Invention Disclosure Form

DESCRIPTION OF INVENTION

Title: Medilytics

Abstract: Medilytics is a full-stack AI-based medical analytics system designed to simplify and automate the understanding of medical reports for both patients and healthcare professionals. The project combines OCR (Optical Character Recognition), Artificial Intelligence, and secure backend architecture to transform medical documents (images or PDFs) into meaningful, easy-to-understand health insights.

Description: Medilytics is an AI-powered medical analytics platform that enables automated reading, interpretation, and analysis of medical reports using modern technologies like Spring Boot, MySQL, Tesseract OCR, Apache PDFBox, JWT authentication, and Gemini API. The system is designed to make complex medical information simple and understandable for patients while helping healthcare professionals save time in report analysis.

Background: Medilytics is an AI-powered platform designed to simplify the analysis of medical data. Patients and healthcare providers often struggle to understand complex medical reports, prescriptions, and documents. Medilytics leverages AI to analyze this data and provide clear, easy-to-understand summaries, improving healthcare accessibility and decision-making.

Detailed Description: Medilytics is an AI-powered healthcare analytics platform that simplifies the interpretation of complex medical information. The platform is designed to assist both patients and healthcare professionals by analyzing medicines, medical reports, and prescriptions to generate easy-to-understand summaries.

Healthcare data, such as lab reports, prescriptions, and diagnostic results, often contain technical terms that are difficult for non-experts to interpret. Medilytics addresses this challenge by using advanced AI algorithms to extract key information, highlight important details, and present insights in simple, readable language. This helps users quickly understand medical instructions, treatment plans, and health conditions.

The platform aims to improve healthcare accessibility, reduce misinterpretation of medical data, and support informed decision-making. By transforming raw medical data into actionable insights, Medilytics empowers users to manage health more effectively, enhances patient-doctor communication, and streamlines the workflow for medical professionals.

Key Features:

- AI-based analysis of medical prescriptions and reports.
- Generation of concise, understandable summaries.
- Highlights critical information for better decision-making.
- User-friendly interface for both patients and professionals.
- Potential integration with healthcare systems for real-time data processing.

Impact:
Medilytics bridges the gap between complex medical information and user understanding, making healthcare more accessible and helping reduce errors due to misinterpretation of medical data.

TECHNICAL PROBLEM INVENTION IS SOLVING

In the current healthcare system, **medical reports and prescriptions are often difficult for patients to understand** due to the use of complex medical terminology, abbreviations, and technical data. Patients frequently rely on doctors or pharmacists to interpret this information, leading to **delays, confusion, or misinterpretation** of their health status and prescribed medicines.

Moreover, the **manual process** of reading and analyzing medical reports is time-consuming for healthcare professionals, and there is **no unified, intelligent system** that can automatically extract, interpret, and summarize data from both **medical reports and prescriptions**.

Another major challenge is the **lack of an integrated platform** that can:

- Analyze **images or PDFs** of reports and prescriptions.
- Interpret **medicine details, dosage, and interactions**.
- Generate **easy-to-understand summaries** for patients.
- Ensure **data security** during medical information processing.

Medilytics solves these problems by introducing an **AI-driven, automated solution** that reads, analyzes, and simplifies medical data securely, eliminating the need for manual interpretation and improving accessibility for non-medical users.

HOW TECHNICAL SOLUTION IS PERFORMED/EXPECTED TO BE PERFORMED

The **Medilytics** system performs its technical solution through a series of integrated steps that combine **Optical Character Recognition (OCR)**, **Artificial Intelligence (AI)**, and **secure backend processing**. The process flow is as follows:

1. **Input and Upload:**
   The user uploads a **medical report, prescription, or medicine image/PDF** through a responsive **React frontend interface**. The file is securely sent to the backend via RESTful APIs.

2. **Data Extraction (OCR & PDF Parsing):**
   The backend, built using **Spring Boot**, receives the uploaded document.
   - **Tesseract OCR** extracts textual data from image-based medical reports.
   - **Apache PDFBox** extracts text from PDF reports.
     This converts unstructured visual medical data into a structured text format for further processing.

3. **AI-Based Analysis (Gemini API Integration):**
   The extracted text is passed to **Google's Gemini API**, which interprets and analyzes the medical content.
   - For **reports**, it explains lab test results and identifies abnormalities.
   - For **prescriptions**, it extracts medicine names, dosages, and instructions.
   - For **medicine analysis**, it identifies the purpose, side effects, interactions, and safe usage warnings.

4. **Data Storage and Security:**
   All results are securely stored in a **MySQL database** for user access and history tracking. The entire communication is protected using **JWT (JSON Web Token) authentication**, ensuring that only authorized users can upload, analyze, or view data.

5. **Output Presentation:**
   The analyzed and summarized report is displayed to the user through an interactive **frontend dashboard**. Users can easily view results, medicine information, and summarized insights in a clear, user-friendly format.

TECHNICAL ADVANTAGES

- **AI-Powered Interpretation:** Automatically analyzes and explains complex medical reports and prescriptions using Gemini API.
- **Multi-Format Support:** Processes both images and PDFs using Tesseract OCR and Apache PDFBox.
- **Enhanced Accessibility:** Converts complex medical data into simple, understandable summaries for patients.
- **Secure Architecture:** Uses JWT authentication to protect sensitive medical information.
- **Scalable and Efficient:** Built on a Spring Boot–MySQL backend with RESTful APIs for fast and reliable performance.
- **User-Friendly Interface:** Responsive React frontend with an intuitive dashboard for smooth user experience.
- **Time-Saving Automation:** Eliminates the need for manual interpretation of reports and prescriptions.

Applicant(s) Details

Name in Full	Gender	Nationality	Country of Residence	Address of the Applicant
GL Bajaj Institute of Technology and Management		Indian		Plot No.2 , APJ Abdul Kalam Road, Knowledge Park 3, Greater Noida, Uttar Pradesh, India, 201306

Inventor(s) Details

Name in Full	Gender	Nationality	Country of Residence	Address of the Inventor
Deepanshu Kumar	Male	Indian	India	Plot No.2 , APJ Abdul Kalam Road, Knowledge Park 3, Greater Noida, Uttar Pradesh, India, 201306
Prashant Baghel	Male	Indian	India	Plot No.2 , APJ Abdul Kalam Road, Knowledge Park 3, Greater Noida, Uttar Pradesh, India, 201306
Palak Goswami	Female	Indian	India	Plot No.2 , APJ Abdul Kalam Road, Knowledge Park 3, Greater Noida, Uttar Pradesh, India, 201306
Priyanka Kumari	Female	Indian	India	Plot No.2 , APJ Abdul Kalam Road, Knowledge Park 3, Greater Noida, Uttar Pradesh, India, 201306