date:: September 2015, Conference Paper

Findings: This paper describes in brief how open source tools can be used for developing learning environments where video content is aggregated with interactive elements, educator content and content coming from open internet resources.

2) Publication: Review of the Techniques for Smart Learning Systems, Author: Jaegeol Yim, Sangheon Kim
Findings: This paper surveys smart learning systems in order to identify the techniques needed in implementation of smart learning systems. Database management, video streaming, web programming, and so on are essential techniques for smart learning system implementation. There are many database management systems (DBMS) we can use to develop database systems. This paper reviews techniques to use MySQL DBMS. This paper also proposes a design of a smart learning system.

3) Publication: A Study on Globally-Connected Learning Based on Smart Education Focused on American and Korean Elementary School Students
Author: Ikseon Choi, Youngkwon Bae, Meeyong Kim, Emily Hodge, Brian Way.

Findings: The purpose of the Globally-Connected STEM Classroom project is to create an online environment where students from across the globe can collaborate to learn more about themselves and each other. With this project thesis, we are trying to develop, validate and propagate a theoretical model of STEM-integrated learning environment, the globally connected.

4) Publication: Impact of Smart Classroom Learning Environment on the Performance of first grade students in English,
Author (tester): Dr.Nasreen Bano

Findings: This paper investigates the effect of smart classroom learning on the performance of first grade students in Mathematics. The present study is an experimental one and is conducted in Srinagar district of Kashmir. The investigator took 30 students of first standard from Govt. High School, Bakshipora. An experiment was conducted on them on the basis of pre-test and post-test.
Collection of data was done based on the performance test, standardised by the investigator and t-test was used to analyze the data collected.

5) Publication: Porterville college-Smart lab project

Findings: This project was developed in order to provide educational resources to the enrol students of TULARE country. Developed in 1994 provide 4 yrs. course span.

6) Publication: International Conference on Technologies The Science, Mathematics and Resources Technology (S.M.A.R.T.)

Findings: Smart Lab (Ryerson University) = Science of Music, Auditory Research and technology
URL=http://smartlaboratory.org/about- us/partners/.

7) Publication: A research framework of smart education - Smart Learning Environments Authors: Zhi-Ting Zhu, Ming-Hua Yu, Peter Riezebos Publisher: Springer Open url:https://slejournal.springeropen.com/ Date: 31 march 2016

Findings: This conceptual paper discusses how we can consider a particular city as a smart one, drawing on recent practices to make cities smart. By exploring the current definition of smart city and various concepts similar to smart city, a set of common multi-dimensional components having the smart city concepts and core factors for a successful smart city initiative is identified. With this paper we have offered the strategic principles disposing the three main dimensions (technology people and institutions) of smart city: integration of infrastructures and technology- mediated services, social learning for strengthening human infrastructure.

8) Publication: Internet of Things for Smart Classrooms, Authors: prof. RohiniTemkar, Mohanish Gupta, SidheshKalgaokar Publisher: International Research Journal of Engineering and Technology (IRJET) URL: www.irjet.net Volume: 30 issue: 07/July/2016

Findings: In this paper, they have labeled the possibility of using IoT to build a smart classroom, i.e. a classroom that enables real-time, automatic feedback on the quality of a lecture and the level of satisfaction of the auditorium with the lecture and the lecturer. Such continuous and real time feedback will allow the professor to monitor the lecture while the presentation is being given so that maximum impact is achieved and alongwith to moderate the future lectures based on the "lessons learned" from the past cases.

9) Publication: Columbia University's Informatics for Diabetes Education and Telemedicine (IDEATel), Project: Technical Implementation
Authors: Justin Starred, MD, PhD George Hripcsak, MD Soumitra Sengupta, PhD C. R. Abbrusca,Pages 25–36, Published: 01 January 2002

Findings: The Centres for Medicare and Medicaid Services (CMS; previously the Health Care Financing Administration), the federal agency responsible for administering the Medicare program, does not currently reimburse health care providers for health care services delivered electronically to patients, except under a small number of limited demonstration projects. Reimbursement requires face-to-face interaction between provider and patient. In rural areas, access to face-to-face care may be impeded by geographic distance, weather, and provider shortages.

RESEARCH TABLE:

S no.	Name of Paper	Published Date	Author Name
1	An interactive video based learning environment supporting learning analytics.	September 2015	Kleftodimos Alexandros Georgios Evangelidis
2	Review of the Techniques for Smart Learning	August 2014	Jaegeol Yim Sangheon Kim

	Systems			
3	A Study on Globally-Connected Learning Based on Smart Education: Focused on American and Korean Elementary School Students	March 2015	Ikseon Choi Youngkwon Bae Meeyong Kim Emily Hodge	
4	IMPACT OF SMART CLASSROOM LEARNING ENVIRONMENT ON THE PERFORMANCE OF FIRST GRADE STUDENTS IN ENGLISH.	April 2014	Dr. Nasreen Bano	
5	Smart lab project = a project developed in order to provide eductaional resources	March 2013	Porterville College Students	
6	Science of Music, Auditory Research and technology	August 2012	Smart Lab(Ryerson University)	
7	A research framework of smart education - Smart Learning Environments	March 2016	Zhi-Ting Zhu Ming-Hua Yu Peter Riezebos	
8	Internet of Things for Smart Classrooms	7 july 2016	Prof. Rohini Temkar Mohanish Gupta Sidhesh Kalgaokar	
9	Columbia University's Informatics for Diabetes	01 January 2002	Justin Starren MD, PhD George Hripcsak	

	Education and Telemedicine (IDEATel)		MD Soumitra Sengupta PhD C. R. Abbruscato

CONCLUSION:

A new model for educational system is proposed. Within this system the student will learn from teacher as he/she is the single person in the class. The students will benefit from the fact that they can see the direct streaming of teacher's screen. This system is beneficial for teacher as well as he/she can keep a check on all the students. Education field today needs to be changed drastically and project could be used for it. In our project the teachers and students both are benefited. Moreover, it is made sure that our target audience properly understands what they are being taught i.e. students. Also the chatting system is provided with students and teacher can interact over the network. Thus smart education field is drastically developed and improved by our project.

REFERENCES

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[5] Zhi-Ting Zhu, Ming-Hua Yu And Peter Riezebos, "A research framework of smart education - Smart Learning Environments", 31 march 2016.

[6] Prof. Rohini temkar, Mohanish Gupta, Sidhesh Kalgaokar in International Research Journal of Engineering and Technology (IRJET), "Internet of Things for Smart Classrooms", 07/July/2016.