

SMART PHONE BASED REMOTE MONITORING TOOL FOR E- LEARNING

Submitted in partial fulfillment of the requirements for
the award of
Bachelor of Engineering degree in Computer Science and Engineering
by

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**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
SCHOOL OF COMPUTING**

**SATHYABAMA
INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)
Accredited with Grade “A” by NAAC**

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MARCH – 2021



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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the Bonafide work of **VINITHA (Reg no 38290103) and SUMITHRA (Reg no 38290092)** who have done the project work as a team who carried out the project entitled **“Smart phone based remote monitoring tool for E-learning”** under my supervision from August 2018 to April 2021.

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Internal Guide
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Head of the Department

Submitted for vivo voce Examination held on _____

Internal Examiner

External Examiner

DECLARATION

VINITHA and **SUMITHRA** hereby declare that the project report entitled **Smart Phone Based Remote monitoring Tool for E-learning** done by me under the guidance of **Dr. SRINIVASAN** is submitted in partial fulfillment of the requirements for the award of Bachelor of Science degree in Computer Science.

DATE :

PLACE: CHENNAI

SIGNATURE OF THE CANDIDATE

ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to **Board of Management** of **SATHYABAMA** for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr. T. Sasikala M.E., Ph.D, Dean, School of Computing, Dr. S. Vigneshwari, M.E., Ph.D. and Dr. L. Lakshmanan, M.E., Ph.D., Heads of the Department** of Computer Science and Engineering for providing me necessary support and details at the right time during the progressive reviews.

I would like to express my sincere and deep sense of gratitude to my Project Guide **Dr. Srinivasan** for his valuable guidance, suggestions and constant encouragement paved way for the successful completion of my project work.

I wish to express my thanks to all Teaching and Non-teaching staff members of the **Department of Computer Science and Engineering** who were helpful in many ways for the completion of the project.

ABSTRACT

In this project, a smartphone-based learning monitoring system is presented. During pandemics, most of the parents are not used to simultaneously deal with their home of_ce activities and the monitoring of the home school activities of their children. Therefore, a system allowing a parent, teacher or tutor to assign task and its corresponding execution time to children, could be helpful in this situation. In this work, a mobile application to assign academic tasks to a child, measure execution time, and monitor the child's attention, is proposed. The children are the users of a mobile application, hosted on a smartphone or tablet device, that displays an assigned task and keeps track of the time consumed by the child to perform this task. Time measurement is performed using face recognition, so it is possible to infer the attention of the child based on the presence or absence of a face. The app also measures the time that the application was in the foreground, as well as the time that the application was sent to the background, to measure boredom. The parent or teacher assigns a task using a desktop application speci_cally designed for this purpose. At the end of the time set by the user, the application sends to the parent or teacher statistics about the execution time of the task and the degree of attention of the child.

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LIST OF ABBREVIATIONS

JDK	Java Development Toolkit
DEX	Dalvik Executables
TCP	Transmission Control Protocol
IP	Internet Protocol
HTTP	Hyper Text Transfer Protocol
ADT	Android Development Tool

CHAPTER 1

INTRODUCTION

1.1 OVERVIEW OF PROJECT

In this project, a tool to monitor the learning activities of children whose parents are working in the home is proposed. The developed tool monitors the attention levels of children solving assigned tasks that cannot be supervised by a present adult. The monitoring information is useful for both, parents and teachers, who can use it to make decisions about the effectiveness of remote learning methods. The proposed tools are focused on handwritten tasks, such as solving arithmetic or algebraic operations, writing some or drawing, where children do not directly interact with the smartphone/tablet, and use it only to read the task description and to report image-based evidence of the carried out work, which will be later revised by a teacher or a parent. Several approaches have been introduced in order to develop software tools for different gaze estimation purposes in e-learning.

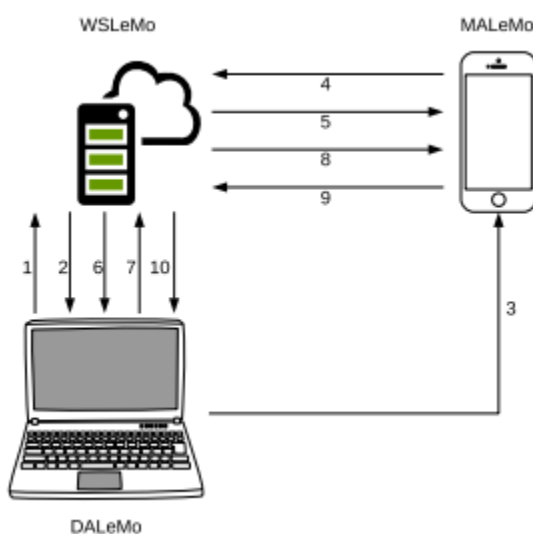
Presented a work related to the task of predicting users' gaze behaviour (overt visual attention) in the near future.. Described a study of combining gaze gestures with vibrotactile feedback. In this study, gaze gestures were used as input for a mobile device and vibrotactile feedback as a new alternative way to give confirmation of interaction events. Results show that vibrotactile feedback significantly improved the use of gaze.

Proposed an eye tracking tool that uses millimeter-size RGB cameras that can be fully embedded into normal glasses. To compensate for the cameras' low image resolution of only a few pixels, the proposed approach uses multiple cameras to capture different views of the eye, as well as learning-based gaze estimation to regress from eye images to gaze directions directly.

Introduced an image processing system to provide a valuable aid to kindergarten teachers, helping them in the of registering observation, by automatically detecting and measuring head posture, including time records.

Presented a drowsiness detection based on video approach to analyze two visual driver's signs: eyes blinking and head movement. Described that one of the most accurate methods to record user behavior is through eye tracking technology. Eye tracking is a method that records real, natural and objective user behavior. Eye movements are and subconscious, may reveal information that is not accessible even to the responder. The human gaze can tell exactly what has seen, in what order and for how long and, on the other side, what has been missed. Therefore, eye tracking data valuable insights for improving the learning process.

Proposed automated methods forand quantifying visual attention from images andvideo of gaze following. Gaze following can be applied toidentify, categorize quick glances to objects, and even identifywhen someone is not paying attention. Stated that using eye gaze to control adaptioneye learning environments provides the ability to gobeyond the student's surface answering behavior or preferences and adapt to the student's implicit behavior.



CHAPTER 2

LITERATURE SURVEY

Project Title : Connecting Gaze, Scene, and Attention Generalized Attention Estimation via Joint Modeling of Gaze and Scene Saliency

Author Name : Eunji Chong, Nataniel Ruiz, Yongxin Wang,

Year of Publish : 2018

Abstract : This paper addresses the challenging problem of estimating the general visual attention of people in images. Our proposed method is designed to work across multiple naturalistic social scenarios and provides a full picture of the subject's attention and gaze. In contrast, earlier works on gaze and attention estimation have focused on constrained problems in more specific contexts. In particular, our model explicitly represents the gaze direction and handles out-of-frame gaze targets. We leverage three different datasets using a multi-task learning approach. We evaluate our method on widely used benchmarks for single-tasks such as gaze angle estimation and attention-within-an-image, as well as on the new challenging task of generalized visual attention prediction. In addition, we have created extended annotations for the MMDB and GazeFollow datasets which are used in our experiments, which we will publicly release.

Project Title : EFFECTIVENESS OF E-LEARNING DESIGN AND AFFECTING VARIABLES IN THAI PUBLIC SCHOOLS

Author Name : Titie Panyajamorn, Suthathip Suanmali

Year of Publish : 2018

Abstract : **Purpose** –This study proposed and examined the effectiveness of e-learning content design by considering two different subjects (mathematics and

reading) and areas (metropolitan and rural). This study also investigated several variables , i.e., students' satisfaction, motivation, and experience, that influenced learning abilities. Moreover, we suggest ways of improving the effectiveness of e-learning for different kinds of students, subjects, and areas.

CHAPTER 3

METHODOLOGY

3.1 SYSTEM ANALYSIS

3.1.1 EXISTING SYSTEM

In the existing system, it is difficult to monitor the students during their online exams/daily tests and online classes by their parents, teacher(s) or tutor(s). This may cause a pandemic situation for each and every parent or tutor to know about their children and to grab their attention towards studies. During online classes, the staff may teach the subjects and give some activities through the online class based on the students grade. Some students may complete but some may not. The parents who are working from home may busy with their office activities and may not concentrate on their children. In the existing system, we are not having any methods or ideas to make students to complete these activities within the given time with maximum attention.

Problem Definition

Many tasks are assigned to the children who are attending their online classes but there is no idea about their completion of their activities given by their staffs. Most of the parents are busy with their home and office activities they may not monitor their children who are attending the online classes or preparing for their exams.

3.1.2 PROPOSED SYSTEM

In this system, we propose a remote learning system and make it more efficient and more useful for parents, students and staffs. The staff will register their details. The Admin have to give permission for the registered staff to proceed with their login process. If the admin reject a staff, then that staff will not be accessible with their further process. The authorised staff will proceed their process after logging in. They will add the students along with their personal details who are under his/her class. Then the staff will upload tasks or activities under courses with any number of selected students who need to attend those activities. The students will register with their android mobile phone. Once the course get started, mail will be sent through their parent's email. After getting mail, students will login using their registered email and the password which gets generated while staffs adding students and it will be sent through the parent's email and the student will start the activity. After completing every activity, the image-based evidence and the video of student while doing activity(attention video) will be saved. The staffs can view the created courses and activities. The students who are added in the activity will get displayed inside that activity. For every activity, the staff can view the performance of the student i.e., the image-based evidence after their activity completion. The attention will get calculated using the attention video in python. After viewing the evidence and the percentage of attention, the staff will enter the mark based on their evidence and attention. Finally, the result will be sent to the parents.

- **Advantages**

- This system makes the remote learning methods more effective and helpful for staffs, students and parents.
- In this method, the students will perform in their exams, activities and in their online classes with more attention than before.

3.2 SYSTEM DESIGN

In this system, we propose a remote learning system and make it more efficient and more useful for parents, students and staffs. The staff will register their details. The Admin have to give permission for the registered staff to proceed with their login process. If the admin reject a staff, then that staff will not be accessible with their further process. The authorized staffs will proceeds their process after logging in. They will add the students along with their personal details who are under his/her class. Then the staff will upload tasks or activities under courses with any number of selected students who need to attend those activities. The students will register with their android mobile phone. Once the course gets started, mail will be sent through their parent's email. After getting mail, students will login using their registered email and the password which gets generated while staffs adding students and it will be sent through the parent's email and the student will start the activity. After completing every activity, the image-based evidence and the video of student while doing activity (attention video) will be saved. The staffs can view the created courses and activities. The students who are added in the activity will get displayed inside that activity. For every activity, the staff can view the performance of the student i.e., the image-based evidence after their activity completion. The attention will get calculated using the attention video in python. After viewing the evidence and the percentage of attention, the staff will enter the mark based on their evidence and attention. Finally, the result will be sent to the parents.

3.2.1 MODULES

- Staff Authentication
- Add students and courses
- Student Registration and Attention Detection
- Sending Result to Parents

3.2.2 MODULE EXPLANATION:

Staff Authentication

The staff will register with their details. The Admin have to give permission for the registered staff to proceed with their login process. If the admin reject a staff, then that staff will not be accessible with their further process.S

Add students and courses

The authorised staff will proceed their process after logging in. They will add the students along with their personal details who are in his/her class. Then the staff will upload tasks or activities under courses with any number of selected students who need to attend those activities.

Student Registration and Attention Detection

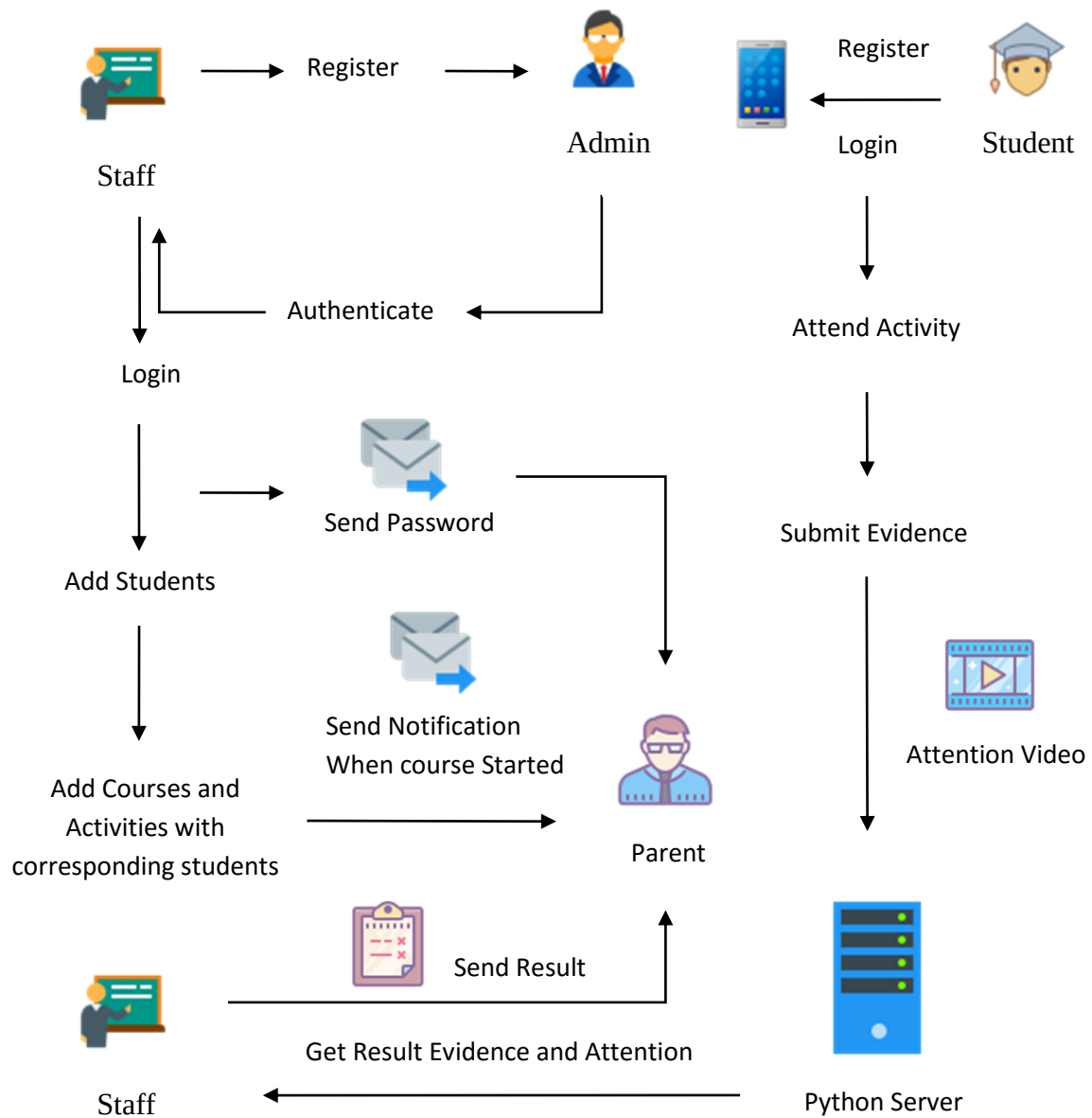
The students will register with their android mobile phone. Once the course get started, mail will be sent through their parent's email. After getting mail,

students will login using their registered email and password and start the activity. After completing every activity, the image-based evidence and the attention video during their activity will be saved.

Sending Result to Parents

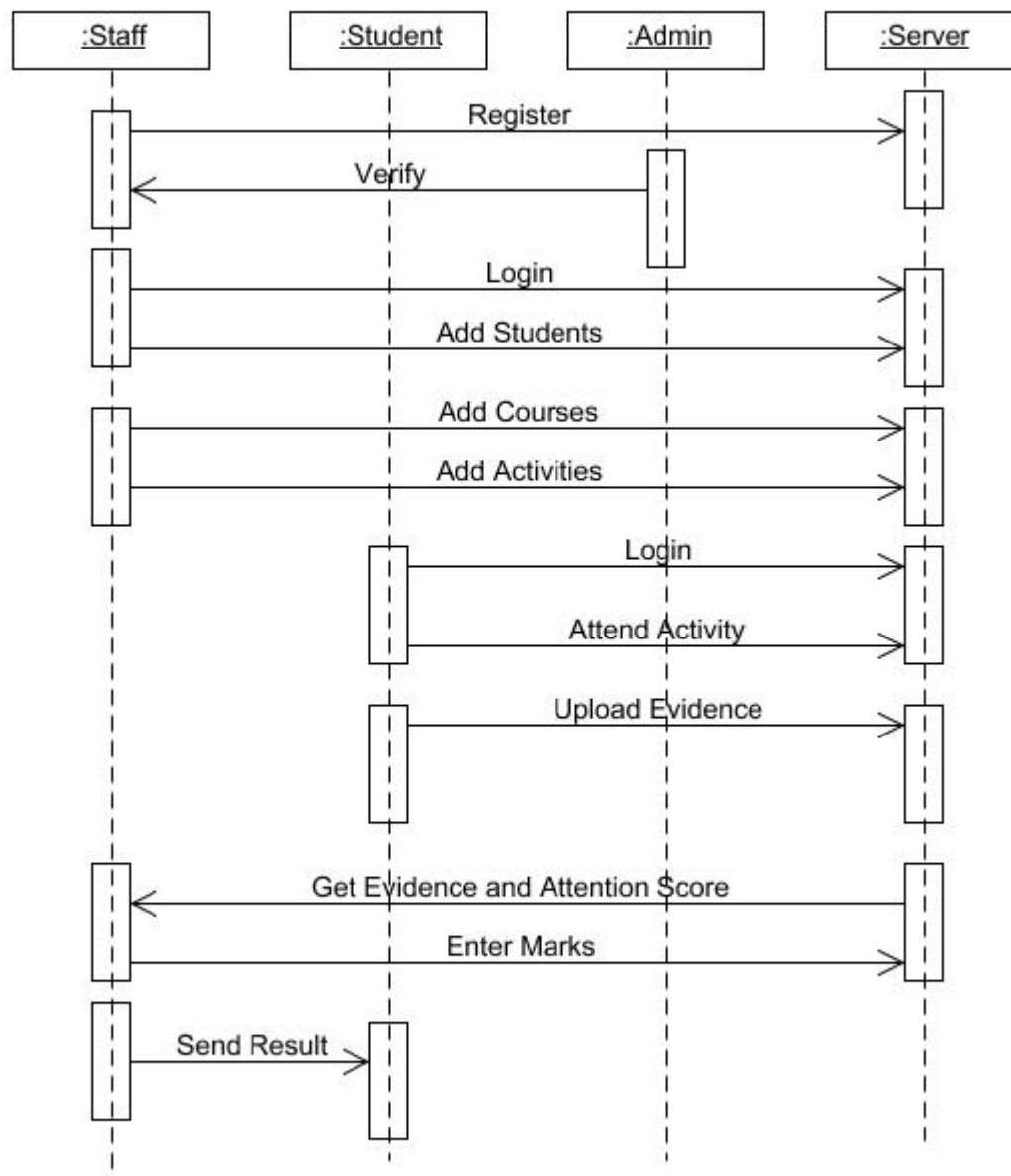
The staffs can view the created courses and activities. The students who are added in the activity will get displayed inside that activity. For every activity, the staff can view the performance of the student i.e., the image-based evidence after their activity completion. The attention will get calculated using the attention video in python. After viewing the evidence and the percentage of attention, the staff will enter the mark based on their evidence and attention. Finally, the result will sent to the parents.

3.3 Architecture Diagram:



3.4 Sequence Diagram:

A Sequence diagram is a kind of interaction diagram that shows how processes operate with one another and in what order. It is a construct of Message Sequence diagrams are sometimes called event diagrams, event sceneries and timing diagram.



3.5 Use Case Diagram:

Unified Modeling Language (UML) is a standardized general-purpose modeling language in the field of software engineering. The standard is managed and was created by the Object Management Group. UML includes a set of graphic notation techniques to create visual models of software intensive systems. This language is used to specify, visualize, modify, construct and document the artifacts of an object oriented software intensive system under development.

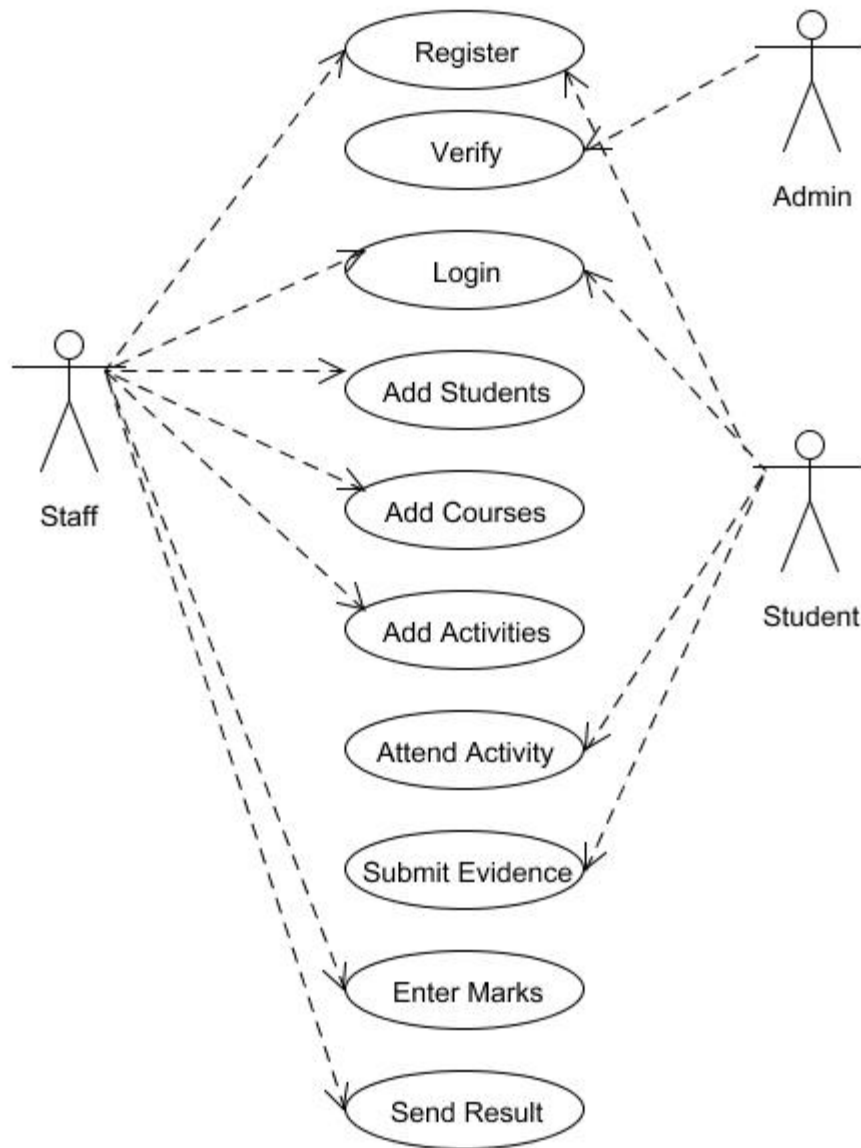
3.5.1 USECASE DIAGRAM

A Use case Diagram is used to present a graphical overview of the functionality provided by a system in terms of actors, their goals and any dependencies between those use cases.

Use case diagram consists of two parts:

Use case: A use case describes a sequence of actions that provided something of measurable value to an actor and is drawn as a horizontal ellipse.

Actor: An actor is a person, organization or external system that plays a role in one or more interaction with the system.

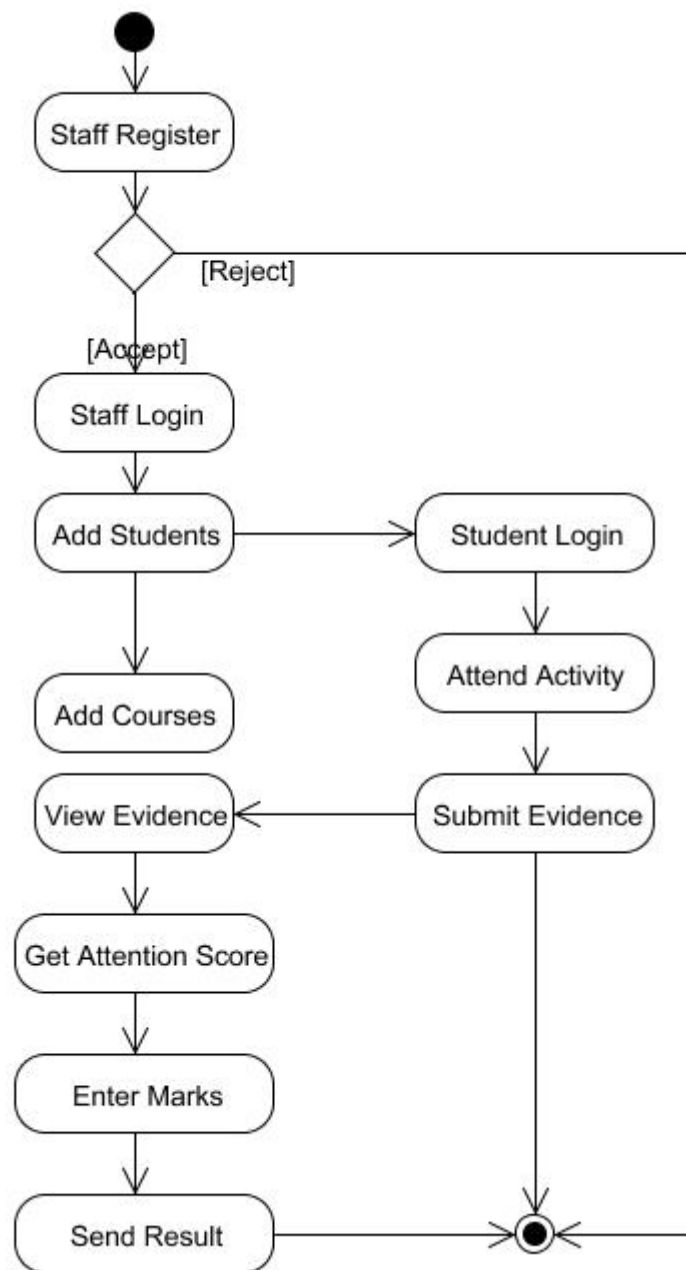


3.6 Activity Diagram:

Activity diagram is a graphical representation of workflows of stepwise activities and actions with support for choice, iteration and concurrency. An activity diagram shows the overall flow of control.

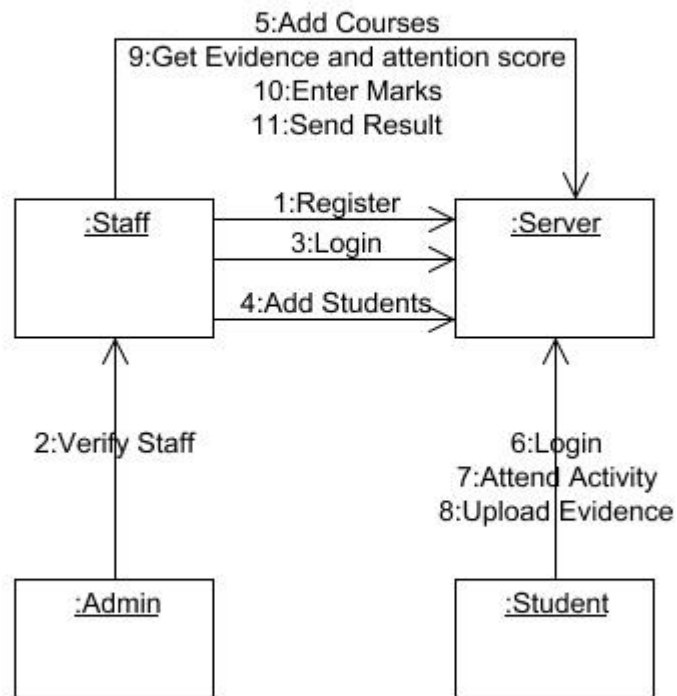
The most important shape types:

- Rounded rectangles represent activities.
- Diamonds represent decisions.
- Bars represent the start or end of concurrent activities.
- A black circle represents the start of the workflow.
- An encircled circle represents the end of the workflow.



3.7 Collaboration Diagram:

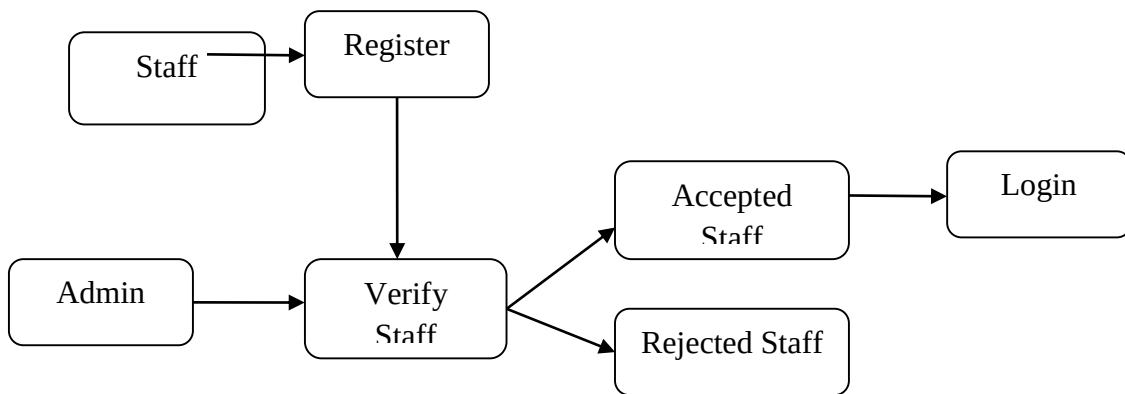
UML Collaboration Diagrams illustrate the relationship and interaction between software objects. They require use cases, system operation contracts and domain model to already exist. The collaboration diagram illustrates messages being sent between classes and object



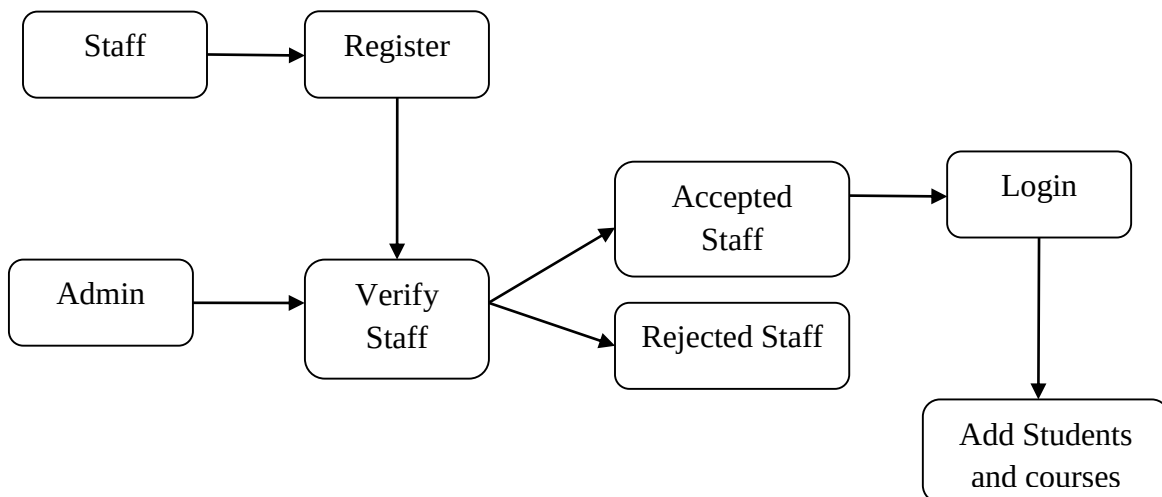
3.8 DATA FLOW DIAGRAM:

A Data Flow Diagram (DFD) is a graphical representation of the “flow” of data through an information system, modeling its aspects. It is a preliminary step used to create an overview of the system which can later be elaborated DFDs can also be used for visualization of data processing.

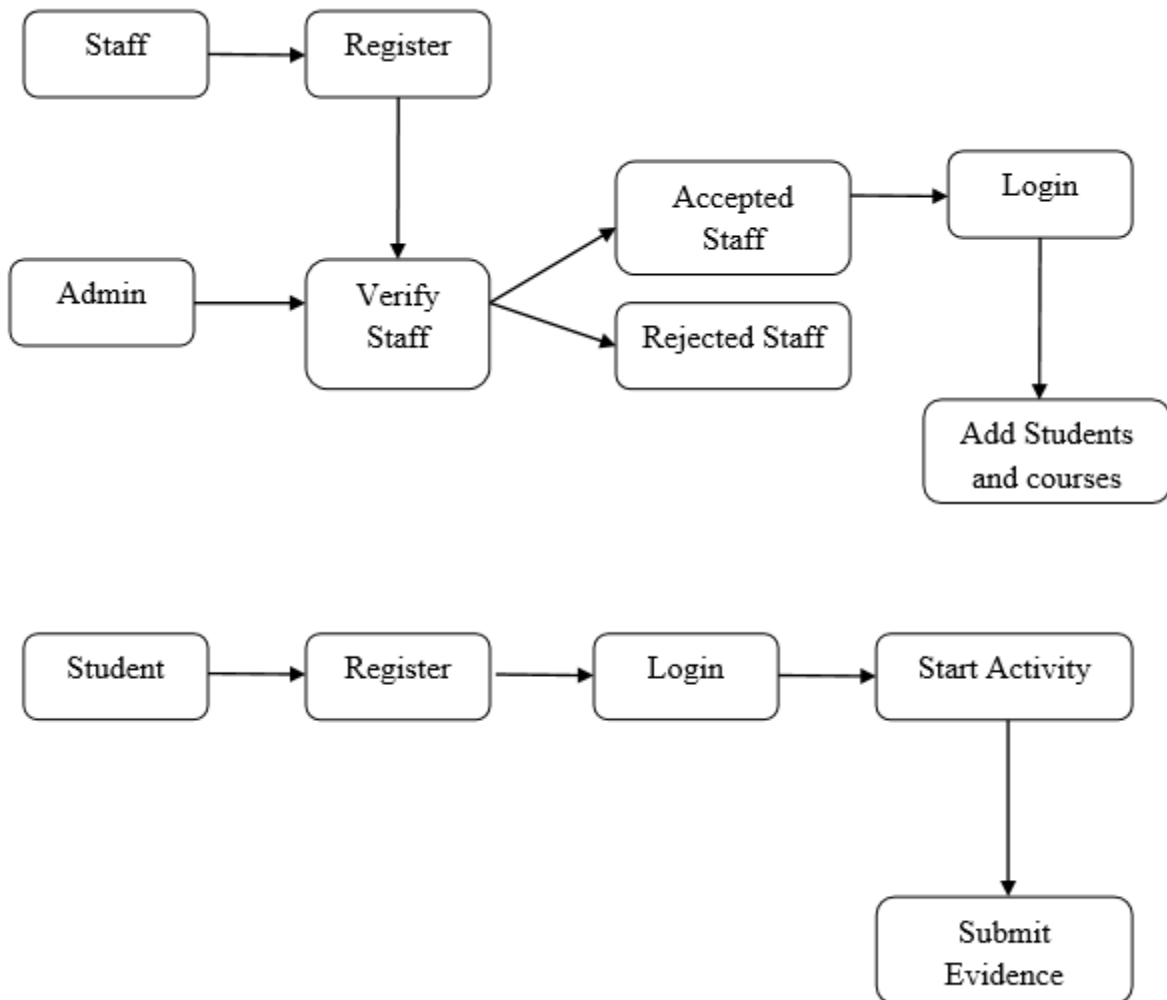
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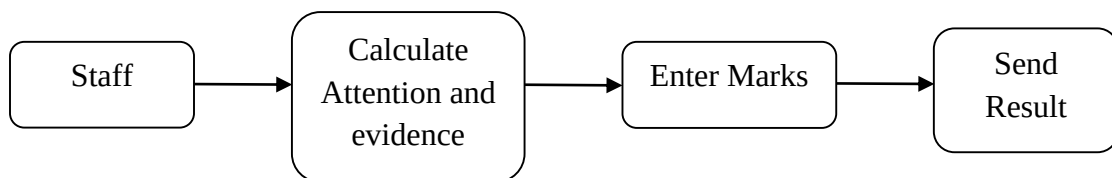
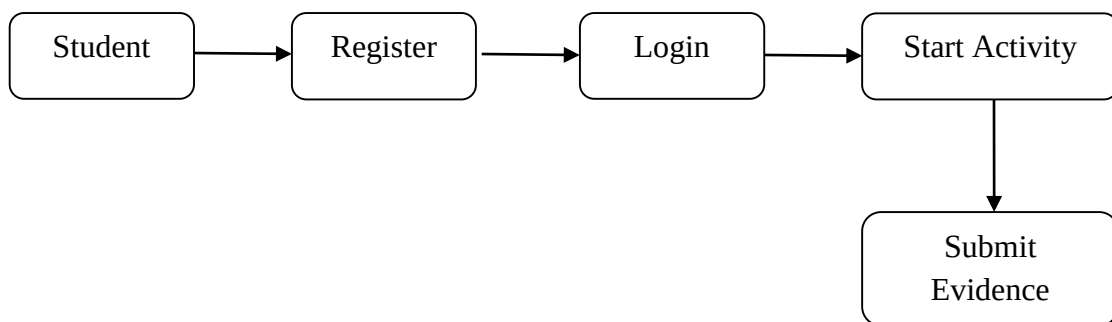
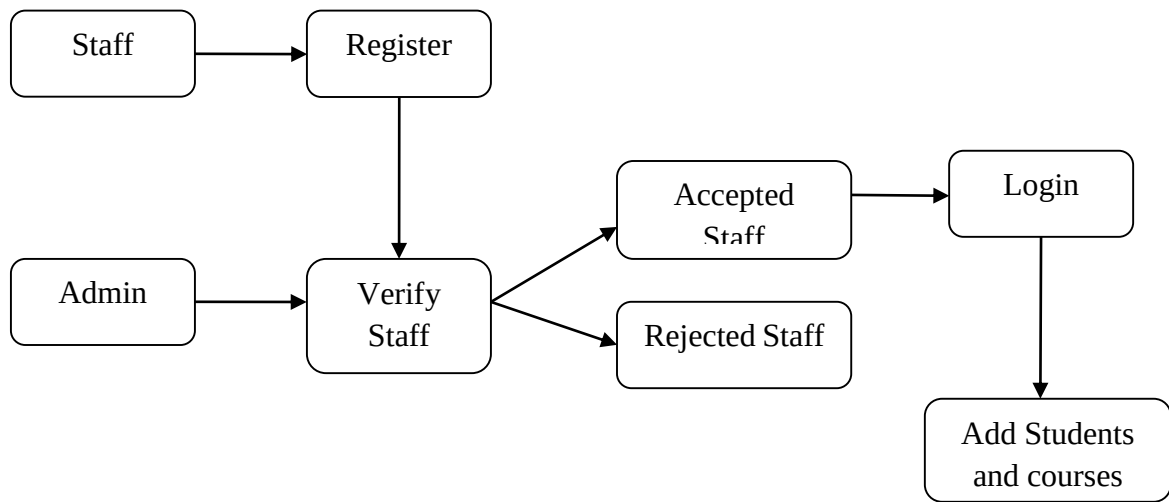
Level 1:



Level 2:

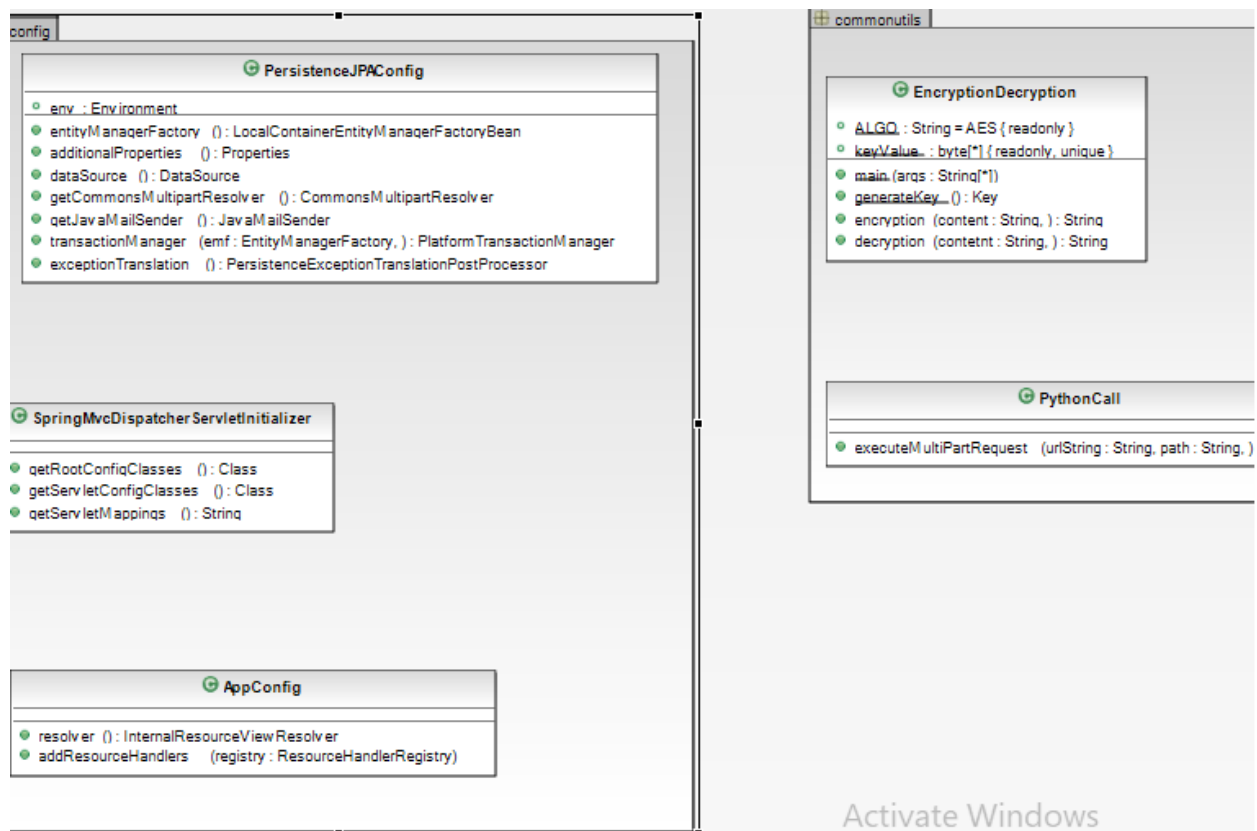


Level 3:



3.9 Class Diagram

A Class diagram in the Unified Modeling Language is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among objects.



CHAPTER 4

AIM AND SCOPE OF PRESENT INVESTIGATION

4.1 AIM

To monitor the student's attention on smart phone for e-Learning

4.2 OBJECTIVES

A Smart phone- based learning monitoring system.

A system allowing a parent , teacher or tutor to assign a task and its corresponding execution time to children.

4.3 HARDWARE AND SOFTWARE SPECIFICATION

4.3.2 HARDWARE REQUIREMENTS

- Hard Disk : 80GB and Above
- RAM : 4GB and Above
- Processor : P IV and Above

4.3.2. SOFTWARE REQUIREMENTS

- Windows 7 and above(64 bit)
- JDK 1.8
- Python 3.6.3
- Tomcat 8.5
- MySQL

- Android Studio 3.4
- Android Phone

4.4 TECHNOLOGIES USED

- Programming Language : JAVA.
- Core Framework : Collections.
- J2EE : Spring Framework.
- Script : JavaScript.
- Web Designing : HTML5, CSS3.
- Animation Effect : jQuery.
- Front-end Framework : Bootstrap3.

4.5 THE JAVA PLATFORM

A platform is the hardware or software environment in which a program runs. The Java platform differs from most other platforms in that it's a software-only platform that runs on top of other, hardware-based platforms. Most other platforms are described as a combination of hardware and operating system.

The Java platform has two components :

- The Java Virtual Machine (JVM)
- The Java Application Programming Interface (Java API)

You've already been introduced to the JVM. It's the base for the Java platform and is ported onto various hardware-based platforms.

The Java API is a large collection of ready-made software components that provide many useful capabilities, such as graphical user interface (GUI) widgets. The Java API is grouped into libraries **(packages)** of related components. The following figure depicts a Java program, such as an application or applet, that's running on the Java platform. As the figure shows, the Java API and Virtual Machine insulates the Java program from hardware dependencies.

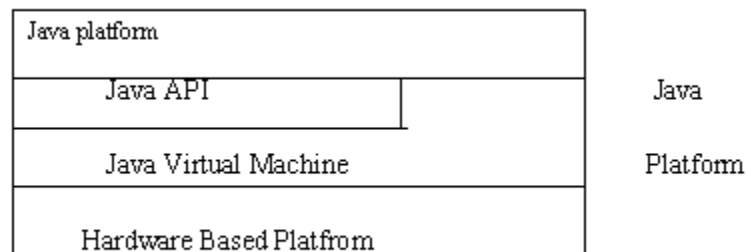


Fig.3.3

As a platform-independent environment, Java can be a bit slower than native code. However, smart compilers, weel-tuned interpreters, and just-in-time byte compilers can bring Java's performance close to that of native code without threatening portability.

4.6 APACHE TOMCAT SERVER

Apache Tomcat (formerly under the Apache Jakarta Project; Tomcat is now a top level project) is a web container developed at the Apache Software Foundation. Tomcat implements the servlet and the JavaServer Pages (JSP) specifications from Sun Microsystems, providing an environment for Java code to run in cooperation with a web server. It adds tools for configuration and management but can also be configured by editing configuration files that are normally XML-formatted. Because Tomcat includes its own HTTP server internally, it is also considered a standalone web server.

- Java Management Extensions (JMX), JSP and Struts-based administration
- Tomcat 5.x
- implements the Servlet 2.4 and JSP 2.0 specifications
- reduced garbage collection, improved performance and scalability
- native Windows and Unix wrappers for platform integration
- faster JSP parsing

4.7 Android Introduction:

Android is a Linux based operating system it is designed primarily for touch screen mobile devices such as smart phones and tablet computers. The operating system has developed a lot in last 15 years starting from black and white phones to recent smart phones or mini computers. One of the most widely used mobile OS these days is android. The android is software that was founded in Palo Alto of California in 2003.



4.7.1 Linux kernel:

The android uses the powerful Linux kernel and it supports wide range of hardware drivers. The kernel is the heart of the operating system that manages input and output requests from software. This provides basic system functionalities like process management, memory management, device management like camera, keypad, display etc the kernel handles all the things. The Linux is really good at networking and it is not necessary to interface it to the peripheral hardware. The kernel itself does not interact directly with the user but rather interacts with the shell and other programs as well as with the hard ware devices on the system.

4.7.2 Libraries:

The on top of a Linux kennel there is a set of libraries including open source web browser such as webkit, library libc. These libraries are used to play and record audio and video. The SQLite is a data base which is useful for storage and sharing of application data. The SSL libraries are responsible for internet security etc.

4.7.3 Android Runtime:

The android runtime provides a key component called Dalvik Virtual Machine which is a kind of java virtual machine. It is specially designed and optimized for android. The Dalvik VM is the process virtual machine in the android operating system. It is software that runs apps on android devices.

The Dalvik VM makes use of Linux core features like memory management and multithreading which is in a java language. The Dalvik VM enables every android application to run its own process. The Dalvik VM executes the files in the .dex format.

4.7.4 Application frame work:

The application frame work layer provides many higher level services to applications such as windows manager, view system, package manager, resource manager etc. The application developers are allowed to make use of these services in their application.

4.7.5 Applications:

You will find all the android applications at the top layer and you will write your application and install on this layer. Examples of such applications are contacts, books, browsers, services etc. Each application performs a different role in the overall applications.

Advantages:

- Android is Linux based open source operating system , it can be developed by any one

- Easy access to the android apps
- You can replace the battery and mass storage, disk drive and UDB option
- Its supports all Google services
- The operating system is able to inform you of a new SMS and Emails or latest updates.
- It supports Multitasking
- Android phone can also function as a router to share internet
- Its free to customize
- Can install a modified ROM
- Its supports 2D and 3D graphics

4.8 ALGORITHM

4.8.1 Base 64

Base64 is an encoding algorithm that allows you to transform any characters into an alphabet which consists of Latin letters, digits, plus, and slash. Thanks to it, you can convert Chinese characters, emoji, and even images into a “readable” string, which can be saved or transferred anywhere.

To figuratively understand why Base64 was invented, imagine that during a phone call Alice wants to send an image to Bob. The first problem is that she cannot simply describe how the image looks, because Bob needs an exact copy. In this case, Alice may convert the image into the binary system and dictate to Bob the binary digits (bits), after that he will be able to convert them back to the original image. The second problem is that the tariffs for phone calls are too expensive and dictate each byte as 8 binary digits will last too long. To reduce costs, Alice and Bob agree to use a more efficient data transfer method by using a special alphabet, which replaces every “six digits” with one “letter”.

4.8.2 Advanced Encryption Standard

The more popular and widely adopted symmetric encryption algorithm likely to be encountered nowadays is the Advanced Encryption Standard (AES). It is found at least six times faster than triple DES.

A replacement for DES was needed as its key size was too small. With increasing computing power, it was considered vulnerable against exhaustive key search attack. Triple DES was designed to overcome this drawback but it was found slow.

The features of AES are as follows -

Symmetric key symmetric block cipher

128-bit data, 128/192/256-bit keys

Stronger and faster than Triple-DES

Provide full specification and design details

Software implementable in C and Java

Operation of AES

AES is an iterative rather than Feistel cipher. It is based on ‘substitution–permutation network’. It comprises of a series of linked operations, some of which involve replacing inputs by specific outputs (substitutions) and others involve shuffling bits around (permutations).

Interestingly, AES performs all its computations on bytes rather than bits. Hence, AES treats the 128 bits of a plaintext block as 16 bytes. These 16 bytes are arranged in four columns and four rows for processing as a matrix -

Unlike DES, the number of rounds in AES is variable and depends on the length of the key. AES uses 10 rounds for 128-bit keys, 12 rounds for 192-bit keys and 14 rounds for 256-bit keys. Each of these rounds uses a different 128-bit round key, which is calculated from the original AES key

.

4.9 Project Purpose and Scope

4.9.1 Purpose

The main purpose of this project is to monitor the student's attention on their school activities and to make the remote learning methods more effective.

4.9.3 Project Scope

Machine learning is an application of artificial intelligence (AI) that provides systems the ability to automatically learn and improve from experience without being explicitly programmed. Machine learning focuses on the development of computer programs that can access data and use it learn for themselves. To analyze the degree of attention of the students of each instance, it needs to be trained using machine learning algorithms. By using this algorithm, we can monitor

the activities of the students and provides results to their parents based on the degree of attention of each and every student

4.9.4 Product Perspective

We propose a smart way to proceed the remote learning method more effective by calculating students attention on their given activities and by motivating the students as well as the staffs and the parents.

4.9.4 System Features

This system makes the remote learning methods more effective and helpful for staffs students and parents. In this method; the students will perform in their exams, activities and in their online classes with more attention than before.

4.10 Design and Implementation Constraints

4.10.1 Constraints in Analysis

- ◆ Constraints as Informal Text
- ◆ Constraints as Operational Restrictions
- ◆ Constraints Integrated in Existing Model Concepts
- ◆ Constraints as a Separate Concept
- ◆ Constraints Implied by the Model Structure

CHAPTER 5

RESULTS AND DISCUSSION

In this section, results of the MaLeMO are presented. For both test subjects, as expected, there were activities whose resolution demanded more time than the originally established, but there were also activities that were completed in a shorter time. From table 2, the NTCC surpassed the TCC in two of the four activities for each test subject.

In all the activities, the GTCC surpassed the NTCC from percentages varying from 45% (subject 1, activity 1) to 80% (subject 1, activity 2). For subject 1, the NTCC required to carry out activities 1 and 3 surpassed the TCC, and for subject 2, the NTCC required to carry out activities 2 and 4 surpassed the TCC.

The AAT is higher than AIT in almost all the activities carried out by the test subjects, except for subject 1 in activity 2. The AAT/AIT relation varies from 50% (subject 1, activity 2) to 119% (subject 1, activity 2). This expresses that in general, the child keeps most time the MaLeMO in the foreground than in background.

The proposed system allows the educators to measure approximate times for each user of the application, thus, making possible to individually evaluate a group of students.

From the second and sixth rows of table 2, it can be noticed that for activity 1, the NTFBS was longer for subject 1 than for subject 2. From this observation it could be

concluded that subject 2 was more focused on the solution of this task. Time plots for each activity monitored in the MaLeMO. that subject 1, and this is congruent with the PFMF, which expresses the number of frames where a face was not detected by the MaLeMO, which was higher for subject 1 than for subject 2, and the NATFDF was longer for subject 2. In figure 12, it can be noticed that for test subject 2 there were less MaLeMO transitions between background and foreground when used by the test subject 1 in activity 1.

From the third and seventh rows of table 2, it can be noticed that for activity 2, the NTFBS was longer for the subject 2 than for subject 1. It can be concluded that subject 1 was more focused on this task than subject 2, and correlates well with the PFMF and the NATFDF, where both parameters were higher in subject 2 than subject 1. From the fourth and eighth rows of table 2, it can be noticed that for activity 3, the NTFBS was longer for subject 1 than for subject 2. This shows that subject 2 was more focused on this task than subject 2, but in this case, the PFMF and the NATFDF, were both higher for subject 1 than for subject 2. This special case can be a matter of a deeper analysis in a future work.

From the fifth and ninth rows of table 2, it can be noticed that for activity 4, the NTFBS was longer for subject 2 than for subject 1. It can be concluded that subject 1 was more focused on this task than subject 2, and this is congruent with the PFMF and the NATFDF being higher for subject 2 than for subject 1.

Compared to the current monitoring systems, the proposed approach, through the MALEMO, is able to record the approximate time that students have paid attention,

allowing the professor to evaluate how fast and how many time the student answered or completed a given activity. The proposed system performs compiles information without user intervention, so it is automatically sent through the network. Furthermore, the instructor can design and add a given activity to the system through the DaLeMO, and get instant feedback when the student has finished the activity.



Subject	Activity	TTC	NTCC	GTCC	AAT	AIT	NTFBS	PFMF	NATFDF
Subject 1	1	0:10:00	0:10:47	0:15:08	0:02:09	0:01:05	4	71 (52/19)	0:07:25
	2	0:08:00	0:06:52	0:12:21	0:02:17	0:02:44	2	56 (44/12)	0:04:27
	3	0:14:00	0:17:00	0:28:39	0:02:07	0:01:39	7	58 (50/8)	0:02:53
	4	0:16:00	0:14:46	0:24:28	0:02:06	0:01:37	6	60 (47/13)	0:02:35
Subject 2	1	0:10:00	0:09:59	0:16:33	0:02:29	0:02:11	3	61 (48/13)	0:05:15
	2	0:08:00	0:11:59	0:20:51	0:01:59	0:01:46	5	58 (46/12)	0:05:26
	3	0:14:00	0:13:40	0:22:55	0:01:57	0:01:32	6	60 (43/17)	0:03:20
	4	0:16:00	0:23:11	0:35:08	0:02:34	0:01:29	8	65 (51/14)	0:04:15

CHAPTER 6

CONCLUSION AND FUTURE WORK

6.1 CONCLUSION

In this project, a Remote Learning Monitoring Systems (RLMS) has been proposed. The proposed systems allow the parent or teacher to use the DaLeMO to assign some learning activities to be carried out by children. Children can use the MaLeMO to read the instructions of these activities, and remotely send image-based evidence of the performed work. The MaLeMo computes some statistics of the children attention and reports them to the WSLeMO. The teacher/parent can obtain the stored statistics by retrieving them from the WSLeMo and analyze them to make better decisions about learning exercises and techniques to be employed.

The MaLeMO is limited to only one user by device, because currently there is no session management. To improve this issue, a session management module must be added to allow multiple children to use the same device.

The proposed RLMS allows sending only image-based evidence of the performed work. Complementary modules can be added to extend the current evidence reporting types to other media types (audio-based or video-based evidence).

The proposed RLMS assumes that a child can read without problems, so it is intended for children between 7 and 13 years old. A speech synthesis module can be added to extend the age range for younger children.

The proposed system improves existing developments by avoiding the use of personal computers and external sensors to remotely monitor learning. In addition, this system allows the professor to easily customize the activities to be performed by the student, and to get practically instantaneous feedback through the statistics compiled by the MaLeMO.

Finally, the results show that the attention monitoring fails in some isolated cases. This could be enhanced with the implementation of gaze tracking and attention detection using deep-learning techniques. To improve the attention measurement, better gaze tracking methods must be added to the proposed RLMS.

6.2 FUTURE ENHANCEMENT

We can propose a method using the advanced machine learning algorithms such as face recognition.

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APPENDIX

A. SOURCE CODE

```
package com.elearning.controller;

import java.util.ArrayList;
import java.util.List;

import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;

import org.slf4j.Logger;
import org.slf4j.LoggerFactory;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.security.core.Authentication;
import org.springframework.security.core.context.SecurityContextHolder;
import
org.springframework.security.web.authentication.logout.SecurityContextLogoutHa
ndler;
import org.springframework.stereotype.Controller;
import org.springframework.ui.Model;
import org.springframework.web.bind.annotation.GetMapping;
import org.springframework.web.bind.annotation.ModelAttribute;
import org.springframework.web.bind.annotation.PostMapping;
import org.springframework.web.bind.annotation.RequestMapping;
import org.springframework.web.bind.annotation.RequestParam;
import org.springframework.web.servlet.ModelAndView;
import com.elearning.entity.Admin;
import com.elearning.entity.Staff;
import com.elearning.service.AdminService;

@Controller
@RequestMapping
public class AdminController {
```

```

        private static final Logger LOG =
LoggerFactory.getLogger(AdminController.class);

        private Boolean boolean1 = false;
        private String message = "";

        @Autowired
        private AdminService adminService;

        @GetMapping("/")
        public String listCustomers(Model theModel) {
            if (boolean1) {
                boolean1 = false;
                message = "User Name Password Wrong";

            } else {
                message = "";
            }

            Admin admin = new Admin();
            theModel.addAttribute("admin", admin);

            return "index";
        }

        @PostMapping("/adminLogin")
        public String admin(@ModelAttribute("admin") Admin admin) {

            if (admin.getEmail().equalsIgnoreCase("admin@gmail.com") &&
admin.getPassword().equalsIgnoreCase("admin"))
            {
                return "admin";
            }
            else {
                boolean1 = true;
                return "redirect:/";
            }
        }

        @GetMapping("/staffrequest")

```

```

public String staffRequest(Model model) {
    List<Staff> staffs = adminService.getStaff();
    model.addAttribute("staffs", staffs);

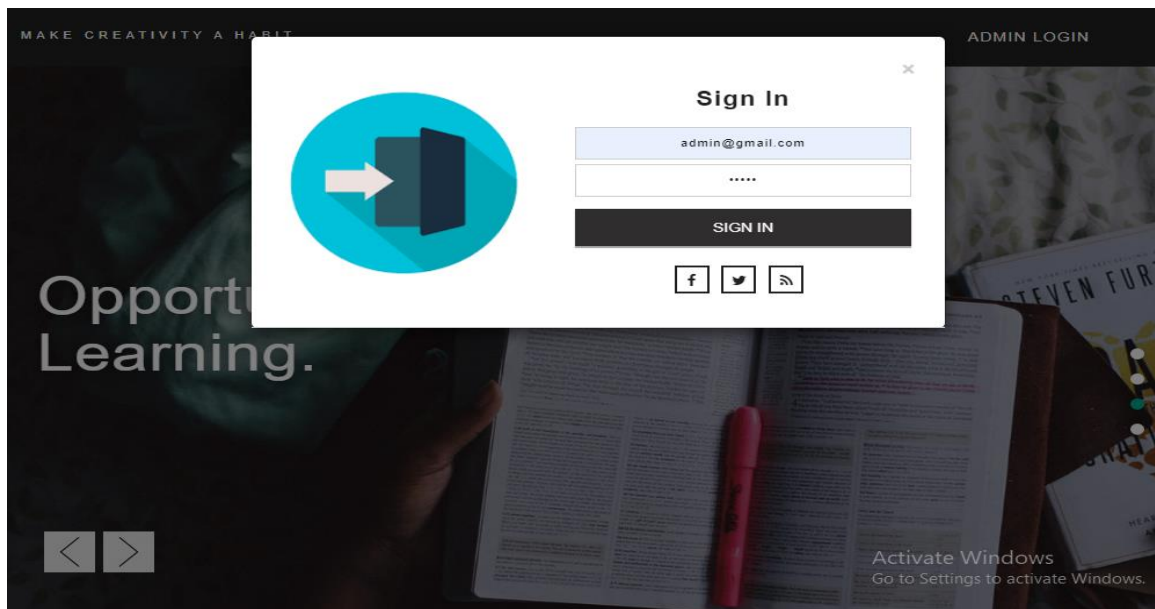
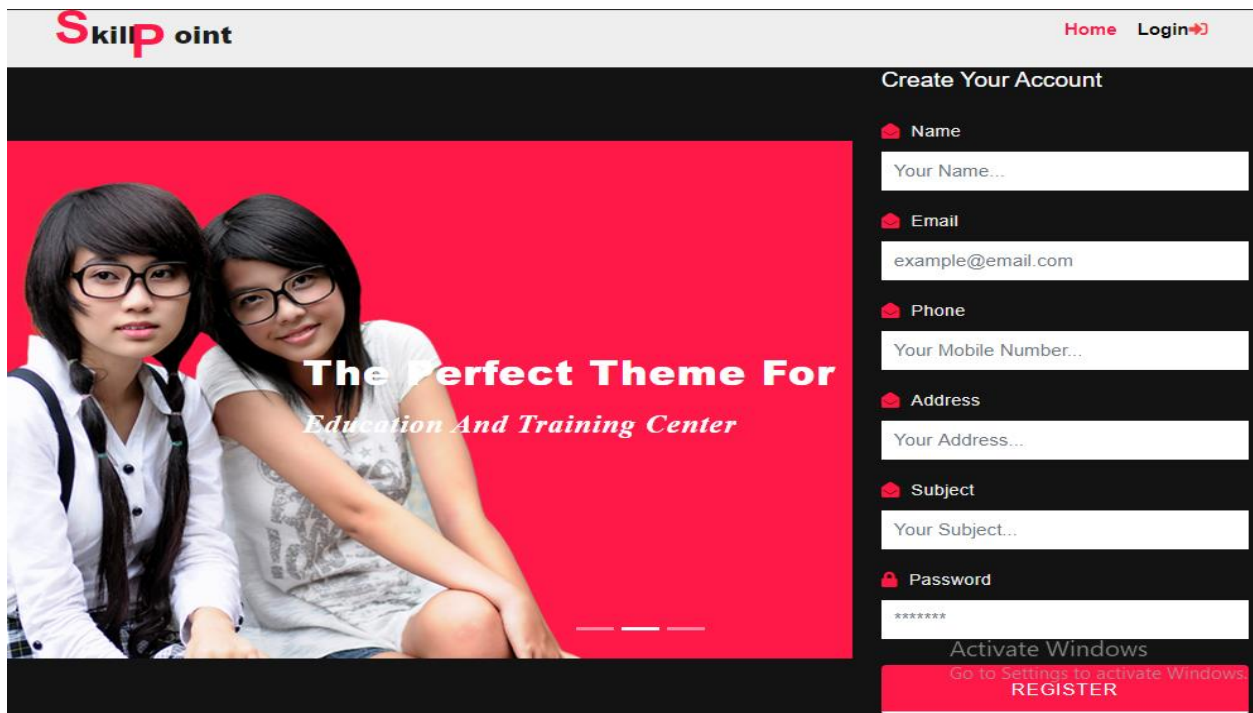
    return "staffrequest";
}

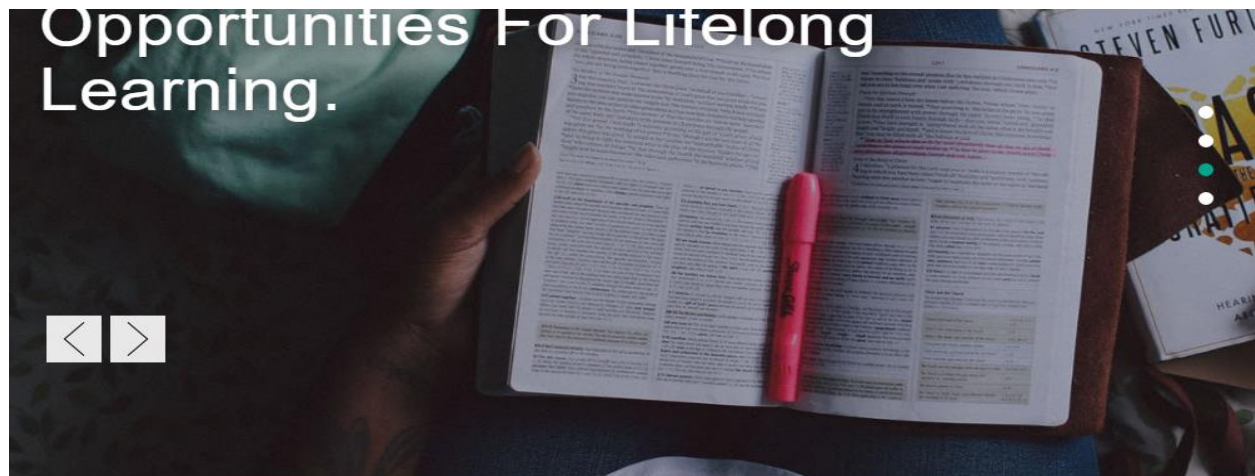
@GetMapping("/reject")
public String reject(@RequestParam("id") int id ,Model model) {
    Staff staff = adminService.getStaff(id);
    staff.setStatus("Rejected");
    adminService.saveCustomer(staff);
    List<Staff> staffs = adminService.getStaff();
    model.addAttribute("staffs", staffs);
    return "staffrequest";
}

@GetMapping("/accept")
public String accept(@RequestParam("id") int id ,Model model) {
    Staff staff = adminService.getStaff(id);
    staff.setStatus("Accepted");
    adminService.saveCustomer(staff);
    List<Staff> staffs = adminService.getStaff();
    model.addAttribute("staffs", staffs);
    return "staffrequest";
}

```

B. SCREENSHOTS





Name	Email	Phone	Address	Subject	Status
Bairavi	bai@gmail.com	8976567834	Chennai	Maths	Accept / Reject

Activate Windows
Go to Settings to activate Windows.

localhost:7777/Administrator/accept?id=1

Home

The Perfect Theme For
Education And Training Center

Login To Your Account

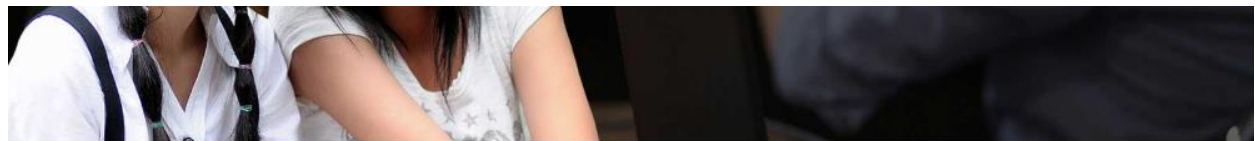
Email
bai@gmail.com

Password
...

LOGIN

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Activate Windows
Go to Settings to activate Windows.



Score Details

Activity Result Details

S.No	Student Name	Email	Evidence	Attention	Marks	Submit	Send
1	Abi	abi@gmail.com	Result	73.4375	90	Completed	Send Result

Evidence

VIDEO EVIDENCE

IMAGE EVIDENCE