**[Final Year Project Proposal]**

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| Sr# | Student Name | Roll Number | Credit Completed | Signature |
| **1** | **Mahad Ashraf** | **20p-0563** | **94** |  |
| **2** | **Muhammad Sharjeel Akhtar** | **20p-0101** | **94** |  |
| **3** | - | - | - |  |

**Suggested Supervisor**:

Faculty Member’s Name: **Shoaib Muhammad Khan** Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date (07 September 2023)

**Project Details**

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| **Project Title** | **DeCognize**: Prescription Digitization Using Knowledge Graphs. | | |
| **Project Area of Specialization** | The project's area of specialization is in Optical Character Recognition (**OCR**) technology, with a focus on medical documents. Specifically, it specializes in **developing** and **fine-tuning** OCR models for the accurate extraction of text from handwritten and **printed medical prescriptions** in **English language**. This specialization involves integrating Object Detection models for precise text region localization, creating synthetic datasets, implementing a single-shot approach for efficient processing, and fine-tuning Document AI methods for medical entity recognition. The project's expertise lies in applying these OCR technologies to address the unique challenges posed by medical document digitization, contributing to improved healthcare data management and decision-making. | | |
| **List Related Core Subjects** | 1) Artificial Intelligence  2) Database Systems  3) Probability And Statistics  4) Programming Fundamentals  5) Object Oriented Programming  6) Data Structures | | |
| **List Related Elective Subjects** | 1) Natural Language Processing  2) Cloud Computing  3) Applied Machine Learning  4) Digital Image Processing | | |
| **Project Start Date** | 2023-09-07 | **Project End Date** | 2023-05-31 |
| **Project Summary (less than 2500 characters)** | Our project aims to revolutionize medical document processing using OCR, an innovative Optical Character Recognition (OCR) system. This system specializes in extracting English text from handwritten and printed medical prescriptions and documents. Our team has a track record of significant accomplishments, including the creation of synthetic datasets, fine-tuning of Object Detection models, and specialization in medical domain-specific AI methods. In this project, we will outline the implementation method, adhering to MLOps principles, for deploying our OCR in a real-world scenario. | | |
| **Project Objectives (less than 2500 characters)** | 1) Prescription Support 2) Enhanced Accuracy  3) Object Detection Integration  4) Synthetic Dataset Creation  5) Single-shot Approach  6) Document AI Integration  7) MLOps Implementation  8) AWS Cloud Deployment  9) User-friendly Interface  10) Documentation and Training  11) Performance Evaluations  12) Security Measures  13) Recognition and Impact  14) Contribution to Healthcare  15) Accessibility | | |
| **Project Implementation Method (less than 2500 characters)** | 1) Discussion and Resource Searching  2) Project planning and scope definition  3) Data collection and preparation  4) Model training and fine tuning  5) Integration of object detection models  6) Domain-specific Enhancements  7) MLOps Integration  8) User Interface Design And Integration  9) Testing and Evaluation  10) Documentation and Training  11) Deployment and Maintenance | | |
| **Benefits of the Project (less than 2500 characters)** | 1) Enhanced Medical Record Digitization  2) Improved Healthcare Decision-Making  3) Research Opportunities  4) Language Flexibility  5) Efficiency and Time Savings  6) Competitive Recognition  7) Synthetic Dataset Creation  8) Scalable Deployment  9) Accessibility  10) Contribution to Local Healthcare | | |
| **DTechnical Details of Final Deliverable (less than 2500 characters)** | We are going to develop an advanced OCR system, designed to extract text from handwritten and printed medical prescriptions in English. It will be an innovative OCR system equipped with OCR support, Object Detection integration, a synthetic dataset, a single-shot approach, Document AI integration, adherence to MLOps principles, AWS cloud deployment, a user-friendly interface, comprehensive documentation, training, performance evaluation, and stringent security measures. These technical details will ensure the success and usability of our project in the healthcare domain. | | |
| **Final Deliverable of the Project** | The final deliverable of the project, "DeCognize," is the innovative OCR system. This advanced OCR solution is designed to accurately extract text from handwritten and printed medical prescriptions in English language. Key components include a deep learning model fine-tuned on a diverse medical prescription dataset, advanced Object Detection integration, and a unique single-shot approach for efficient full-page text extraction. OCR also incorporates Document AI methods for entity recognition, follows MLOps principles, and is deployed on the AWS cloud, ensuring scalability and reliability. A user-friendly web interface, comprehensive documentation, and robust security measures complete the deliverable, offering enhanced healthcare data management and decision-making capabilities. | | |
| **Type of Industry** | This project primarily targets the healthcare industry. Specifically, it focuses on addressing the challenges related to the digitization and processing of medical documents, including handwritten and printed medical prescriptions. This project's innovations in Optical Character Recognition (OCR) technology and medical entity recognition have direct applications within the healthcare sector with additional use of knowledge Graph. | | |
| **Technologies** | This project leverages advanced technologies such as deep learning frameworks (PyTorch and TensorFlow), Object Detection models, Document AI methods, and cloud computing infrastructure (AWS) to develop the system for extracting entities from handwritten medical prescriptions. | | |
| **Sustainable Development Goals** | 1) Good Health and Well-being due to improved healthcare data management  2) Advancements in technology infrastructure and innovation.  3) OCR’s support addresses linguistic. | | |

**Project Key Milestones**

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| **Elapsed time in (days or weeks or month or quarter) since start of the project** | **Milestone** | **Deliverable** |
| * Month 1-Month 6 | ***1st 6 MONTHS*** | * Initial Research * Literature Review * Data Gathering * Annotations * Labeling * Annotation * Text-Detection * Detailed-Literature Analysis * Training Text Extraction Models * Improving Text Detection Techniques |
| * Month 6-Month 12 | ***2nd 6 MONTHS*** | * Creating FRONT-END and BACK-END (Initial) Complete Web Application * Improving Text Extraction Module * Testing And Validation * Integration of Improved Detection Techniques * User Testing and Feedback * Documentation * Training and Support * Performance Optimization * Deployment * Project Presentation And Final Evaluation |

**Project Equipment Details**

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| **Item Name** | **Type** | **No. of Units** | **Per Unit Cost (in Rs)** | **Total (in Rs)** |
| - | - | - | ­- | - |
| - | - | - | - | - |
| - | - | - | - | - |
|  |  |  | **Total in (Rs)** | **-** |