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Abstract—Tutoring has been popular among urban and rural populations ever since education was formalized. Many people face several problems with the way tutoring is handled and processed today. This is because of the lack of check and balance and regulation of the tutors and students. According to the work presented below, we have created a mobile application that works on cloud technology. It allows users to sign up as either a tutor or a student. Students can use the different filters to find the right tutors and vice versa. The cloud will store all the information necessary such as user information and graphical data. The cloud is also used to perform several calculations and processing.

Index Terms—e-tutoring, Cloud Technology

I. INTRODUCTION

Online tutoring and mobile applications that provide platforms for services similar to it have become commonplace in this day and age [1]. Ever since the advent of technology, the world has moved towards the web and automated several processes. [2]

Even simple processes like transport and commuting have become automated in many developed countries which use applications and punched cards for this purpose [3]. The health sector of many countries has also automated and now runs on computerized systems [4]. Several academic processes are now online and the processes are easier than ever due to the hassle-free procedures [5][6].

Cloud computing is a process of providing a set of computing or storage resources that are shared on a network. [7][8] This revolutionary strategy allows for shared pools of resources to be available for use by different organizations or people. [9]

Cloud Computing has evolved from a risky concept to a useful strategy that organizations of all sizes are now using to adopt as a part of their business plan. [7][9]

Cloud technology does not exist in isolation to other business investments. Many organizations these days use a cloud computing platform which is integrated into their central data system. The cloud can be used as three different kinds of services. [9]

Infrastructure as a Service (IaaS) The cloud systems can provide their infrastructure service. This means that services like a server, storage or messaging queues can be used to provide scalable and automated computer resources. [8] Startups and smaller businesses tend to use IaaS in order to prevent expenditure on purchase of hardware and software. [9]

Software as a Service (SaaS) The SaaS offers up several benefits to the user by eliminating the need to install, maintain and upgrade software. The SaaS saves up time for other technical tasks. [8] Normally, SaaS is used by several startups that need to launch their ecommerce or blog websites. Other than that, software projects that need quick and easy collaboration also use the SaaS. [9]

Platform as a Service (PaaS) The PaaS is slightly analogous to SaaS. The difference is seen in the delivery process. While SaaS provides software, the PaaS provides a platform to create the software which is needed. [8] The PaaS is used by larger businesses to create and design software that are scalable and also take on some cloud features. [9]

In this paper, we will discuss the system we developed called, “Tutelage: A Complete Tutoring Solution”. This system aims to centralize all tutoring activities. It provides a platform to both students and teachers to find tutors and find students respectively. This system uses cloud technology for a majority of its workings. With this system, we aim to make it easier for tutors to find suitable students and vice versa. [10]

II. PROBLEM STATEMENT

A. Existing problem

The education sector in a country like Pakistan has not seen much development over the past few decades. While the world moves towards electronic data processing and online methods of teaching and learning, developing countries are struggling. [11]

This struggle stems from the underlying problems in the system of education. According to the Annual Status of

Education Report 2011, it was found that private tutoring has seen a rise in urban populations of the country. [12]

In figure 1, the percentage of children aged 3-16 who take up private tuitions in different regions of Pakistan are shown. [12]

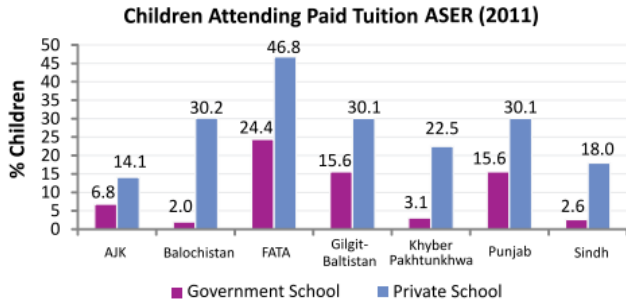


Fig. 1. Children attending paid tuition

According to ASER 2011, almost 30 percent of all school-going children aged 3-16 require and take up some form of private tutoring. Online tutoring in urban and even some rural areas of Pakistan has seen a generous rise in the past few years. Figure 2 shows the exponential increase of mobile internet users in Pakistan. Ever since the rise of mobile internet in Pakistan, services like WhatsApp, Facebook Messenger and Skype have seen a steady increase in usage from Pakistan. [13]

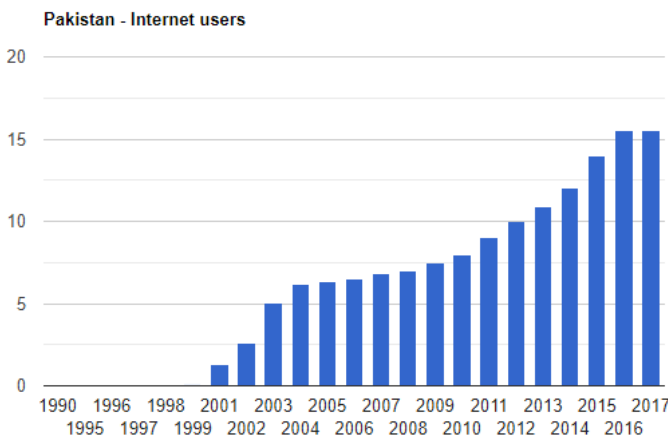


Fig. 2. Pakistan's increase of mobile internet users

The problem is not in private tutoring itself. The problem arises in the way these private tuitions work. The problem is seen in the way tutors manipulate students and vice versa. Some common problems are listed below:

- 1) Tutors sometimes do not arrive on time and yet leave before time. This leads to a problem as the allotted time set by the student is not being properly given. Yet the tutor faces no consequences.

- 2) Students are not able to find out if the tutors which they are hiring have a good reputation among other students or not.
- 3) Tutors cannot figure out the appropriate fee as sometimes the students need extra attention. If that is the case, then tutors should be able to charge extra. But since they've made the commitment already, they are not able to do that.
- 4) Students often need a tutor for a few days or just a few hours in case they have an important exam that they forgot to study for. In this case, it is difficult to find tutors for such a short time.

B. Proposed System

The proposed system which we will present in this paper is called "Tutelage: A Complete Tutoring Solution". This is an Android-based mobile application that uses GPS and internet to provide a solution to the problems stated.

Here students and tutors have to sign up using their e-mail addresses and enter some personal and academic information in order to complete the sign-up process. They can then use the several features to their benefit and avoid the complications that and inconveniences that they normally have to face.

III. LITERATURE REIVEW

It is believed that academic tutoring is a support and counselling platform which is elaborately designed for students. This platform ultimately aims to help you choose the best social and academic options. The most basic principle of academic tutoring is relationship between the student and the tutor. e-Tutoring makes sure that the tutor is a facilitator to the student to increase their interpersonal as well as scientific knowledge. [14]

e-Tutoring focuses on providing personalized instruction and education through the new and improved electronic methods. [15] The term e-tutoring has effectively broadened the workings and functions of traditional tutoring. This is done not to undermine or steer away from the original purpose, but to achieve that purpose through electronic methods. Therefore, the term itself refers to a single individual who provides their services of education or counselling through a common medium such as the internet [16]

The e-tutoring systems consist of several functions such as the initialization and calibration of academic environments and also scientific and personal development [17]

IV. METHODOLOGY

A. Application Concept

Basically, the Android application will consist of two basic modules: the tutor module and the student module. Users can sign up as either and then begin to use the other features. As a student, the user may find tutors using the several filters available. They may ask a particular tutor to be assigned to them. Students may also set up their profile to include their personal and academic information. With the application, students can effectively set dates and times for tutors.

As a tutor, the users can set up their academic profile on the start up page. They will be asked to write up a short introduction. Then, they may use the application to find students and coordinate teaching times with them. Users can also set up an online course to be bought for online classes.

The storage of all information such as login information, signup information, academic and personal data will be stored on the cloud service. The cloud will act as a server to the application as it will handle all storage transactions as well as calculations. For instance, when the map will be used to find the nearest possible tutor, the application will send the input data to an algorithm on the cloud system which will then implement the algorithm. Once this is done, the output will be displayed on the screen. Furthermore, calculation of fee and salary will also be performed at the cloud. This will optimize performance as the device will not be bothered to perform such complex calculations.

B. Student Application

The student side of the application starts up with a login page where users will be prompted to log in using their credentials. In the case that they have not signed up, they will be prompted to create an account. Once at the sign-up screen, they will be prompted for personal details such as name, National Identity Card number, phone number, address, city, province and gender. All of this information will be stored on the cloud service attached to the application.

Additionally, the student will be asked to enter their academic history of previous academic accomplishments such as grades, extracurricular activities and other awards. The student will be asked to enter the school or institution's name. Users will then be prompted to enter their photo as an optional requirement.

Next, the students will also be asked to enter whether they need a long-term tutor or a short-term tutor to help them get started. However, this can be done later as well. The users will be allowed to skip. Once at the main screen, they will be prompted to enter a search option. They can either search for tutors based on courses offered, gender, city, area, experience, ratings and type of tutor.

When the user chooses a filter to apply at the search, a list of tutors will be displayed on screen. Students can check the tutor's profile out and decide whether the tutor is reasonable or not.

Students can then choose a tutor accordingly and then set the date and time for their arrival and departure. Students can chat with the tutor to figure out whether the tutor will be available for the day or not. This chat feature will enable privacy as all the conversations will be through the application. Students can choose to go for online tutors as well who offer online courses for different areas such as fashion, makeup, cooking, interpersonal skills and many other categories.

C. Tutor Application

The tutor side of the application is similar to the student side initially. The same personal and academic fields will have to

be filled. Furthermore, the tutor will be asked to give a short introduction to themselves. The tutor will then be asked for the same kind of filters as the student. All the other procedures for the tutor will be the same.

The tutor will have two additional options. The tutor can sign up as an online tutor for a specific subject or for a particular class. This will allow the tutor to teach students via video calling or even video lectures that the student can open to watch. Students can then contact the tutor for questions about the lecture.

D. Billing

The billing algorithms runs on the cloud platform. The billing is based on several factors such as the time of arrival and departure of the tutor. It also depends on how many days the tutor taught the student and how many courses. The tutor is able to get the money in cash after showing the receipt generated by the system which will also have to be acknowledged by the student.

Billing for online courses and online lectures will depend on the course's price.

V. FURTHER ENHANCEMENTS

While the system works efficiently and solves much of the problems stated in the problem statements, the application can be made better in two ways.

- 1) The system can be enhanced to include verification systems that can tap into the database of higher education boards.
- 2) The system can include payment options other than the cash payment options like VISA, MasterCard, microfinance options like easyPaisa, JazzCash and so on.

VI. CONCLUSION

With the work presented above, we successfully explained how the tutoring processes in Pakistan can be optimized using advanced mobile technology and cloud computing. We also demonstrated how the different modules would work in the application along with several benefits that it provides the users with.

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