Android based Student Progress Analysis System using Adaptive Data Visualization

Samik Bhattacharjee
School of Electronics, Devi Ahilya University, Indore, India

Kirti Panwar
School of Electronics, Devi Ahilya University, Indore, India

ABSTRACT
In last decade Indian Education System got very advanced. Technological growth is the primary reason behind it. Although its always difficult to have the strong communication between Teachers and Parents. The proposed system is targeted to provide a very effective communication between Teachers and Parents while they are on move. This system is implemented as an application for Android Operating System. This application is very useful for Schools to provide interaction between two import stakeholders. The core idea of this project is to implement Android based System for management of academics and details of both Teacher and Students for advancement of Institution and educational system. Features implemented in our System are notices, academic details and reminders of examination, performance record, and intimation to the parents using Android applications. This system helps teacher keep record of students for their progress assessment. This system gives a prior intimation to student as soon as their attendance goes below the specified attendance threshold in the form of notice.

Keywords
Android, Adaptive Data Visualization, PTM, School, Progress Analysis

1. INTRODUCTION

Mobile devices have evolved with a very rapid rate. Before a decade mobile phones were used for making phone calls only. And now mobile has become a computer in our pocket. This small computer is efficient enough to simplify the administrative and academics responsibility of any school. We proposed an android application for same. It manages different processes of school. This is done by offering variety of modules, to facilitate school to operate and function without increasing their workload. It also helps to keep the track of the progress of the students through graphical means and as a developer help us to gain good knowledge about client-server architecture. Basically the management in this application is divided into 4 components.

Admin: It is the third party user assigned by the Head of the department or Principal of the respective school for data manipulation of other teachers and students like adding academic details of each student.

Principal: This user has the access to all the details including teachers and students. He or she has the authority to have the all the necessary information about any teacher or student.

Teachers: In this the user has the authority to access and update any details regarding students.

Parents: In this the user can enquire and compare the academic details of their children so that they can stay updated

2. OBJECTIVE

Objective of this application is to use the current technology and make communication between parents and teachers easier and simpler. It has the following objectives:-

1. To bring home and the school in close contact.
2. The main goal is to develop interactive User Interface and integrating it with web Services
3. To provide flawless connectivity using web services between client and server so that data can be easily fetched from the server.
4. Learning to create network with the help of server and maintaining it.
5. Learning about server analysis, optimization, troubleshooting, and testing,
6. To visualize the data adaptively from the server in the form of graph so that it can be more helpful for the clients.
7. Multiple users can be created for using same database

3. ARCHITECTURE

Figure 1 shows the architecture of implemented system. It consists of three modules. Principal Module, Teacher Module and Student Module. Data is stored on the server.

Principal has access to the details of teachers and students. Teachers have access to the time table and student details. Students and their parents have access to academic details, progress in study and have option to give feedback.

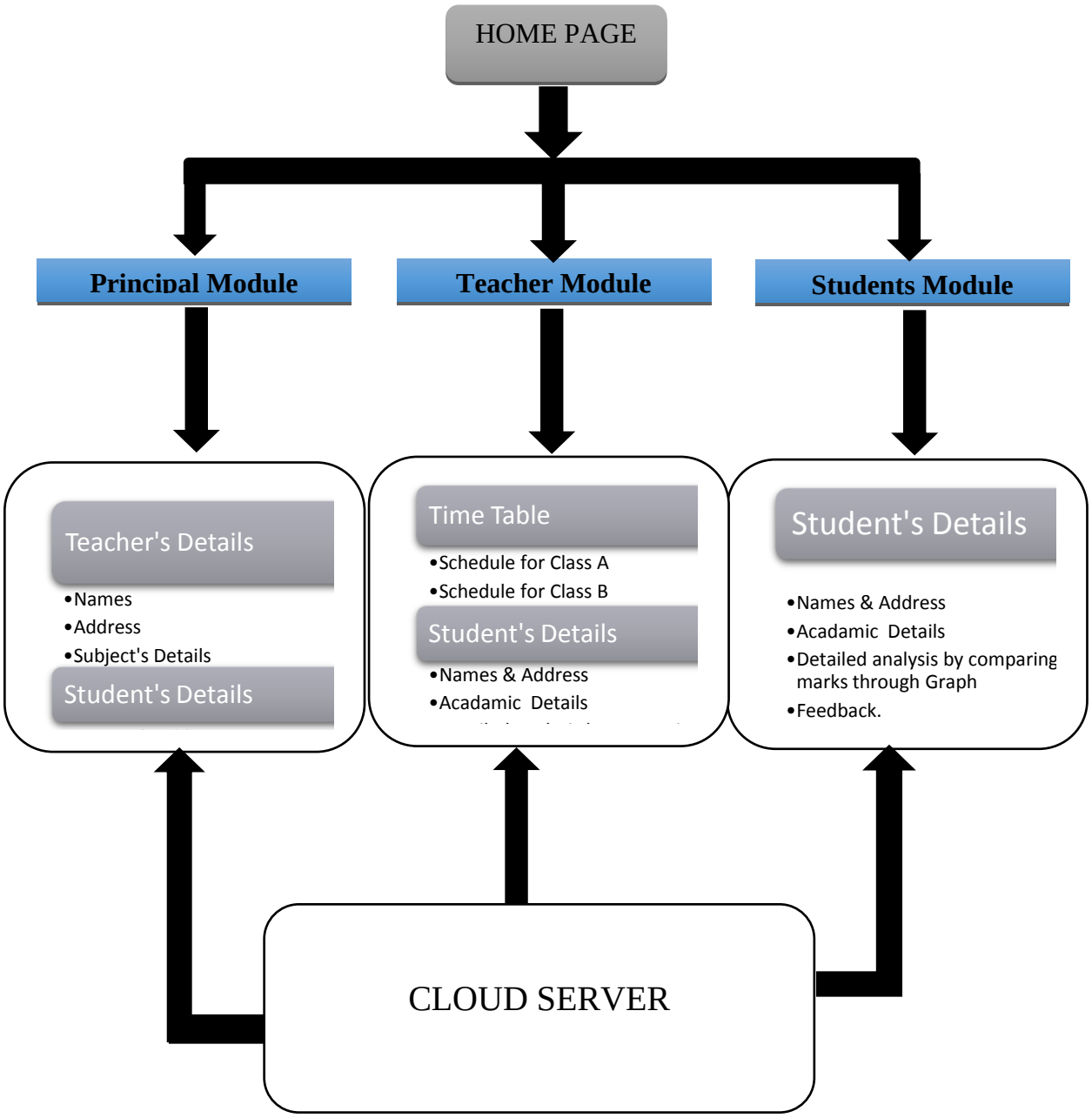

Figure 1: Architecture of proposed system

1. Client software formulate the query and also mention that which database needs to access for getting the data.
2. Then client connect to the database and give the query for fetching the required data.
3. Application server fetch the data from database and send the data to client.
4. The client processes the data received from the server and present it in a suitable format required by client.

4. LITERATURE SURVEY

Cloud storage is used because of its features like data processing, storage and distribution.[1, 2] Shutchapol Chopvitayakun et al [3] has proposed CloudExp. It is a cloud computing framework. They also compared different cloud platforms.

Mohamed Medhat Gabera, Arkady Zaslavsky et al [9] has described about the primary factors required for using data mining for adaptive transfer of data in mobile devices. Jae-wook Ahn, Peter Brusilovsky et at [10] has mentioned about the various categories for adaptive data visualization. Hannah Kim, Jaegul Choo, Chandan K. Reddy, Haesun Park I et al [11] has described about High Dimensional Data Visualization for industries.

Konstantin Ryabinin, Svetlana Chuprina et al [12] has described about the adaptive scientific data visualization techniques. Jia Chaolonga, WANG Hanningb, WEI Lilic et al [13] has described about the Visualization theory and its implementation and few interesting points about Data visualization.

5. TECHNOLOGICAL OVERVIEW

The technologies used in this application are as follows:

- Operating System: Android, Windows 8.1.
- Database: SQLite.
- Web Scripting: PHP.
- Web Service: JSON.

Android as an Operating System: Currently Android has the highest market share so it is used as a target OS for development of the system. Android uses the Linux kernel. Developed system is compatible with the various version or API level of Android OS which is supported by different hardware devices.

SQLite Database: SQLite is a database engine. It does not require any configuration means you do not need to configure it in your system. It is a server less database engine. The source code for SQLite is in the public domain.

PHP Web Designing:"PHP: Hypertext Preprocessor" is a Open Source general-purpose scripting language. It is used for web development and can be embedded into HTML

- PHP allows dynamic content on websites
- PHP was designed for web.
- PHP can be used inside an HTML document.

6. RESULT

The Application contains the following activities.

6.1Home Page

As shown in Figure 2, it contains

- Image containing application name
- Developer name

Figure 2: Home Page

6.2 Login Portal Page

Here the activity contains 3 buttons each leading to its sign in path as shown in Figure 3.

Figure 3: Login Module

The Login module shown in Figure 3 contains three login activitiesthe name of which are as follows

- Principal Login
- Teacher Login
- Parents Login

6.3 Principal Home Page

Figure 4: Principal Home

After logged in from the principal id as shown in Figure 4, principal has access over all the details regarding students and teachers which can be seen in the form of

- **Student Details**
- **Teacher Details**

Student Details contain the details of each and every students of the particular class where the details are under each of the students Roll no., Name, Class and Email address.(Figure 5)

Figure 5: Students Detail

Teacher Details consist the details about their respective ID and password (Figure 6).

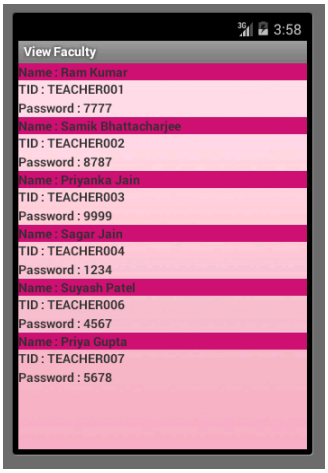

Figure 6: Teacher Details

Both the details have been accessed through the database saved on the server which has been shown in Figure 7 and Figure 8.

Figure 7: Students Database

Figure 8: Teachers Database

6.4 Teacher Home Page

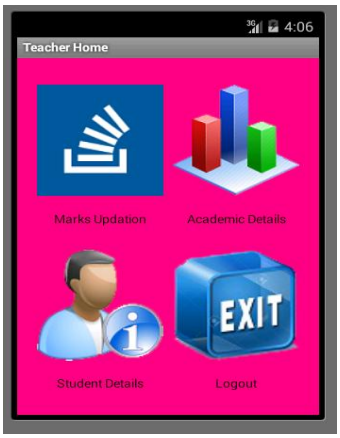

Figure 9: Teacher Home

- Teachers are provided with both the personal and academic details of each and every students which can be seen in Figure 9
- Marks Updation is provided to a particular teacher so he can update the result of each and every student of the particular exam which can be seen in Figure 10.

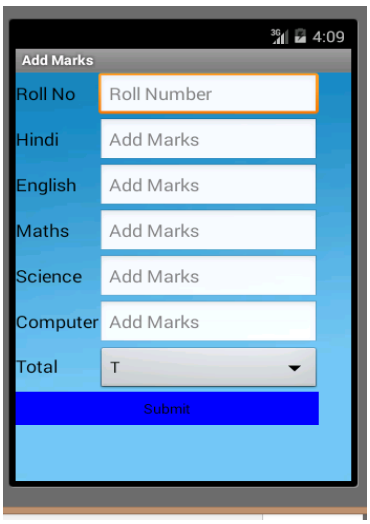

Figure 10: Marks Updation

- **Academic Details** of a particular student is on the basis of two graphs which shows the academic progression of a particular student.

- Two types of graphical view have been used to show the progress of students are
    - **Bar Chart**
    - **Pie Chart**
- In Bar Chart every subject of student is compared to the maximum marks obtained in the subject and also with the average marks of all the students in that subject which is shown in Figure 12.

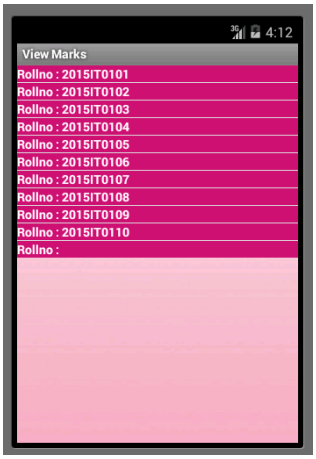

Figure 11: List of Students

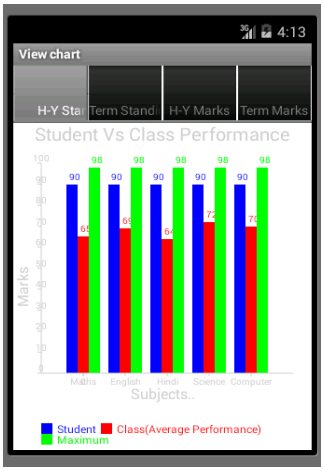

Figure 12: Bar Chart

- In Pie Chart the overall marks obtained by the particular student in every subject is mentioned in a single place has been shown in the Figure 13.

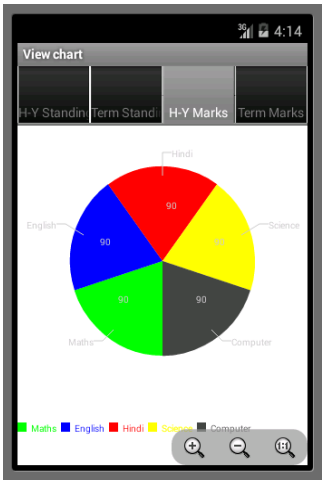

Figure 13: Pie Chart

6.5 Parents Home Page

Figure 14: Parents Home

- **Parents** have been provided with each and every little detail about their child progress as shown in Figure 14.
- And if they have any further complains and problems regarding the progress chart provided so the message option is also provided so they can directly communicate with the respective teacher.
- Progress Chart is further same as the graphical details provided to the teachers as shown in Figure 15 and 16.

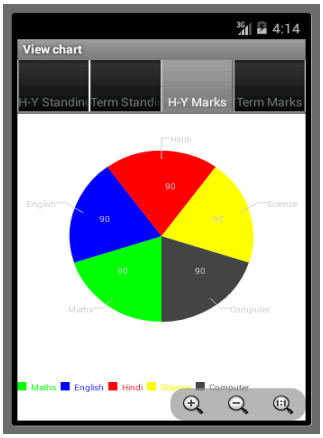

Figure 15: Pie Chart

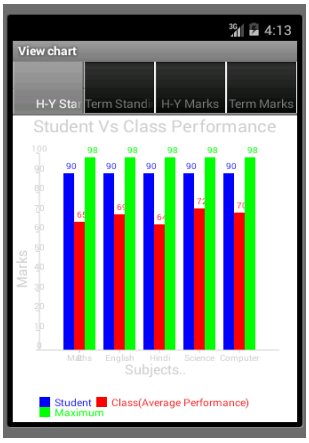

Figure 16: Bar Chart

6.6 Update and Upload Module

- In this application the teacher and the admin which is the third party both the users has been granted with the permission of uploading or updating the data whereas admin can also update the data of the teachers.
- For example if we are updating the result of any student from the application then it will be directly uploaded in the server DATABASE and vice versa with the help of running service as we can see in Figure 17.

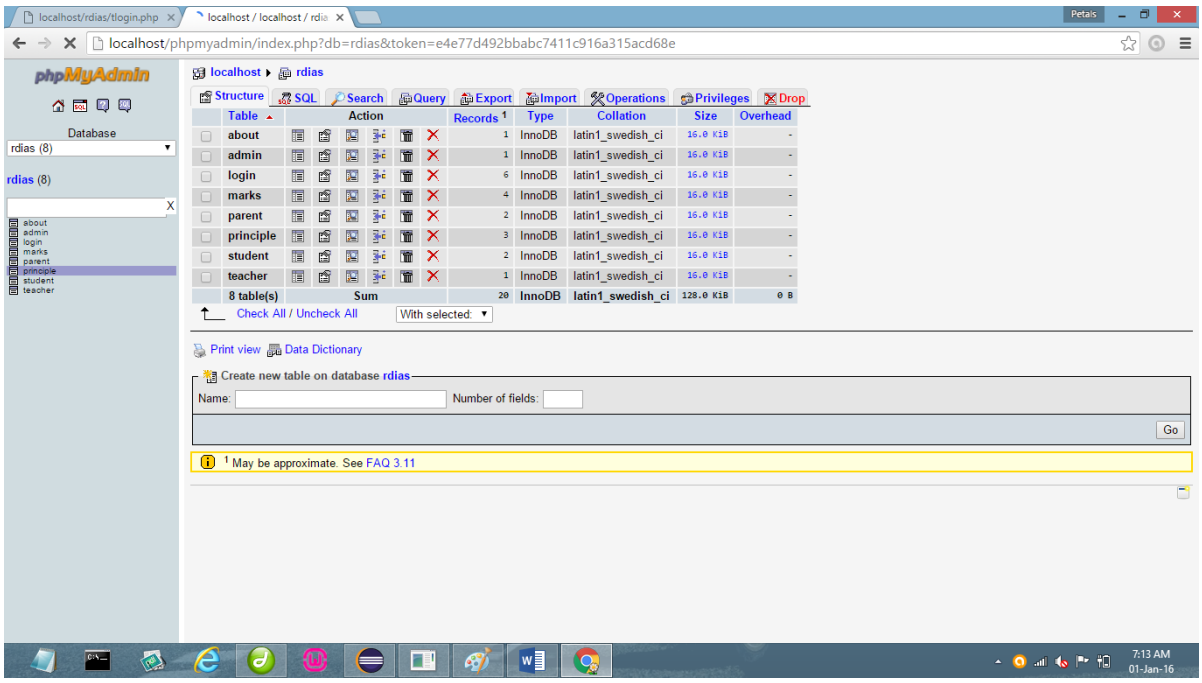

Figure 17: All Tables

8. CONCLUSION

By the help of this application parents as well as teachers can stay updated regarding children academic performance and since the application uses indirect way of communication between teachers and parents so in future when it will be online it will use less RAM and data for usage so it can be ideally suited for users. Less chances of malfunctioning. In future this system can be implemented to automate most of the educational systems and it can be designed for cross platform.

9. REFERENCES

[1] A.Srinivas, Kalyan Srinivas, A.V.R.K.Harsha Vardhan Varma. 2013. A Study On Cloud Computing Data Mining. International Journal of Innovative Research in Computer and Communication Engineering. Volume 1,Issue 5, pp 1-6

[2] David C. Chou. 2015. Cloud computing risk and audit issues. Computer Standards & Interfaces. Volume 42. pp 137-142

[3] Steve Jones.2015. Cloud computing procurement and implementation: Lessons learnt from a United Kingdom case study. International Journal of Information Management. Volume 35, Issue 6. pp 712-716

[4] Shutchapol Chopvitayakun. 2015. Android Application to Enhance Performance of Internship Program Implementing Cloud Computing Platform and Infrastructure. Procedia - Social and Behavioral Sciences. Volume 197. 2530-2538

[5] M. Amoretti, A. Grazioli, F. Zanichelli. 2015. A modeling and simulation framework for mobile cloud computing. Simulation Modelling Practice and Theory.

[6] Mazhar Ali, Samee U. Khan, Athanasios V. Vasilakos. 2015. Security in cloud computing: Opportunities and challenges. Information Sciences. Volume 305. 357-383.

[7] M. Amoretti, A. Grazioli, F. Zanichelli. 2015. A modeling and simulation framework for mobile cloud Computing. Simulation Modelling Practice and Theory

[8] Babak Akhgar, Ashkan Tafaghodi and Konstantinos Domdouzis. 2015. Chapter 15 - Cloud Computing, Sustainability, and Risk: Case Study: A Quantitative Fuzzy Optimization Model for Determining Cloud Inexperienced Risks. Appetite, In Green Information Technology, edited by Mohammad DastbazColin PattinsonBabak Akhgar, Morgan Kaufmann, Boston. 295-311

[9] Mohamed Medhat Gaber, Shonali Krishnaswamy, Brett Gillick, Hasnain AlTaiar, Nicholas Nicoloudis, Jonathan Liono, Arkady Zaslavsky. 2013. Interactive self-adaptive clutter-aware visualisation for mobile data mining, Journal of Computer and System Sciences. Volume 79, Issue 3. 369-382

[10] Jae-wook Ahn, Peter Brusilovsky. 2013. Adaptive visualization for exploratory information retrieval. Information Processing & Management. Volume 49, Issue 5. 1139-1164

[11] Hannah Kim, Jaegul Choo, Chandan K. Reddy, Haesun Park, Doubly supervised embedding based on class labels and intrinsic clusters for high-dimensional data visualization, Neurocomputing, Volume 150, Part B, 20 February 2015, Pages 570-582

[12] Konstantin Ryabinin, Svetlana Chuprina. 2015. Development of ontology-based multiplatform adaptive scientific visualization system. Journal of Computational Science. Volume 10. 370-381

[13] Jia Chaolong, Wang Hanning, Wei Lili. 2016. Research on Visualization of Multi-Dimensional Real-Time Traffic Data Stream Based on Cloud Computing. Procedia Engineering. Volume 137. 709-718

[14] Sascha Fahl, Marian Harbach, Lars Baumgärtner, Bernd Freisleben. 2012. Why Eve and Mallory Love Android: An Analysis of Android SSL (In)Security. CCS'12 ACM. 50-61

[15] Android (operating system) http://en.wikipedia.org/wiki/Android_(operating_system)

[16] Android Overview http://www.openhandsetalliance.com/android_overview.html

[17] Android http://www.android.com

[18] International Journal of Trend in Research and Development, Volume 2(5) http://www.4shared.com/office/0RX_5-iE/file.html

[19] Stack Overflow http://stackoverflow.com