

## **MedConnect: AI-Driven Patient-Doctor Matching**

### **Problem Statement:**

In today's healthcare landscape, patients struggle to find doctors who match their specific medical needs, leading to delays in care, misdiagnoses, and poor treatment outcomes. This challenge is compounded by language barriers, limited transparency about doctor expertise, and difficulty integrating medical history into the decision-making process. For example, a rural patient with diabetes might struggle to find an endocrinologist in their locality, facing long travel times or unavailable specialists. Doctors, too, lack efficient ways to reach patients who need their expertise, hindering timely interventions.

**This problem matters because it impacts millions across India—rural and urban patients, especially in linguistically diverse and underserved regions, and healthcare providers striving to deliver effective care. With a doctor-patient ratio of 1:834 (below WHO's 1:1000 recommendation), inefficient matching strains an overburdened system, increases costs, and worsens health disparities. Studies estimate 20% of diagnoses falter due to poor specialist access, disproportionately affecting vulnerable groups like migrant workers and low-income families.**

## **Proposed Solution :**

**MedConnect** is an innovative AI-powered platform designed to address the pervasive challenge of connecting patients with the right doctors in India's complex healthcare system, where delays, misdiagnoses, and language barriers often hinder effective care. Patients frequently waste time navigating outdated directories or face difficulties finding specialists suited to their needs, especially in multilingual and underserved regions. MedConnect tackles this by integrating an interactive voice chatbot, a document analyzer, and a comprehensive doctor directory to deliver personalized, efficient healthcare access.

The platform begins with an **AI-driven voice chatbot** that allows patients to describe their symptoms aloud in their preferred language—supporting over 22 Indian languages like Hindi, Tamil, or Bengali. Through an interactive question-and-answer session (e.g., “How long have you had this cough? Is it dry or wet?”), the AI gathers detailed symptom data, making it accessible for patients who find typing cumbersome, such as the elderly or those with limited literacy. Simultaneously, a **document analyzer** enables patients to upload health reports (e.g., blood tests, X-rays), using optical character recognition (OCR) and natural language processing (NLP) to extract critical insights like abnormal glucose levels or imaging findings. The AI combines these inputs to infer potential specialties needed—such as pulmonology for respiratory issues—without diagnosing, then recommends doctors from its directory. Patients can filter these suggestions by location, fees, reviews, and real-time availability, ensuring practical and trusted options.

**Unique aspects** of MedConnect include its voice-based, multilingual interface, which breaks down language barriers, and its dual-input system (voice and documents), offering a more accurate match than symptom-only platforms. Unlike typical directories like Practo, MedConnect's interactive AI mimics a triage process, enhancing precision in specialty recommendations.

**Modern technologies** power this solution. *Speech recognition and NLP* process voice inputs across dialects, while *machine learning* refines matching accuracy by learning from patient interactions and outcomes. *OCR and data processing* handle document analysis, extracting actionable medical data. *Cloud*

*computing* ensures scalability, delivering real-time updates on doctor availability nationwide. Encrypted data storage complies with India's Personal Data Protection Act, safeguarding privacy. By leveraging these computational techniques, MedConnect transforms healthcare access, empowering patients with swift, tailored doctor connections and supporting physicians with better-aligned patient loads, ultimately improving care quality and system efficiency.

### **Example Scenario**

A patient says, "I've been feeling chest pain and shortness of breath." The AI asks, "When did it start? Is the pain constant or occasional?" Meanwhile, the patient uploads a recent ECG report. The AI detects irregular patterns in the report and, based on the symptoms, suggests a cardiologist. The patient filters the recommendations by location and reviews, booking an appointment with a nearby, well-rated doctor.

### **Tech Stack & Tools for MedConnect:**

**Frontend:** javascript (React) , HTML, CSS

**Backend:** javascript(Node.js)/java(Springboot)/python(Django)

#### **AI/ML:**

- **SpeechRecognition (Python):** For converting patient voice inputs into text, supporting the voice chatbot.
- **Natural Language Processing (NLP):** To process and understand symptom descriptions from voice data.(I don't know it yet).
- **OCR: (Tesseract):** An open-source tool for extracting text from health reports (e.g., PDFs, images of lab results.)
- **TensorFlow or PyTorch:** For building and training machine learning models to infer specialties from symptoms and documents.

**Database:** MongoDB

**Cloud Services:** AWS/GCP

## Architecture Overview



### **Challenges & Mitigation Strategies:**

- **Accurate Voice Recognition Across Languages and Accents:** Use **Google Cloud Speech-to-Text**, which supports multiple Indian languages and adapts to accents, supplemented by training with diverse audio datasets.
- **Convincing doctors to join and maintain profiles might be tough:** Offer incentives like free profile setup, increased patient visibility, or analytics on their practice (e.g., appointment trends).
- **Health reports vary in format (handwritten notes, PDFs, images), and OCR errors could misinterpret critical data (e.g., “HbA1c” mistaken for “HbAlc”)**
- **With millions of potential users across India, the platform could face slowdowns or crashes during peak times (e.g., flu season):** Deploy on AWS EC2 with auto-scaling to add server capacity as demand grows, and use AWS Lambda for lightweight, real-time tasks like availability updates.
- **Maintaining doctor directory.**

**These challenges are manageable with a mix of smart tech choices, user feedback, and strategic partnerships.**