Implementation Of E-Learning System on Full-Stack concept

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Abstract
E-Learning system is a popular method proposed for effective learning from virtually anywhere. The proposed technique is for creating an E-learning system with the implementation of Full-Stack Concept. It offers the ability to share material in all kinds of formats such as videos, slideshows, word documents and PDFs. It will allow the teachers to conduct webinars (live online classes) and communication/discussion between students and teachers via thread forums. The system will focus on providing open free courses to everyone interested in participating in the learning process via registration to the system and subscribing to the specific courses. The purpose is to eventually build a digital library for each subject and create frequently Asked Questions (FAQ) for the section. It will focus on allowing users to view, share, upload, register, login, logout, add to favorite, browse history, subscribe to courses, view the contents, comments and view them, create discussion threads. The main focus will be to design the system using full-stack concept which allows only one language to be used primarily for the implantation of the system.

Keywords: *Profile Generation, Upload of Data, Keywords Searching algorithm, content management system, Learning management system, gamification.*

INTRODUCTION

With the improvement in the technology and E-Learning methods have played an vital role changing the atmosphere over the learning paradigms. MOOC is the new trend in the internet and has rapidly gained much popularity. MOOC are Massive Open Online Courses, that are available online, anytime, anywhere and anybody can be benefited from it. These courses are massive in size may be 4 to 12 weeks long. Students have to register themselves online to avail these courses and weekly they need to spend 6 to 8 hours. These courses mostly aim to promote higher education, employee development and executive education. These courses are conceptualized and designed by various well known universities and MOOC platform vendors across the globe. Major players are Nptel, Coursera, edx, Khan Academy, Udacity,[1-5]. Reputed universities from all over the world offer these MOOCs.

LITERATURE SURVEY

1) *[6] Title : eLearn central- the journey to e-learning*
   Author : Lubica Stuchlikova, Jana Benkovska
   Description: They have build up a brand new portal based on the newest Moodle version available then. They have prepared new courses for their portal following the latest e-learning know-how and standards and have updated the previous courses from their previous portal "eLearn central" (http://ec.elf.stuba.sk),transfer them to new portal "eLearn central" (http://kme.elf.stuba.sklmoodle) where they will undergo the review process by specialists in given fields to be published. *A 3-level Model for implementing MOOC in India*
2) *[7] Title : A 3-level Model for implementing MOOC in India*
   Authors : Aman Sharma & Rinkle Rani

Description: This paper has proposed a vision for implementing MOOCs in Indian education system using BLMM as a base for the improvement. It first describes the general scenario of MOOCs in India and later will proposed three level implementation models for Indian education system. Their proposed Model has a vision to affect the Indian education system in a way that along with quality learning experience, individual could pursue their interest.

3) [8] Title : Design an Active E-Iearning System Authors : Chun-Xia Qi, Hui-Bao Cui, Chang-Vi Li Vue-Xing Sun
Description: The objective of this paper is to design a kind of active e - learning system with the design basis including students' requirements, related experiences and system design engineering are analyzed firstly. And then they proposed the workflow of the system and designed the function modules of the active e-Learning system.

4) [9] Title : Knowledge System Modeling in MOOC
Author: Lingling Wu & Li Zheng
Description: In this article, through analysis to the course construction of MOOC, the curriculum knowledge system modeling method and steps are put forward. And a specific course in MOOC, taken for example, has been presented as the implementation of the curriculum and knowledge System Model.

5) [10] Title: Social Software Enhanced E-learning System to Support Knowledge Sharing among Students.
Author: Yossawadee Kaeomanee; Dhanapal Durai Dominic P, Riaza Perveen Binti Mohd Rias
Description: The growing popularity of social software e.g. Facebook, Weblog, Wikis, YouTube, social bookmarking sites among generation of students tends to be an undeniable fact. Sharing information and knowledge on social software is now surpassing the traditional channel such as e-mail and e-Learning. While many studies have been done to support the use of these tools for educational and knowledge sharing purposes, the related study in both areas within Malaysian Higher Education Institutions is still rare. This paper argues that social software could be integrated into the current e-Learning system of the institutions; thus bringing about the sharing of information and knowledge among the students. It furthermore highlights a part of the findings from the survey pilot study on the use of e-learning and social software among students in the respective context.

PLATFORM & LANGUAGE
The main focus within this project is to avail the implementation of full stack concept and design & develop an E-learn system. Full-stack really is referring to the 'stack' everything from low-level programming, system- administration, and much more, to that higher level, front-end, web-development, stuff. This system is being developed primarily in one language allowing the creation of good, healthy, isolated development environments in either Docker or virtual machines like Vagrant. It should allow intimate familiarity to the developer with version control systems in order to be able to reliably produce backups and shareable collaborative collection of code tracked for changes across time.

PLATFORM
The first step was to choose a good reliable language and a platform for the implementation of the proposed system. I selected DJANGO platform. [15] Developers have built Django Web framework in high-level Python language that allows rapid development and pragmatic design implementation in the

web designing. Django is built with the foucs of allowing ease in the development process without creating inflictions of Web development, so one can focus on writing apps without needing to reinvent the wheel. It's 100% free and open source to all the developers and for extending the Django framework as well as the private web development. This has been designed in a way to help the developers make an application as fast as possible. From idea to production and release, Django helps in making it both cost effective and efficient. Thus it is an ideal solution for developers having a primary focus on deadlines. It works in a way that includes dozens of extras to help with user authentication, site maps, content administration, RSS feeds and much more such things. These aspects help in carrying out the web development process completely. Security related errors and mistakes are prevented in the Django environment. Developers tend to commit mistakes like cross-site request forgery , SQL injection, cross-site scripting and clickjacking. To meet the heaviest traffic demand, the benefits of Django framework can be seen. Therefore, the busiest sites use this medium to quickly meet the traffic demands. Content management, scientific computing platforms, and even big organizations, all these aspects are very efficiently managed by the use of Django. More detailed data is available at https://www.djangoproject.com/

PROGRAMMING LANGUAGE [12]
I have opted for the python programming language which works perfectly in the collaboration in the Django framework. Python is the one of the top notch programming languages due to its ease of learning, design and flexibility, making it one of the most amazing programming languages. Python is a favourite among many developers for its strong emphasis on readability and efficiency, especially when compared to other languages like Java, PHP, or C++. Python's reliance on

whitespace and common expressions trims out a lot of programming fat. It allows to do more with fewer lines of code next to Java or C++. Python also serves as a stepping-stone for new developers allowing them to learn new skills. Python's object-oriented principles are compatible with other languages like Perl, JavaScript, Ruby, and C#.

IMPLEMENTATION
The implementation part is basically learnt from the content available from https://www.djangoproject.com/. It allowed me to install django and configure it with the help of python easy-install, pip easy-install and virtualenv.

DJANGO[14]
The current version of django available is 2.0 which have many features and packages for help in the implementation of the system. The django allows the reusability of the app and the packages once written. It also allows the changes needed to introduce in any app or package. These app & packages can be connected together to form another or with other project to provide a new feature with full accessibility.

DJANGO-CMS[13]
Django CMS is a modern web publishing platform built with Django. Django CMS was originally conceived by web developers frustrated with the technical and security limitations of other systems. Its lightweight core makes it easy to integrate with other software and put to use immediately, while its ease of use makes it the go-to choice for content managers, content editors and website admins. Integration of Django applications is a major feature allowing developers to write reusable applications. For compatibility of different applications while integration developers can build brand new compatible apps that take advantage of django CMS's publishing and

editing features. Django CMS is user friendly and has a very intuitive drag and drop interface. Majority of the Django framework is build in python but it allows several different programming languages on its platform.

FIRST STEP

This includes the creation of the models which are the backbone of the system allowing several features in the system. I created home page, courses and system registration and log -in & log out modules. The GUI included the interactive features like a bulletin board approach and the user profile accessibilities.

MODELS [14]

A model is the single, definitive source of information about system data. It contains the essential fields and behaviors of the data I am storing. Generally, each model maps to a single database table.

The basics:
1. Each model is a Python class that subclasses django.db.models.Model.
2. Each attribute of the model represents a database field.
3. With all of this, Django gives you an automatically-generated database-access API.

Once defined the models, there is a need to Django to use those models. It can be done editing settings file and changing INSTALLED_APPS setting to add the name of module that contains models.py

DATABASE [15]

Django provides an inbuilt database powered by SQlite. SQLite is a relational database management system contained in a C programming library. In contrast to many other database management systems, SQLite is not a client–server database engine. Rather, it is embedded into the end program. Django provides the availability of connecting the system to a different database of the developer choice like mysql or mongoDB. I have decided to make changes in the database after the launch of the system.

URL DISPATCHER [16]

A clean, elegant URL scheme is an important detail in a high-quality Web application. Django allows to design URLs as one wishes, with no framework limitations. There's no .php or .cgi required, and certainly none of that 0,2097,1-1-1928,00 nonsense. To design URLs for an app, I have created a Python module informally called a URLconf (URL configuration). This module is based purely on Python code. It maps URL path expressions to Python functions (views). This size of the mapping depends on the developers choice. It can reference other mappings. Being pure Python code, it can be constructed dynamically. Django also provides a way to translate URLs according to the active language being applied.

TEMPLATES [17]

A template contains the static parts of the desired HTML output as well as some special syntax describing how dynamic content will be inserted. Being a web framework, in Django templates allows a convenient way to generate HTML dynamically. I have configured the system with several template engines using the Django built-in back-ends for its own template system, creatively called the Django template language (DTL), and for the popular alternative Jinja2 Templates engines are configured with the TEMPLATES setting. It's a list of configurations, one for each engine. The default value is empty. The settings.py generated by the startproject command defines a more useful value: Backend is a dotted Python path to a template engine class implementing Django's template backend API. The built-in backends are django.template.backends.django.DjangoT

emplates and django.template.backends.jinja2.Jinja2.

ISSUES & CHALLENGES [18]

1. Learning of advance python and the working pattern of django is difficult. For anyone who is not familiar with the django or python either will have difficulties in first few steps.
2. Django isn't a CMS. It can't do everything that Wordpress or Drupal can do right out of the box. That said, one can do infinitely more with Django, because it isn't a CMS. To overcome this problem CMS had to be induced in the system and then the integration part was eased off.
3. Configuration of local environment for Django is one of the biggest hurdles. There are different versions of django available which requires different specific versions of pip, virtualenv, build-essential and at some stages python as well. For many beginners, it takes longer to install the framework locally than to build their first app. Installing Django and configuring it to run on the local machine is tricky. I had read concepts like symlinks[11]. The Django install docs[11] are pretty comprehensive, besides that I took help from youtube videos as well.[20]
4. Being new to Django (or MVC frameworks in general), odds are the terms "projects" and "apps" were a little confusing.
5. With Django, a Project is just a collection of apps. Say you were building a YouTube clone; you would create a project, "MyTube", that would contain apps like "videos", "comments", "ratings", "blog", etc.
6. Apps are similar to modules in a CMS, except I build them from scratch. They're a lot smaller in scope, typically performing only one main function. For the MyTube example, I wouldn't just create one app that allowed users to upload videos, comment on them, rate them, and anything else.
7. Because Django doesn't serve media files itself, it likes to separate the media files (images, JavaScripts, stylesheets, etc.) into a directory away from the apps. This allowed me to decide how I was going to serve those static files.

DJANGO BASED SYSTEM [16]
NASA
The NASA's official website is the place to find news, pictures, and videos about their ongoing space exploration. This website has been developed in Django which can easily handle huge amounts of views and traffic.

PINTEREST
Pinterest is a social bookmarking site where users collect and share photos of their favorite events, interests and hobbies. One of the fastest growing social networks online, Pinterest is the third-largest such network behind only Facebook and Twitter. This site developed in Django allows stocking of large amount of data using the cloud services.

INSTAGRAM
Instagram is an online mobile photo sharing, video-sharing and social networking service used by more than 400 million people worldwide. Python and Django platform allows the website's users to browse, find and post pictures easily and from all kinds of mobile devices.

MOZILLA
Django is the basis of a number of Mozilla websites, in particular, their support page, add-on marketplace, and certain modules which have been created in Django.

NATIONAL GEOGRAPHIC
National Geographic is a world leader in geography, cartography and exploration, and the web site is one of the most

informative and user friendly resources of the kind. Everyday it handles a large amount of users accessing videos. Django allows the system to handle the traffic and the large amount of data processing.

APPLICATION OF E- LEARNING SYSTEM PRIMARY LEVEL
1. At primary level interactive learning can be there using SPOC (Small Private Online Courses) to students. These courses can be customized considering student's requirements and interest.
2. At this initial stage of learning, the major challenge that comes across the primary teachers is to understand child psychology .Parents can also use such kind of platform to better understand their child interests.
3. It can also provide hands on practical experience to Students. By the use of haptic technology, they get to learn with a practical approach.
4. Apart from the formal curriculum of the school Student can also opt for various courses of their interest informally.
5. Students can use virtual labs platform for having practical skills. A virtual lab platform has been provided by MHRD, India.
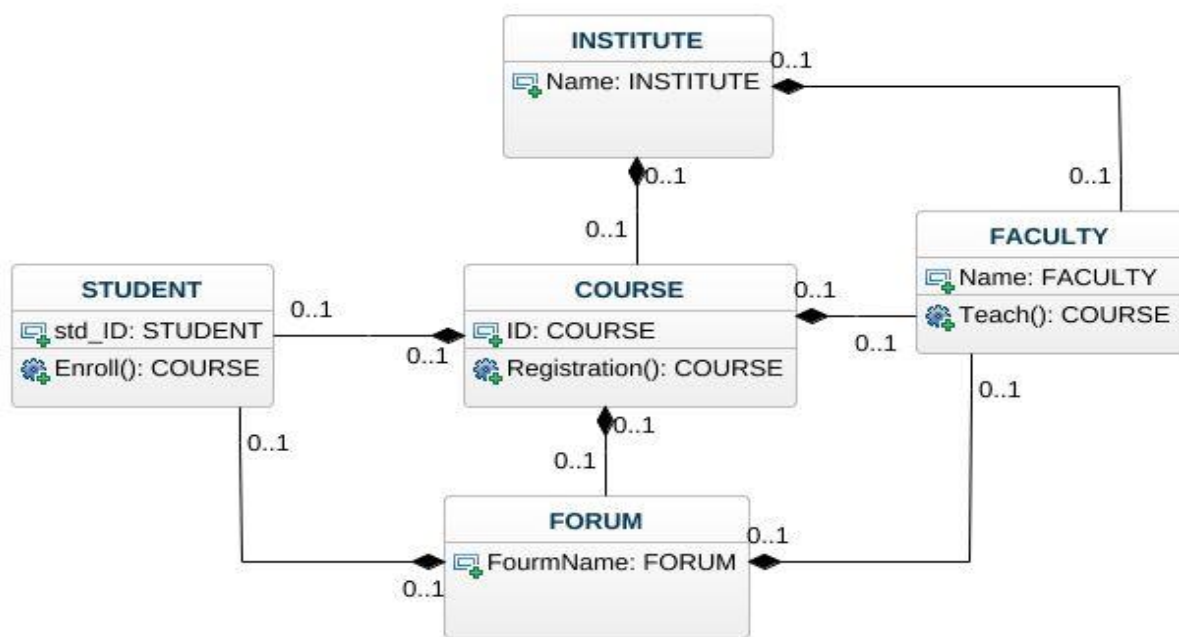

Fig 1: The Proposed Model

CONCLUSION
With the increase in the internet availability and ease of access the computer has become a common resource in human world. With this E-learning becomes increasingly viable and accessible. E-learning has made a lot of significant changes in the way we learn making it more effective and measurable. Ample number of interactive courses standardizes learning process and/or injection of informal elements to otherwise formal learning processes have introduced and a change in the students which has attracts a large number of participants every year. Several e-learning trends give us a view to how e-learning and learning tools will be shaped in the future. Implementation of this system based on Full-stack Concept is just another way of

easing the way of E-Learning implementation. Allowing only one language will also give an edge over better creativity as well as flexibility. This paper has been proposed as a vision for implementing E-Learning system developed based on the full-stack concept. It focuses on the use of only one programming language primarily.

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