

Attendance Monitoring Using a Mobile Application

COMP1696 Group Project
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1 Overview

“The conventional method of taking attendance by calling names or signing on paper is very time consuming and insecure, hence inefficient.” [Lim09]

The aim of this project is to eradicate the problem facing educational institutions by finding a solution to the current method of registering students in a lecture theatre. Since almost the start of education, attendance has been taken by using paper and pen, although recent technological researchers have made progress in accurate and efficient automated attendance systems, these systems still have teething problems.

Largely Higher Educational Institutions (HEI) administrators are alarmed about students' improper attendance pattern. Failure to attend (truancy) can influence student overall academic performance. The conventional routine of tracking and tracing attendance via the means of signing on a registration paper is a long-winded and insecure, thus incredibly inefficient. If it takes on average 30 seconds for a student to receive the register, find and sign their name and pass it on, a lecture theatre of 300 students will take 2 hours 30 minutes, which in most cases is longer than the lecture, and results in a buildup of students toward the end attempting to sign.

The project will focus on building up the manual registration system and creating a suitable user interface to be used by students and Staff of the University of Greenwich. Other significant aspects will include questioning staff and students on mobile devices and . This will enable getting a better appreciation of the current obstacles with the intent of triggering ideas on how an automated solution can be implemented in the future.

Keywords: Java, Android, Mobile, Smartphone, Wireless, Database, Client-Server, Bluetooth, Application, Attendance, Registration, Authentication, Biometrics.

2 Aim

Recording attendance in large audiences using a combination of mobile technology and biometric authentication.

3 Objectives

The objectives here are the main tasks for the project. The times are in days.

3.1 Research Report

Create a report evaluating existing research and technologies of mobile, biometric and attendance monitoring systems. Expected outcome describing this objective in more detail. This should clearly establish how this objective is SMART and therefore some indication of how the success or otherwise of delivering the objective may be measured.

- 3.1.1** Write a literature review looking at current research into biometric authentication, combining mobile devices and biometrics, and attendance monitoring. [bs199 12, eb903 7]
- 3.1.2** Analyse and evaluate existing biometric and attendance systems as an existing product review. [eb903 12, tm939 12]
- 3.1.3** Write a technology review evaluating potential technologies of biometrics and mobile devices and conclude on what technology to use. [tm939 7, yw903 12]

3.2 Design Report

Analyse the findings of 3.1 to create a set of requirements and specification, and then using these develop a set of design diagrams for use in implementing the system.

- 3.2.1** Write functional and non functional requirements based off of conclusions from 3.1. [bs199 6, eb903 6, tm939 6, yw903 6]
- 3.2.2** Create a specification to outline all features and functionality of the system. [bs199 7, eb903 7, tm939 7, yw903 7]
- 3.2.3** Create a set of UML diagrams based off of 3.2.1 and 3.2.2 to describe the system. [tm939 18, yw903 18]

- 3.2.4** Create network diagrams to depict the communications aspect of the system outlined in 3.2.1 and 3.2.2. [eb903 18]
- 3.2.5** Create entity relationship diagrams for the database using the requirements from 3.2.1. [bs199 18]

3.3 Mobile application

Create a mobile application that can be used by attendees to register themselves using biometric authentication.

- 3.3.1** Design a graphical user interface for the mobile application. [bs199 3]
- 3.3.2** Develop a biometric authentication system using the mobile devices camera functionality. [bs199 12, tm939 15]
- 3.3.3** Develop the networking aspect of the mobile application to allow an attendee to send their authenticated attendance to the server. [bs199 16, tm939 16]

3.4 Authentication server

Create a server that will allow administrators control over attendance and allow the attendees to authenticate and commit attendance.

- 3.4.1** Create a web server/web site that will let administrators control classes and registration times and enable attendees to connect and authenticate their attendance. [eb903 6, tm939 6]
- 3.4.2** Create a database to hold attendee accounts, timetabling information and attendance records. [bs199 6, yw903 6]

3.5 Evaluation

Evaluate and test the project as a whole.

- 3.5.1** Test the product that was developed against the specification and requirements outlined in 3.2.1 and 3.2.2. [bs199 7, eb903 7, tm939 7, yw903 7]
- 3.5.2** Critically review the product against the specification, requirements and conclusions in the research report. [bs199 10, eb903 10, tm939 10, yw903 10]

- 3.5.3** Critically review the processes used to complete the project. [bs199 10, eb903 10, tm939 10, yw903 10]
- 3.5.4** Evaluate the product and state what future work could be done to continue or improve what was developed. [bs199 9, eb903 9, tm939 9, yw903 9]

4 Legal, Social, Ethical and Professional

A legal issue to consider is biometric methods of authorisation. Images of people are considered sensitive personal information by the Data Protection Act, and therefore must be handled correctly in accordance with the law, by providing a way for the user to consent to storing or using their image. Fingerprints are only a problem for the data protection act if they are forensic prints; a digital scan of a users fingerprint is not considered sensitive personal information.

As the system could potentially be used by younger children, ethical problems may need to be considered. However, as the system proposed will be specific to the University of Greenwich, these issues are not present.

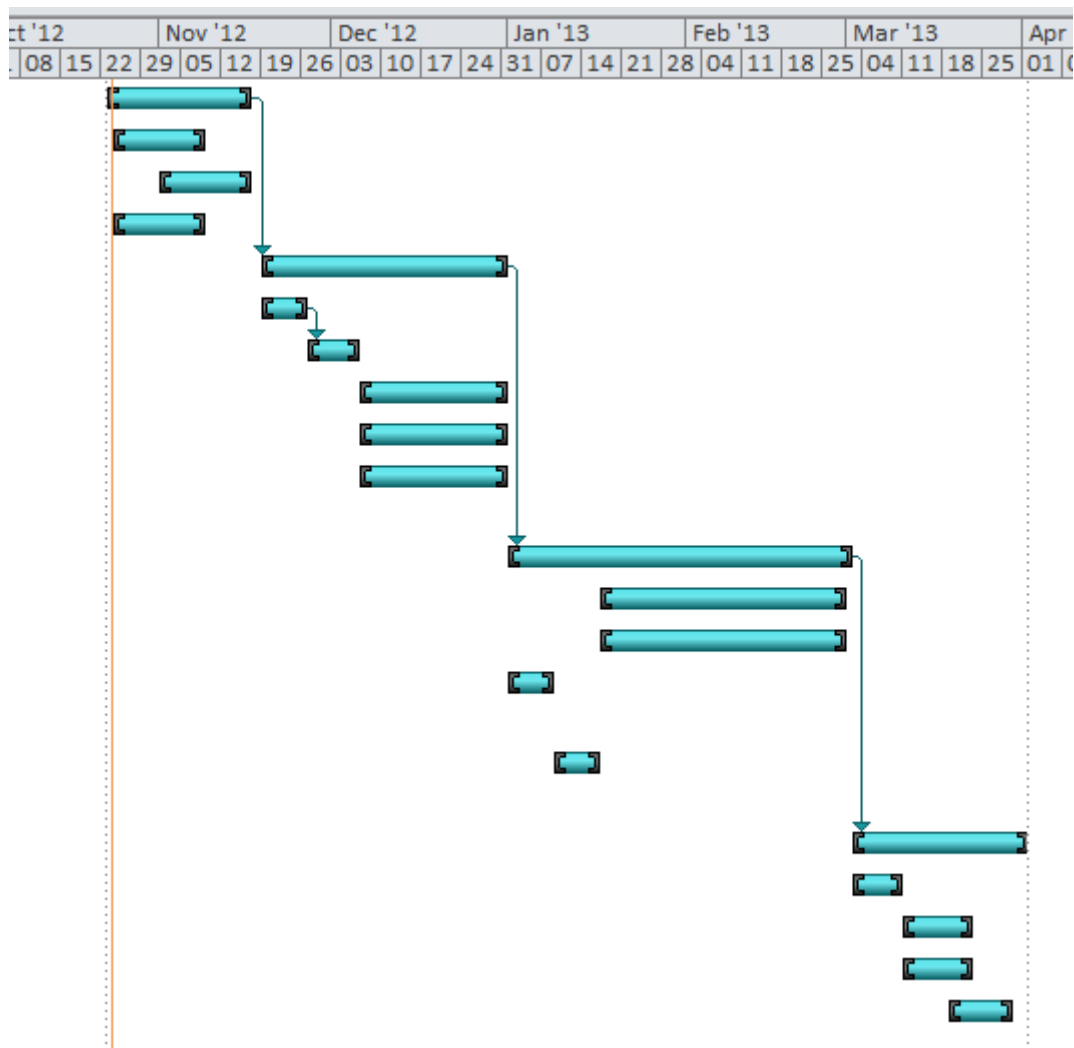
The system may be open to abuse by allowing attendees to register their attendance without actually attending. There are several ways this could be approached, for example the location of the user can be part of the authentication, the time the user has to register has to be specific and changes and is only made public during the period of registering, or the biometric authentication could be local to the area the attendee should be registering from.

5 Planning

The approach to this project is using the waterfall model, where each stage of the project is completed in succession, and past tasks may be revisited if the need arises. The implementation will be a mixture of exploratory and iterative prototypes, due to the combination of several components and subsystems, with UML diagrams to direct the development. The plan to manage the project is to meet weekly and discuss what was to be done for the following week, taking minutes for each meeting so that actions can be followed up and the plan adjusted if needed.

Task Name	Duration	Start	Finish	Predecessors
1.Research Report	19 days	Tue 23/10/12	Fri 16/11/12	
2.Literature Review	12 days	Wed 24/10/12	Thu 08/11/12	
3.Existing Product Review	12 days	Thu 01/11/12	Fri 16/11/12	
4.Technology Review	12 days	Wed 24/10/12	Thu 08/11/12	
5.Design Report	31 days	Mon 19/11/12	Mon 31/12/12	1
6.Requirements Analysis	6 days	Mon 19/11/12	Mon 26/11/12	
7.Specification	7 days	Tue 27/11/12	Wed 05/12/12	6
8.UML Diagrams	18 days	Thu 06/12/12	Mon 31/12/12	
9.Network Diagrams	18 days	Thu 06/12/12	Mon 31/12/12	
10.Entity Relationship Diagrams	18 days	Thu 06/12/12	Mon 31/12/12	
11.Implementation	44 days	Tue 01/01/13	Fri 01/03/13	5
12.Mobile Client	31 days	Thu 17/01/13	Thu 28/02/13	
13.Mobile Server	31 days	Thu 17/01/13	Thu 28/02/13	
14.Back End Student Database	6 days	Tue 01/01/13	Tue 08/01/13	
15.Authentication Web Server	6 days	Wed 09/01/13	Wed 16/01/13	
16.Evaluation	22 days	Sat 02/03/13	Mon 01/04/13	11
17.Testing	7 days	Sat 02/03/13	Sun 10/03/13	
18.Product Review	10 days	Mon 11/03/13	Fri 22/03/13	
19.Process Review	10 days	Mon 11/03/13	Fri 22/03/13	
20.Future Work	9 days	Tue 19/03/13	Fri 29/03/13	

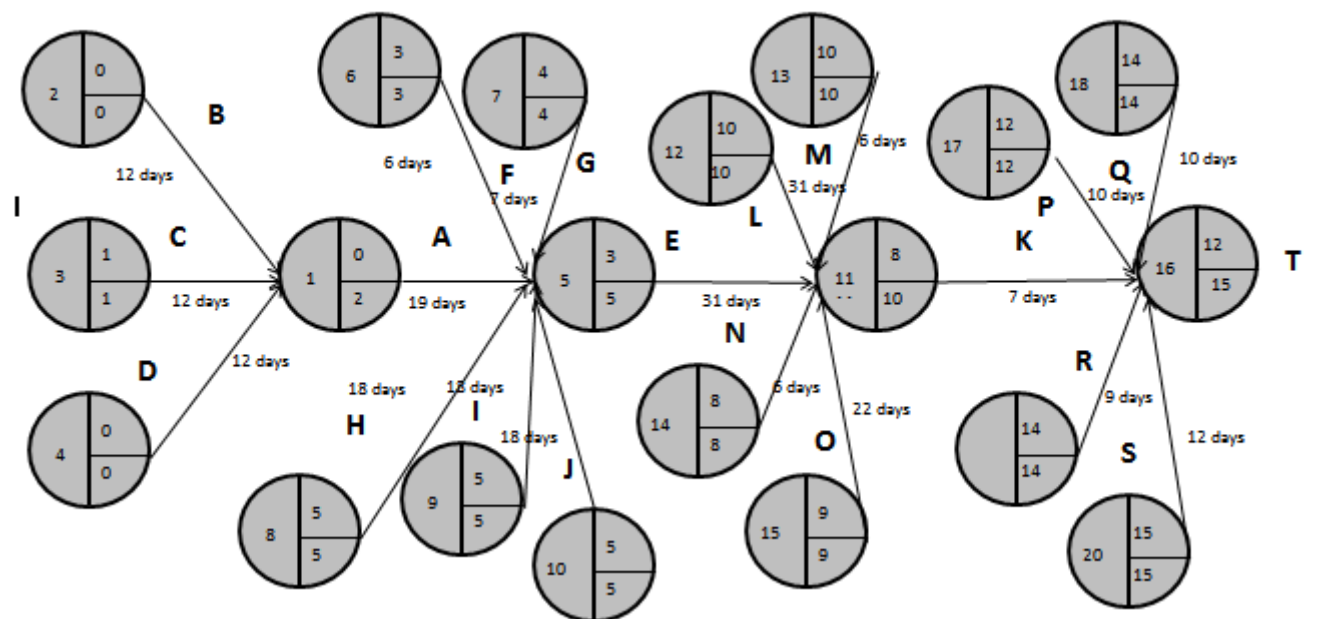
Table 1: Initial task list with estimated durations



Gantt chart of initial schedule

Task	Title	Days	EST (week)	LFT	Dependant on
1 - A	Research Report	12 days	0	2	B, C.D
2 - B	Literature Review	12 days	0	0	
3 - C	Existing Product Review	12 days	1	1	
4 - D	Technology Review	31 days	0	0	
5 - E	Design Report	6 days	3	5	A,F,G,H,I,J
6 - F	Requirements Analysis	7 days	3	3	
7 - G	Specification	18 days	4	4	
8 - H	UML Diagrams	18 days	5	5	
9 - I	Network Diagrams	18 days	5	5	
10 - J	ERD Diagrams	44 days	5	5	
11 - K	Implementation Report	31 days	8	10	E,L,M.N.O
12 - L	Mobile Client	31 days	10	10	
13 - M	Mobile Server	6 days	10	10	
14 - N	Back End Database	6 days	8	8	
15 - O	Authentication Web Server	22 days	9	9	
16 - P	Evaluation Report	7 days	12	15	K,Q,R,S,T
17 - Q	Testing	10 days	12	12	
18 - R	Product Review	10 days	14	14	
19 - S	Process Review	9 days	14	14	
20 - T	Future Work	12 days	15	15	

Critical path analysis of objectives



Critical path analysis of objectives

References

- [KM10] S. Kdry and S Mohamad. Wireless attendance management system based on iris recognition. Technical report, Faculty of Science, Lebanese University, Lebanon, 2010.
- [Lim09] T.S. Lim. Rfid based attendance system. *Industrial Electronics & Applications, 2009. ISIEA 2009. IEEE Symposium on*, 2:778–782, 2009.
- [LWW12] T. Li, H. Wu, and T. Wu. The study of biometrics technology applied in attendance management system. Technical report, Nan Jeon Institute of Technology, 2012.