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AN APPROCH TO IMPLEMENT E-LEARNING LEARN, IMPLEMENT AND EXPERIENCE.

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***Abstract*— This paper refers to an approach which gives an implementation of E-learning modes. In today's world everyone uses internet. In this internet world everything is online, so the need of E-Learning came to an existence. It consists of online compiler, e-library and augmented reality. The online compiler aims to reduce the complexity in writing and compiling and debugging program online. E-library is relatively new, evolving increasingly with the phenomenal success of the internet. This has opened up the idea that digital collection can be made available to a wide variety of users, over an internet. It consist collection of engineering books which will be easily made available to user. Augmented reality (AR) is an emerging computer technology where the perception of the user is enhanced by the seamless blending between a realistic environment and computer-generated virtual objects coexisting in the same space. The resulting mixture supplements reality, rather than replacing it. The Augmented Reality becomes widely used in Engineering.**

***Keywords*—online compiler; e-library; augmented reality; virtual reality;**

I. INTRODUCTION

The scope of engineering is very large, as we all know there is no end of logics and ideas in engineering. Engineering is all about creating and implementing new and innovative ideas. Engineering in different fields refers to different scope and aspects of subjects. To understand engineering one need to have some of basic resources to understand the subjects in their field. E-Learning provides all necessary sources required to understand Engineering subjects. E-Learning consists of online compilers which help to understand and implement programming codes. Online compiler consists of different programming languages like java, c#, python, node.js. These are the languages which are popular and students are eager to learn this languages but problem they face is availability of software compatible to run those languages. E-Learning provides an easy way to run programs without any software. This is an application where the student can also learn the languages by referring the tutorial provided on web site. E-Learning also provides e-library, which contains collection of engineering books. This is a digital library in which book are provided in PDF book format. This will help students for deep studies related to engineering subjects. Student can refer it from anywhere and at any time. There is no need to issue books or return it which is done in regular formal libraries. These problem faced by students can be solved. E-Learning next model is Augmented Reality Learning in this model we are going to use Augmented Reality and Virtual reality.

Augmented reality (AR) is an emerging computer technology where the perception of the user is enhanced by the seamless blending between a realistic environment and computer-generated virtual objects coexisting in the same space. The resulting mixture supplements reality, rather than replacing it. The evolution of modern microprocessors and computer memories during the past decade has made the acquisition, recording and manipulation of virtual 3D data technically affordable, even with standard personal computers and handheld devices.

II. PROBLEM DEFINITION

Compiler is used to run program and convert them into text format to executable format. A compiler that is to be installed manually on every system physically requires a lot of space and also configuring of it if not install using default parameter. Also once a program is compiled it becomes platform dependent. It is also not easy to carry the same program code to multiple systems if situation does not permit the usage of a single system. Another drawback is that we would need to install a different compiler on each language on which we wish to work.

Compiling different languages on system is quite difficult since it requires large space and configuration of software. Also the complier is not portable for each devices .So that it is difficult to use compiler in any devices .Most of the time for using the online compiler, Students needs to install some software in their smart phones. Hence the project online compiler is proposed so that user can access proposed programming language compilers anywhere using internet. This also reduces space and time of installation.

E-Library is digital library which contains engineering books required for all branches. This has made us understand that our view of what is valuable and what is not transitory. This is why libraries would like to preserve everything. Most of the students have no idea about the standard books which is required for study and how to download those books from internet. To reduce all these problems proposed project contain e-library where collection of engineering books are introduced.

Engineering graphics is the one of the huge concept of imagining object. Some students find it difficult due to lack of imagination. The proposed project contains Augmented Reality which creates the objects of different engineering objects.

III. Online Compiler

In this online compiler application, so many works are performing like login, creating Program, saving, reset, updating error checking and executing. Here, in this project first we are doing login with user id and password. If suppose that we are giving wrong id or pass then it will flash the message that user id and password is wrong. When user id and password is correct then it will go to next page. After that we will create program by choosing programming language like java, c#, node.js, python [1] and we will save that program .Then we will compile the program if any error will occur then it will give the message and we can update that program and after compiling it will automatic generate class file on server .And last step is execution after doing compiling we can execute that file and it will show the output on user Android mobile. For doing this all process internet connection is necessary [2]. Without using server model we can't access this application. In this project we are using server model. It means without installing the java software in user device we can compile and execute the code in Android mobile. Here that all process is as follows:

- Create program
- Compile the program
- Execute the program

The client machine does not having java development kit or any other software. Online compiler helps to reduce the problems of portability and storage space by making use of concept of server model. The ability to use different compilers allows the programmer to pick up the faster or the most convenient tool to compile the code and remove the errors. Moreover, a web-based application can be used remotely through any network connection and it is platform independent. The error/output of the code is store in most convenient way. Also, the trouble of installing the compiler on each computer is avoided [3].

IV. E-library

E-library is a special library with a focused collection of Engineering books that can include books which is required for all engineering departments stored as electronic media formats (as opposed to print, microform, or other media), along with means for organizing, storing, and retrieving the files and media contained in the library collection. E-library is the Digital libraries can vary immensely in size and scope, and can be maintained by individuals, organizations, or affiliated with established physical library buildings or institutions, or with academic institutions .The digital content may be stored locally, or accessed remotely via computer networks. An electronic library is a type of information retrieval system [4]. An important advantage to digital conversion is increased accessibility to users. They also increase availability to individuals who may not be traditional patrons of a library, due to geographic location or organizational affiliation. The user of a digital library need not to go to the library physically; people from all over the world can gain

access to the same information, as long as an Internet connection is available.

E-library module is specially designed for engineering students, so that they can easily access their subject books. E-library is designed in a way that one can access the book according to their semester and branch. Books are in PDF format so they are easily downloadable [5].

V. AUGMENTED REALITY

Augmented reality (AR) is an emerging computer technology where the perception of the user is enhanced by the seamless blending between a realistic environment and computer generated virtual objects coexisting in the same space [6]. The resulting mixture supplements reality, rather than replacing it. The evolution of modern microprocessors and computer memories during the past decade has made the acquisition, recording and manipulation of virtual 3D data technically affordable, even with standard personal computers and handheld devices. Augmented reality technology has been proven to have great potential in many different areas, such as education, entertainment, medicine, engineering or the arts [7].

A more comprehensive definition of AR would be as a system that has the following characteristics: (1) combines real and virtual world, (2) interactive in real time and (3) registered in 3D [8]. Augmented Reality enhances a user's perception of and interaction with the real world. The virtual objects display information that the users cannot directly detect with their own senses. The information conveyed by the virtual objects helps a user perform real-world tasks.

The AR-based Engineering System utilizes standard reading books as the main working environment. The students can do their tasks normally with their textbooks. Only with an aid of a camera, connected to a computer screen, will the 3D model appear on the page. This is done when the camera points at the marker and it is read and then displays the corresponding 3D model as though it is on the page. The student then is able to move, tilt, zoom, and conduct other manipulations on the model for a more immersive and enriching educative experience [9].

Application of augmented reality for 3d model presentation can be used in all field of engineering where we use virtual three dimensional models in process of projecting. However, the most commonly AR is used in area of mechanical engineering, civil engineering, architecture and for purpose of education in engineering. An example of the scenario is displayed below in *Fig.1*.

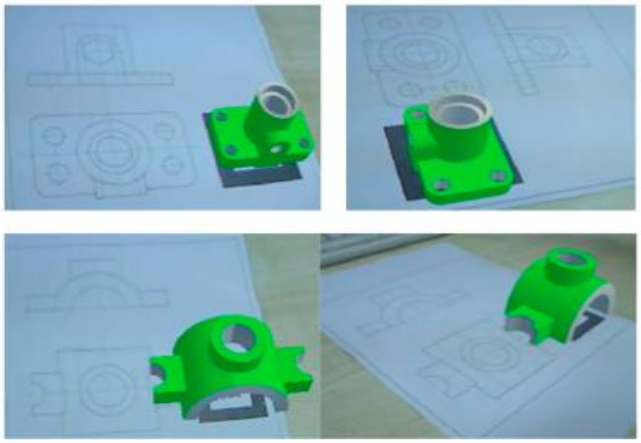

Fig.1. Augmented Reality Based Engineering System in function.

This form of education where the information is relayed in a virtual aspect is beneficial to students that struggle with learning from the more traditional methods and have difficulties in visualizing complex structures. With the use of such a technology, it allows them to interact more freely with the material and gain a deeper understanding. Not only is this Advantageous for the student, but it is the same for the lecturer.

A. PROPOSED SYSTEM ARCHITECTURE

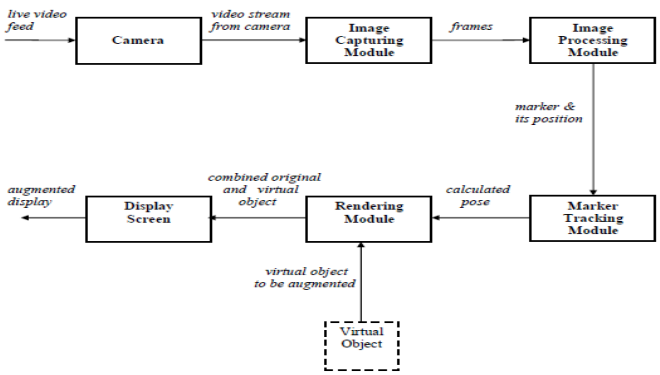

Fig.2. Architectural block diagram.

The proposed system architecture is as shown in figure contains following modules:

1. Camera
2. Image Capturing Module
3. Image Processing Module
4. Rendering Module
5. Display Screen

1) Camera: A real-world live video is feed as an input from the Android cell phone camera to the Camera module. Displaying this live feed from the Android cell phone camera is the reality in augmented reality. This live video stream is given as an input to the Image Capturing Module.

2) Image Capturing Module: The input to Image Capturing Module is the live video feed from the camera of a mobile device. This module analyses the camera feed, by analysing each frame in the video. This module generates binary images i.e. a digital image that has only two possible values for each pixel. Typically the two colour used for a binary image are black and white. These binary images are provided as an input to Image Processing Module.

3) Image Processing Module: Inputs to Image Processing Module are the binary images from Image Capturing Module. These binary images are processed using an image processing technique to detect the AR Marker. Detection of AR Marker is essential to determine the position, where to place the virtual object. Once the AR Marker is detected, its location is provided as an input to the Tracking Module.

4) Marker Tracking Module: The tracking module is "the heart" of the augmented reality system; it calculates the relative pose of the camera in real time. The term pose means the six degrees of freedom (DOF) position, i.e. the 3D location and 3D orientation of an object. The calculated pose is provided as an input to Rendering Module.

5) Rendering Module: There are two inputs to Rendering Module. First is the calculate pose from the Tracking Module and other is the Virtual Object to be augmented. The Rendering Module combines the original image and the virtual components using the calculated pose and renders the augmented image on the display screen of the mobile device.

VI. SOFTWARE AND HARDWARE REQUIREMENT

A. SOFTWARE REQUIREMENT

- Apache Tomcat 9.
- MySQL server 5.0.
- Eclipse neon ADT or android studio.
- Eclipse neon or Net beans (java 1.8)
- Web browser.
- Android Operating System above 4.1.1
- Java 1.6 and above.
- Unity 3D with vuforiya.

B. HARDWARE REQUIREMENT

- 3 GB RAM.
- CPU P-4, 1GB RAM, WIFI.
- Connecting devices
- Android Device with at least 1 GB RAM and 100 MB of free space.

VII. CONCLUSION

As compared to the current scenario where each machine need to install compiler separately. This would eliminate the need to install the compiler separately. So, we can check the code at the centralized server. Another advantage of this project is that whenever the compiler package is upgraded it can be done easily without again installing it on each and every machine.

Use of E-library helps students to study by accessing digital books. This will lead to less cost and less infrastructural management with many other benefits.

With the rapid development of hardware and software use of augmented reality in engineering is becoming more and more adopted. AR applications, offers numerous opportunities for integrating and improving conventional methods used in the fields of mechanical engineering, civil engineering, architecture and for purpose of education in engineering. Augmented reality is definitely the future of visualization in engineering. The further development and improvement of the technology

will surely contribute to the better quality and functionality of AR application.

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