Style Guidelines for Final Year Project ReportsTitle of the Project

Final Year Project Proposal

Session 2021-2025

A 4th Year Student

A project submitted in partial fulfilment of the

COMSATS University Degree

of

BSc. (Hons.)BS in Computer Science / Software Engineering (CUI)



Department of Computer Science

COMSATS University Islamabad, Lahore Campus

09 March 2024

**Project Registration**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Project ID (for office use) | | |  | | | | |
| Type of project | | | [✓] Traditional [ ] Industrial [ ] Continuing | | | | |
| Nature of project | | | [ ] **D**evelopment [ ] **R**esearch [✓] **R**&**D** | | | | |
| Area of specialisation | | | Machine Learning | | | | |
| **Project Group Members** | | | | | | | |
| Sr.# | Reg. # | Student Name | | CGPA | Email ID | Phone # | Signature |
| (i) | SP21-BCS-007 | Asad Ali | | 3.02 | sp21-bcs-007 @cuilahore.edu.pk | 0307 4315952 |  |
| (ii) | SP21-BCS-003 | Asad ur Rehman | | 3.02 | sp21-bcs-003 @cuilahore.edu.pk | 0335 4550064 |  |
| (iii) | SP21-BCS-017 | Muhammad Haroon Shahzad | | 2.99 | sp21-bcs-017 @cuilahore.edu.pk | 0318 4559527 |  |
| **Declaration:** FYP group members have cleared all prerequisites courses For FYP-I as per their degree requirements.  For BS (Computer Science)  (CSC241 Object Oriented Programming, CSC291 Software Engineering Concepts, CSC371 Database Systems-I, HUM102 Report Writing Skills)  For BS (Software Engineering)  (CSC241 Object Oriented Programming, CSE291 Introduction to Software Engineering, CSC371 Database Systems-I, HUM102 Report Writing Skills) | | | | | | | |

# Plagiarism Free Certificate

This is to certify that, I am Asad Ali S/D/o Ghaffar Ahmad, group leader of FYP under registration no CIIT/SP21-BCS-007/LHR at Computer Science Department, COMSATS Institute of Information Technology, Lahore. I declare that my FYP proposal is checked by my supervisor and the similarity index is \_\_\_\_\_\_\_\_% that is less than 20%, an acceptable limit by HEC. Report is attached herewith as Appendix A.

A black background with letters

Description automatically generatedDate: 11-03-2024 Name of Group Leader: Asad Ali Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Name of Supervisor: Muhammad Aksam Iftikhar Co-Supervisor (if any): \_\_\_\_\_\_\_\_\_\_\_\_\_

Designation: Associate Professor Designation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Project Abstract**

Heart diseases is one of the most pressing issues globally. Effective and correct heart disease prediction methods are imperative for timely intervention. This project presents a comprehensive strategy and techniques for predicting heart disease through detailed analysis of electrocardiogram signals and image repots, employing advanced machine learning techniques. By combining demographic information with ECG data and exploring ECG signals, the project aims to enhance prediction accuracy and provide additional avenues for accurate predictions. The project primarily focuses on integrating demographic information such as age, gender, and medical history with heart rhythm recordings through a data pipeline and feeding it to machine learning model for training and making it able to predict for new patient. Additionally, the project deals with image-based ECG reports, establishing a separate pipeline to convert ECG images reports into signal data. Once trained, these machine learning models are deployed on a cloud service and seamlessly integrated into a user-friendly interface that includes a mobile app and website. The web interface facilitates doctors to easily upload ECG data in bulk and process it for predictions and get medical prescriptions based on predicted disease, also provides essential features like user authentication, keeps track of patient information and history predictions. Also, the inclusion of a medical chatbot within the web interface assists users in interpreting results and offers valuable medical guidance. Furthermore, a mobile app allows users to upload images and view predictions. In essence, this project represents a significant advancement in heart disease prediction methodologies, offering a helpful and user-friendly solution.

# Introduction

This section will expand the title quoted for the project by explaining the background to the work you propose and the objectives you expect to achieve. A project title often will do little more than identify a broad area within which you will work: the accompanying description must elaborate on this, giving details of specific goals to be achieved and precise characterizations of the methods used in the process. You should identify the main sub-tasks that make up your complete project and outline the algorithms or techniques to be adopted in completing them. A project description should give criteria that can be used at the end of the year to test whether you have achieved your goals and should back this up by explaining what form of evidence to this effect you expect to include in your dissertation.

# Success Criterion

Similarly, a proposal must specify what it means for the project to be a success. It is advisable to choose a reasonably modest but verifiable success criterion which you are as certain as possible can be met; this means that your dissertation can claim your project not only satisfies the success criterion but potentially exceeds it. Projects that do not satisfy the success criterion are, as in real life, liable to be seen as failures to some extent.

Success is the way to reach the defined objectives of your project if it is according to the project proposal and satisfies all the goals and objectives listed in the document. Success requires the acceptance of the project by the supervisor and satisfaction of the client if it is other than your primary supervisor.

# Related Work (mandatory)

# The main reasons for using information from external sources are either to complement the contents of the work with relevant data or to provide a different opinion on the issue stated. In both cases, it means adding credibility to the project, making it look more trustworthy and complete. The author should create an analytical review of the previous scientific works on the topic or explore related development. The student has to provide the historical background and inform the reader about current achievements in research/development. Using only proven credible sources from journals, conferences, and books accepted in academic circles is vital. All the used sources have to be appropriately cited through the text. The bibliography is situated at the end of the paper. It should follow the provided format and display sources in alphabetical order. It is necessary to study the structure of such work to write a strong final year project proposal. Moreover, a clear scheme will make a formal proposal easier to read.

Use IEEE referencing style available in Microsoft word as shown in Fig. 3.

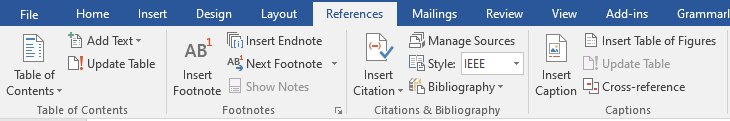


Figure 3. Word references tab.

# Project Rationale

Describe the purpose, motivation or relevance of the project. Describes why the problem is important. You must convey why you want to take this project and what you hoped to learn from your research/development.

## Aims and Objectives

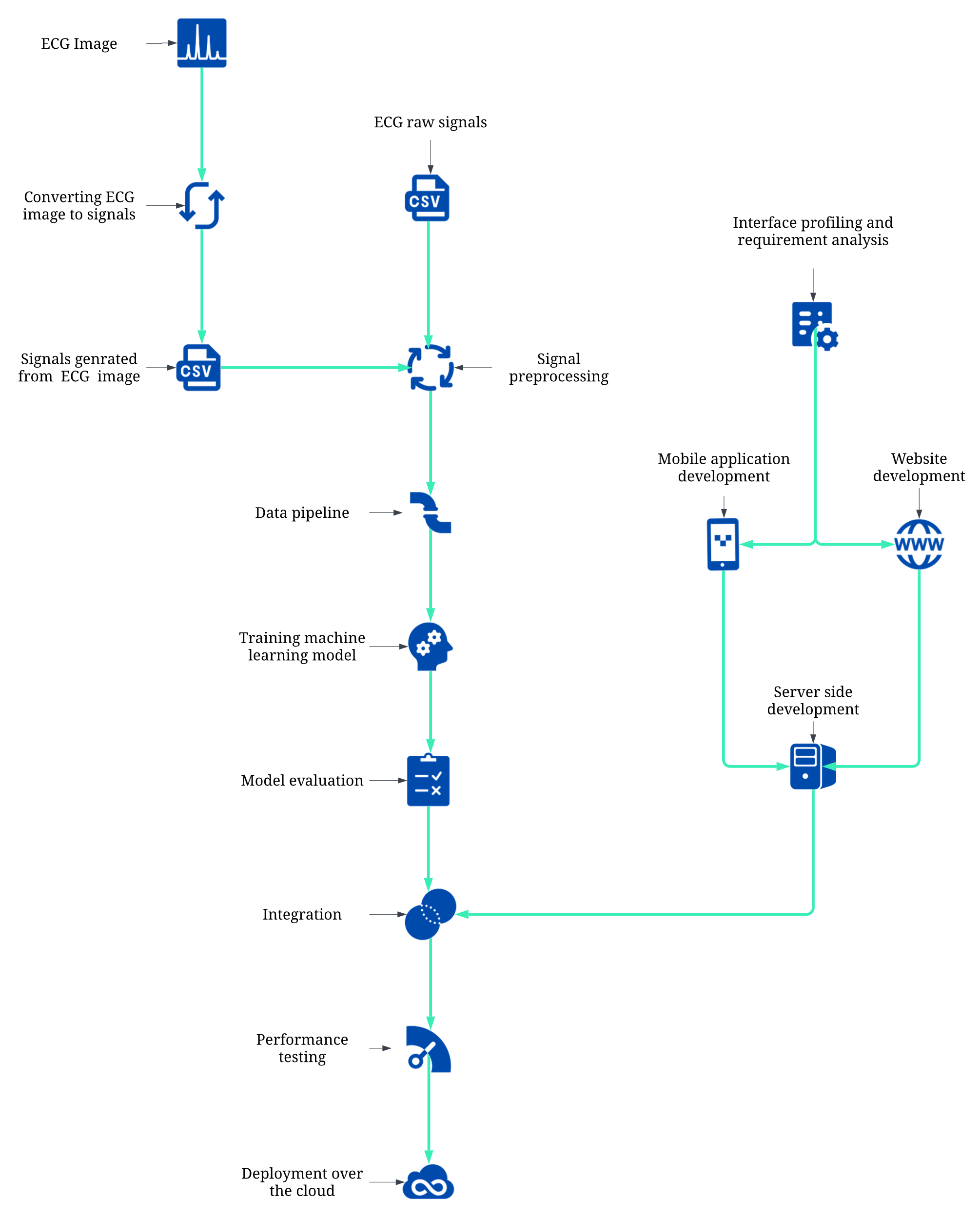
The goal of the project and the main focused objectives of the project are discussed in this section.

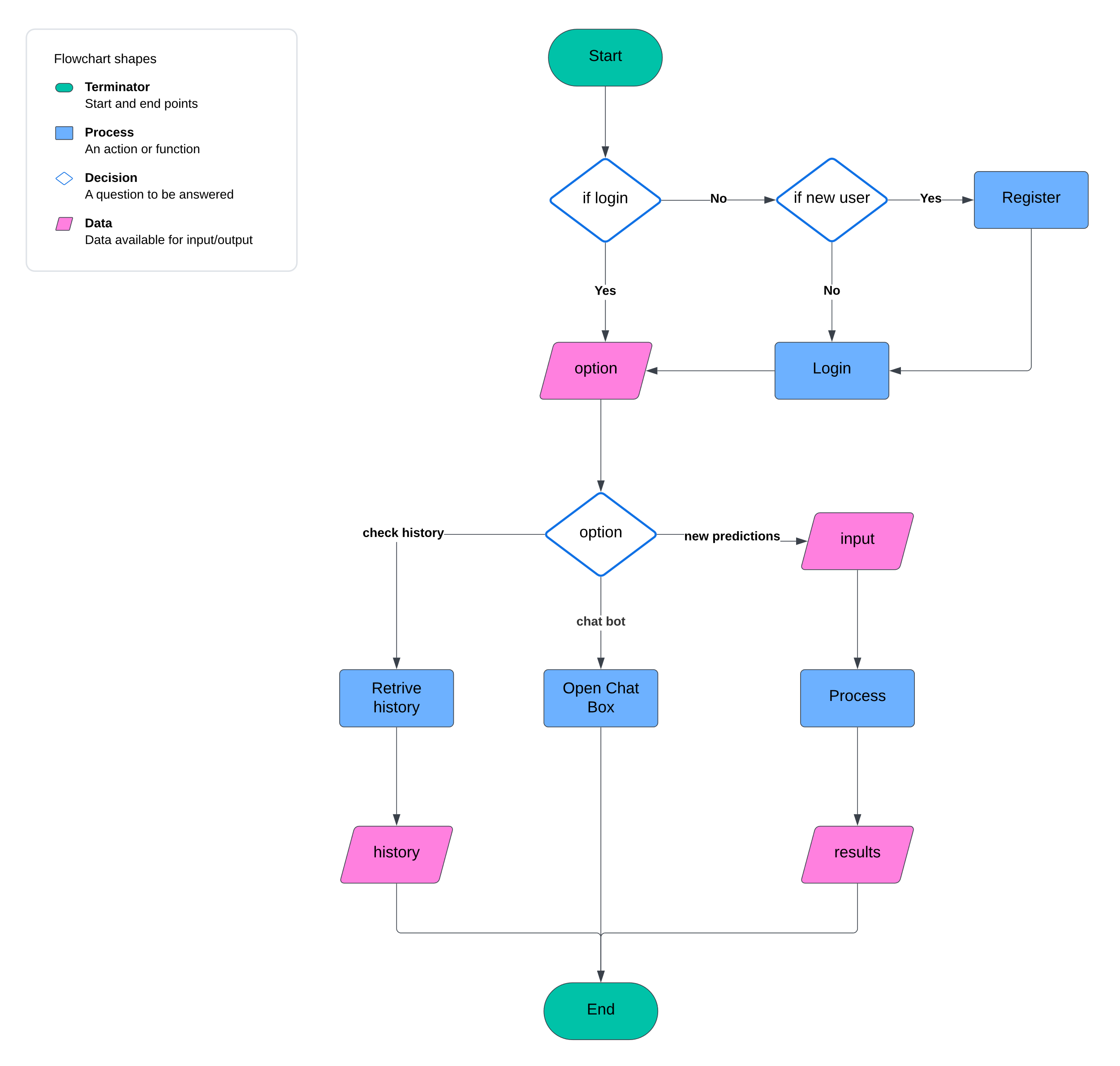
## Scope of the Project

Scope defines what needs to be achieved and the work that must be done to deliver a project. It includes specific project goals, deliverables, features, functions, tasks, deadlines, and ultimately costs.

# Proposed Methodology and Architecture

This section provides insight into what methodology you will employ in the development of the envisioned system. It is the systematic, theoretical analysis of the methods applied to your study. It can comprise step-by-step procedures, flowcharts, block diagrams or algorithms of the proposed system.





# Individual Tasks

|  |  |  |
| --- | --- | --- |
| **Team Members** | **Activity** | **Tentative Date** |
| Asad Ali, Asad ur Rehman, Muhammad Haroon Shahzad | Research and Project Planning | 11 March 2024 – 07 April 2024 |
| Asad ur Rehman, Muhammad Haroon Shahzad | Literature Review | 15 March 2024 – 07 April 2024 |
| Asad Ali, Muhammad Haroon Shahzad | Dataset Collection | 20 March 2024 – 29 March 2024 |
| Muhammad Haroon Shahzad, Asad Ali | Data Preprocessing and Pipeline Designing | 01 April 2024 – 12 April 2024 |
| Asad Ali | Interface Profiling and Requirement Analysis | 11 March 2024 – 12 April 2024 |
| Asad Ali, Asad ur Rehman, Muhammad Haroon Shahzad | Model Development and Training | 15 April 2024 – 10 May 2024 |
| Muhammad Haroon Shahzad | Website Development | 15 April 2024 – 10 May 2024 |
| Asad Ali, Asad ur Rehman | Model Evaluation and Validation | 13 May 2024 – 24 May 2024 |
| Asad Ali, Asad ur Rehman, Muhammad Haroon Shahzad | Integration and Testing | 13 May 2024 – 24 May 2024 |
| Asad Ali | Mobile App Development | 24 June 2024 – 09 Aug 2024 |
| Muhammad Haroon Shahzad, Asad Ali | Model Optimization and Enhancement | 24 July 2024 – 06 Sep 2024 |
| Asad Ali, Asad ur Rehman, Muhammad Haroon Shahzad | Interface Refinements | 11 Aug 2024 – 06 Sep 2024 |
| Muhammad Haroon Shahzad, Asad Ali | Backend Development and Integration | 11 Aug 2024 - 09 Nov 2024 |
| Asad Ali, Muhammad Haroon Shahzad | Deployment Process | 11 Nov 2024 – 30 Dec 2024 |
| Asad Ali, Asad ur Rehman, Muhammad Haroon Shahzad | Documentation and Reporting | 11 March 2024 – 30 Dec 2024 |

# Gantt Chart (Mandatory)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Activity** | |  |  |  | | --- | --- | --- | | Semester 7 | Summer Break | Semester8 | |
| |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | |
| Research and Project Planning | |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  | |
| Literature Review | |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  | |
| Dataset Collection | |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  | |
| Data Preprocessing and Pipeline Designing | |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  | |
| Interface Profiling and Requirement Analysis | |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  | |
| Model Development and Training | |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  | |
| Website Development | |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  | |
| Model Evaluation and Validation | |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  | |
| Integration and Testing | |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  | |
| Mobile App Development | |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  | |
| Model Optimization and Enhancement | |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  | |
| Interface Refinements | |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  | |
| Backend Development and Integration | |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  | |
| Deployment Process | |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  | |
| Documentation and Reporting | |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  | |

# Tools and Technologies

We have carefully selected different tools and technologies to make sure that we successfully achieve our goals and develop and implement a complete solution to our chosen problem.

## Technologies

### Machine Learning Model

* **Python:** Primary language for implementing ML models and web frameworks.
* **TensorFlow:** Building and training neural networks and deep learning models.
* **Keras:** Used with TensorFlow for rapid prototyping of high level ANNs.
* **scikit-learn:** Library for handling, classifications, and clustering problems.
* **OpenCV:** Library providing tools for image processing and manipulation.
* **NumPy:** Providing supports to other required libraries.
* **Pandas:** EDA and data pipeline designing of feeding data to ML model.
* **Matplotlib:** Visualizing ML model’s performance and confusion matrix.



### Interface Design and Development

* **HTML 5:** Assisting in structuring our web pages.
* **CSS 3:** Style sheets to give a robust look to the user interfaces.
* **JavaScript:** Making applications interactive to enhance user experience.
* **Bootstrap 5:** Ensure responsive design and quick prototyping.
* **Flask:** Quickly develops a web server in python dealing with ML model.
* **Pillow:** Processing images on the Python server for ML model.
* **React Native:** Building mobile app for engaging more users.
* **React:** Making fully functional web application for the project.
* **Django:** Hosts and manages the complete server for web and mobile.

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Description automatically generated A blue and black logo

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### Databases

* **MS SQL Server:** Storing our model training data after pipeline and preprocessing.
* **MongoDB:** Keeping user demographics and medical history for applications.

## Tools

### Integrated Development Environments

* **Google Collab:** Cloud based notebooks for Model development and collaborations.
* **Visual Studio Code:** Light weight and versatile IDE for app and web development.
* **Jupyter Notebook:** Interactive code writing environment for EDA and prototyping.
* **Anaconda:** Facilitates Python virtual environments and robust library management.

 A logo with orange and grey circles

Description automatically generatedA green circle with a white border

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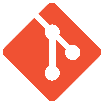
### Deployment

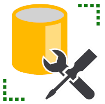
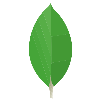
* **Microsoft Azure:** Facilitates ML model deployment and server less app hosting.
* **Docker:** Streamlines application management across different environments.

### Others

* **Git and GitHub:** Enables code management, sharing and team to collaborate.
* **SSMS:** SQL Server Management Studio to manage SQL database server.
* **MongoDB Compass:** Efficiently managing MongoDB from the desktop.

 A black cat with a tail

Description automatically generated  

# References (Mandatory)

You must provide references (IEEE style) when appropriate to justify your study.

# General Guidelines

Before starting write up, first, confirm that the correct template has the correct paper size. This FYP proposal template has been tailored for output on the A4 paper size. Specify paper width according to dimensions shown in Fig. 1.

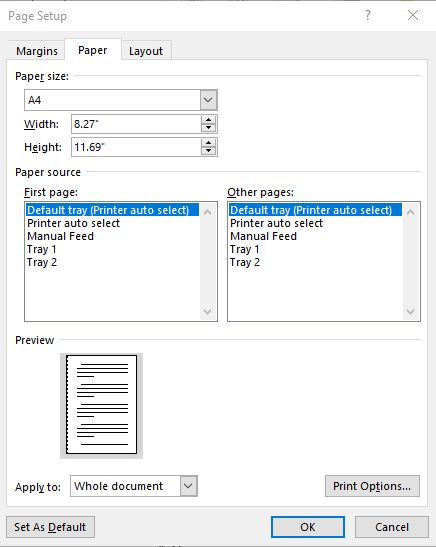


Figure 1. Paper size settings.

Ensure page margins are according to the margin values shown in Fig. 2.

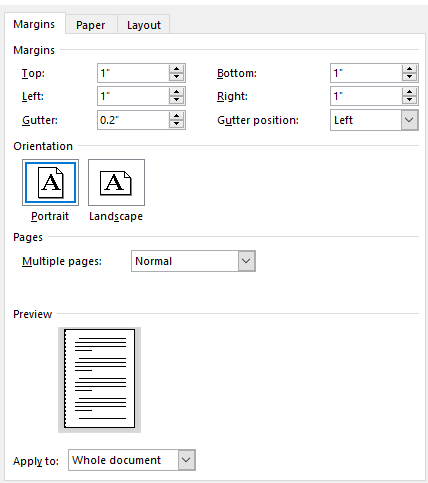


Figure 2. Template page margins.

# Template Heading (Heading-1)

Each section should start with heading font size 16, bold, and font face “Times New Roman”. First, outline the proposal in different sections and try to include relevant heading. If it is required to split the section into sub-headings, should use a font size of 13, bold, and font face “Times New Roman.

## Selecting a Sub Heading (Heading-2)

Describe FYP in detail problem background, problem complexity, and proposed solution.

### Selecting Sub Sub Heading (Heading-3)

Follow the numbering style for the sub-sub-section under the main section. In order to write the third level of subheading, use font size 12 and font face italic “Times New Roman.”

#### Body Text

All the body text should be in font size 12 and single line spacing. Moreover, ensure that the complete document must use only font-face “Times New Roman”.

# Figures and Tables

Use the following instructions to create tables and figures. All the figures and tables must be cross-referred in the text. For example, the figure is inserted in the introduction section in this document figure and can refer to the paper size, and margins see Fig. 1. In the same way, all tables should be cross-referred in the text.

## Figures and Tables

Figure captions should be below the figures; table heads should appear above the tables. Insert figures and tables after they are cited in the text. Use the abbreviation “Fig. 1”, even at the beginning of a sentence.

1. Table Type Styles

| Table Head | Table Column Head | | |
| --- | --- | --- | --- |
| Table column subhead | Subhead | Subhead |
| copy | More table copy |  |  |

1. Example of a figure caption. (*figure caption*)

Figure Labels: Use 11 point Times New Roman for Figure labels. Use words rather than symbols or abbreviations when writing Figure axis labels to avoid confusing the reader.

# Failure to Submit FYP proposal on time

Any student or group who fails to submit a project proposal on time breaches regulation and will not be registered in FYP-I.

Appendix A

*Include here the 1st page of Turnitin Report*

Every supervisor has his/her own Turnitin account. If not, then supervisors are requested to get the account from Library as soon as possible.