Department of Computer and Information Systems Engineering

CS-406 Computer Engineering Project

Proposal for the Final Year Design Project

Title	**DIGITAL OPD**

Domain	Domain 1 Optimization & Data Cleaning	Domain 2 Front-end implementation	Domain 3 MLA Implementation	Domain 4 Integration of functionalities	Domain 5 API services on Mobile app	Domain 6 Project Testing

1. **Nature of Project [Tick all that applicable]**

☐ New Project OR ☑Extension of Existing Project	☑ Industrial Collaboration	☑Funded
☐ Other Department Collaboration (If yes) Department Name_____	☐ Other Academic Institution Collaboration (If yes) Institution Name_____	

2. Brief Outline (*Problem Identification and Significance*)

As the world is evolving at a rapid pace in almost every domain and many industries are extremely benefited by Computer Science/Engineering like mechanical, automotive etc. Here comes the need of Computer Science/Engineering in the healthcare industry, there are many advancements that need to be addressed for a healthier world and Digital OPD aims the same. Before the outbreak of pandemic, we were progressing at a slow pace in healthcare technology, but pandemic has forced us to accelerate the pace of technology acquisition and adaptations. These advancements in healthcare technology have allowed physicians to diagnose and treat their patients better. Digital OPD will facilitate patients at their end. This is the reason behind the product development initiatives and refinements to the existing product.

3. Objectives

A digital OPD system's core idea is to provide convenience at the patient's end and make things easier for the provider, which includes:

- An electronic health record system which helps to get rid of stacks of medical documents and helps to save patient's lives because of lack of documents availability.
- To prognose various diseases from provided (symptoms, X-rays, images, test reports, MRI images) as input with detailed analysis under the supervision of well qualified doctors.
- To provide easy access for online OPD's.
- To provide E-prescription & medical store facilities.
- Introduce an online appointment approval/decline system using automation.
- To predict genetic diseases using hierarchical network family trees.
- To connect some other digital pharmacies.

4. Scope

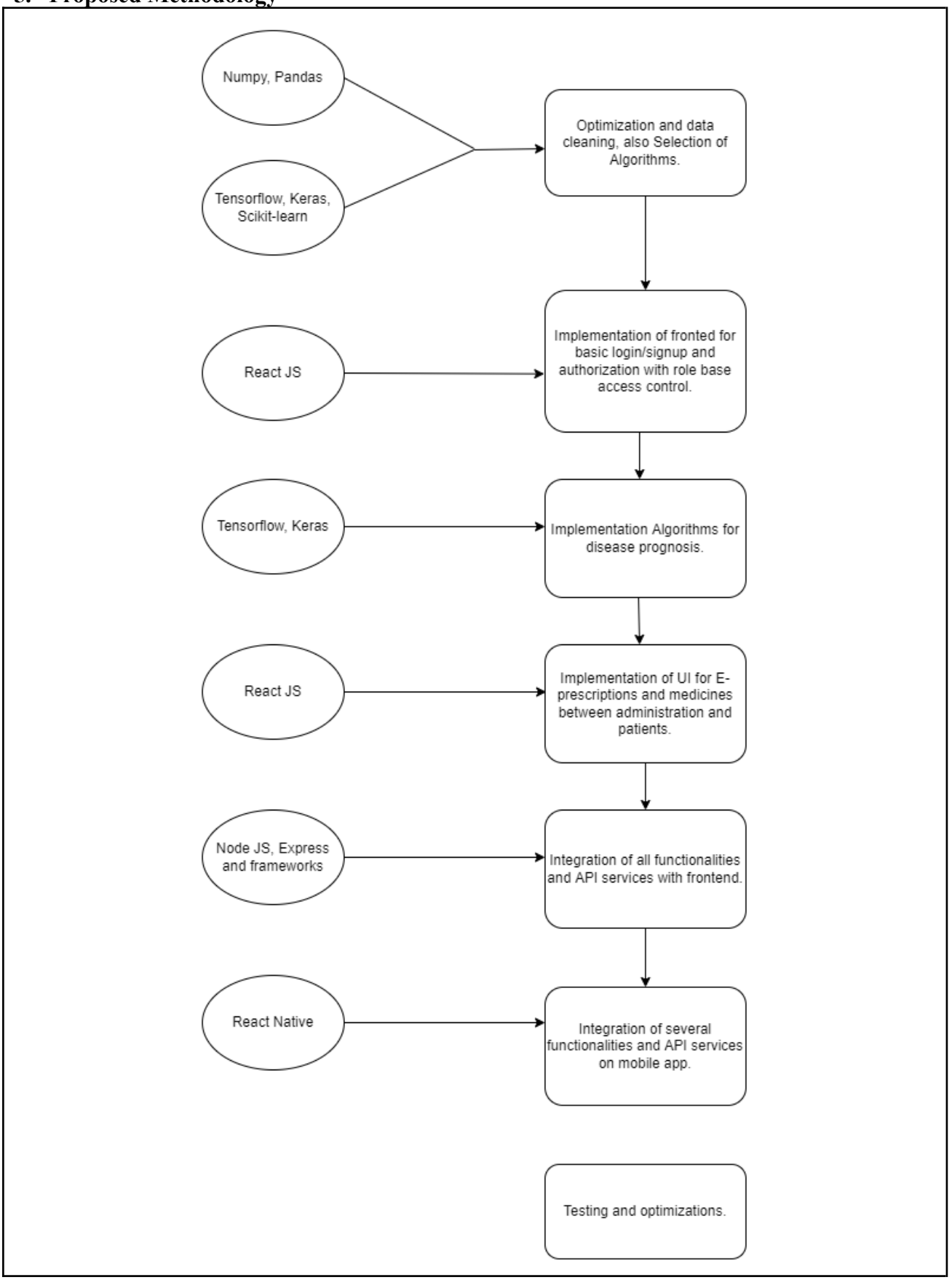
Current communication system is based largely on paper records and prescriptions. Which have become old-fashioned, inefficient, and unreliable. When multiple healthcare professionals and facilities are involved in providing healthcare for a patient, the health care services provided aren't often coordinated.

Typically, a physician writes a prescription on paper and gives it to the patient. The patient carries the prescription to the pharmacy,waits in line to hand the prescription to the pharmacist, and waits for the pharmacist to fill the prescription. The pharmacist might be unable to read the physician's handwriting; the patient could modify or forge the prescription; or the physician might be unaware of medications prescribed by other physicians. These and other problems indicate the need to improve the quality of the healthcare system.

With the help of Digital OPD we can now break out from long queues, overcrowding and ready time at medical institution 'Outpatient Departments' (OPDs) and clinics due to an incorporated mobility platform, Digital OPD, to help patients avoid queues in hospitals. Digital OPD is an extension of LUCID AI (Lung cancer and infection analysis), whose subject matter expert is Saleem Sayani (Director of the technology Innovation aid Center at the Aga Khan college; Director of the Aga Khan Improvement community digital health useful resource Center (AKDN dHRC)).

Digital OPD is a way to automate all of the inner procedures and workings of a hospital, its patients, and the body of workers. With our product the patient saves money, time and avoids unnecessary stress. The digital OPD application will mature in a phased way. Our intention is to offer satisfactory quality healthcare offerings to anybody globally. Digital OPD efficiently surmounts those enterprise demanding situations by means of passionately persisting and imparting, while at the same time, earning consumers' trust in telehealth services through its agile solutions.Effective and timely communication between patients, physicians, pharmacists, and other healthcare professionals is vital to a good healthcare system.

5. Proposed Methodology



The major equipment tools to be used:

- Tensorflow and Scikit-learn for machine learning and deep learning algorithms.
- MERN stack for web interface and backend API services.
- React Native for mobile app development.
- Flask framework for model's API services.

6. Resources Involved

Every project requires resources to contribute to its implementation and ultimately its success. The successful management of a project translates into efficient steering of the various project resources that are essential for the smooth running & completion of the project.

Cost resources:

Discussion underway with the resource provider.

Work Resources:

Every team member jointly plans and discusses everything and is present in every scheduled-project-meeting.

Time Resources:

A proper project plan has been made to meet milestones.

Equipment resources:

Software Specifications:

- For Front-end Development:
  - The GUI of our mobile app will be developed by using **React Native** which is an open-source UI software framework. We choose react native over flutter because, the speed of development is faster in it and it can be used for both android and iOS applications. Also **React JS** has an ability to reuse components
- For Back-end Development:
  - The same stack is repeated for the back-end development of the web app like the mobile app.
  - **Database:**
    - MySQL and MongoDB will fulfill database requirements of the application.
  - **Nodejs:**
    - Node.js is an open-source, cross-platform, back-end JavaScript runtime environment that runs on the V8 engine and executes JavaScript code outside a web browser.
  - **Framework:**
    - **Express:**
      - We preferred Express over Adonis which was our first choice as it is comparatively quicker as well as easier to use.
    - **PYTHON FLASK:**
      - Flask is a micro web framework that is written in Python. We will use this framework to implement API services of our Machine Learning Models.

Hardware Specifications:

Digital OPD is independent of hardware.

7. Description of Industrial Support (If any)

Sponsoring Organization:

"5CORE NEXTGEN"

Role of External:

The CEO of 5Core NextGen will fully fund digital OPD, which is an extension of LUCID AI (Lung Cancer and Infection Diagnosis), whose subject matter expert is Saleem Sayani (Director of the Technology Innovation Support Centre at the Aga Khan University; Director of the Aga Khan Development Network Digital Health Resource Centre (AKDN dHRC)). 5Core NexGen Solutions (Pvt) Ltd is an international Information and Communication Technology company specializing in Artificial Intelligence solutions. They help businesses by facilitating access to professional big data transformation, RFID, IOT, web solutions and services, boosting performance with tailored consultancy.

- The team of Digital OPD will be entirely guided at every stage during the development. The whole workflow will be monitored throughout in order to have the right product in hand as a result.
- All the relevant expenses will be borne, including the payment gateway and the launch of this product.
- Furthermore, there will be a representative present with the team of Digital OPD to authenticate the product developed and that all the features and functionalities have been added.

8. SDGs (If Applicable)

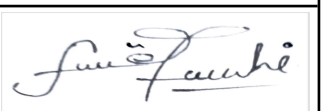
☐ No Poverty	☐ Zero Hunger
☑ Good Health and Well-Being	☐ Quality Education
☐ Gender Equality	☐ Clean water and Sanitation
☐ Affordable and Clean Energy	☑ Decent Work and Economic growth
☑ Industry, Innovations and Infrastructure	☐ Reduced Inequalities
☐ Sustainable Cities and Communities	☐ Responsible Consumption and Production
☐ Climate action	☐ Life Below Water
☐ Life on Land	☐ Peace, Justice and Strong Institutions
☐ Partnerships	

9. Gantt Chart

Months	Year 2022 to 2023
November	Research for optimization and cleaning of data.
December	Implementing frontend of basic login/signup and role based access control.
January	Implementing machine learning algorithms.
February	Implementing machine learning algorithms.
March	Implementing hierarchical family disease data.
April	Implementing an automatic appointment system.
May	Integrate functionalities with frontend.
June	Integrating several functionalities on mobile applications.
July	Project testing and optimization.

10. Details of Project Team

i. Students

No.	Name	Seat No.	Signature (s)
1	Muhammad Hammad	CS-19149	
2	Muhammad Jan	CS-19302	
3	Musfirah Fayyaz	CS-19303	
4	Faseeh U Rehman	CS-19304	

ii. Supervisors / Advisors

	Name	Designation & Department	Address & Contact	Signature(s)
Supervisor	Prof. Dr. Syed Abbas Ali	Professor Computer Systems Engineering	CISD NEDUET +92 3003991788	
Co-Supervisor (If any)				
Industrial Advisor (If any)				

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Project Serial No.: _____ Dated: _____	Signature Convener Steering Committee	Signature FYP Coordinator

☐ Proposal Approved	☐ Not Approved	☐ Returned for Clarification / Modification
Comments: (if any)		

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(Signature of Chairperson)

Date: _____