SENICARE AI

AI-Powered Medical Assistant for Prescription Analysis

1. Introduction

Healthcare systems all over the world are facing increasing challenges related to aging populations, medical complexity, and digital transformation. One of the most common problems is the misinterpretation of medical prescriptions. Doctors often write prescriptions by hand, and patients, especially seniors, may not understand the medication names, dosages, or duration of treatment. This can result in wrong drug intake, overdoses, or skipped medication, which are serious risks to patient safety.

With the rapid progress of Artificial Intelligence, new opportunities have emerged to solve these problems. OCR technologies can convert images of documents into digital text, and language models can understand and structure this information. SeniCare AI was created to leverage these technologies to improve medical accessibility and patient safety.

The objective of this project is not to replace doctors, but to provide patients with an intelligent assistant that helps them understand their prescriptions, check their medications, and follow their treatment correctly.

2. Objectives of the Project

The main objectives of SeniCare AI are:

- **To allow users to upload a medical prescription in image format**
- **To extract text from the image using OCR**
- **To correct OCR errors using Artificial Intelligence**
- **To identify the patient information and medications**
- **To display the information in a clear medical interface**
- **To generate a PDF medical report**
- **To provide a conversational assistant for medical questions**

These objectives aim to improve patient autonomy, safety, and access to medical information.

3. General Architecture

SeniCare AI follows a client-server architecture composed of three main layers:

Frontend (User Interface)

The frontend is built using HTML, Tailwind CSS, and JavaScript.
It provides:

- **A modern chat-style interface**
- **An OCR upload modal**
- **Medication cards**
- **Patient information display**
- **PDF export button**

Backend (FastAPI)

The backend is implemented using FastAPI (Python).
It exposes two main endpoints:

- **/chat → for general medical conversation**
- **/ocr → for processing prescription images**

AI Services

The backend integrates:

- **OCR engine to extract raw text from images**
- **Large Language Model (LLM) to:**
  - **Correct OCR errors**
  - **Understand medical context**
  - **Extract structured medical data in JSON format**

4. Functional Workflow

The user clicks the "+" button to upload a prescription image

The image is sent to the backend via the /ocr endpoint

The OCR extracts the raw text

The AI model analyzes the text and generates:

- **A corrected version**
- **A structured JSON containing patient and medications**

The frontend parses the JSON and displays:

- **Patient card**
- **Medication cards**

The user can download the prescription as a PDF

The user can ask additional questions via the chat interface

5. OCR and Medical Text Processing

The OCR module converts scanned prescriptions into text. However, OCR alone is not sufficient because medical prescriptions often contain:

- **Handwritten text**
- **Abbreviations**
- **Errors and noise**

Therefore, a Large Language Model is used to:

- **Correct spelling mistakes**
- **Interpret medical terms**
- **Normalize drug names and dosages**
- **Generate structured medical data**

Example of extracted JSON:

```
{

  "patient": { "name": "Marie Curie", "age": "45" },

  "medicaments": [

    { "name": "Amoxicilline", "dose": "500 mg", "times": ["3 fois par jour", "7 jours"] }

  ]

}
```

6. User Interface Design

The interface follows modern medical UI standards:

- **Dark mode for visual comfort**
- **Clear separation between messages**
- **Medication cards for clarity**
- **Patient card for identification**
- **Simple upload and send buttons**

The goal is to make the system usable even by elderly patients.

8. Security and Data Privacy

Although the current version is a prototype, the system is designed to be compatible with medical data security principles:

- **Data is processed on the backend**
- **No permanent storage without consent**
- **The architecture can easily be extended with authentication and database encryption**

9. Results and Evaluation

The system successfully:

- **Reads prescription images**
- **Extracts medical data**
- **Displays it in a structured form**

Compared to simple OCR tools, SeniCare AI provides:

- **Error correction**
- **Medical understanding**
- **Human-friendly output**

10. Limitations

Some limitations remain:

- **OCR accuracy depends on image quality**
- **Medical database is not yet integrated**
- **No automatic drug interaction checking**

These can be improved in future versions.

11. Future Improvements

Planned enhancements include:

- Patient history storage (MongoDB)
- Doctor dashboard
- Drug interaction warnings
- Cloud deployment
- Mobile version

12. Conclusion

SeniCare AI demonstrates how Artificial Intelligence can be effectively applied to healthcare to improve the understanding of medical prescriptions. By combining OCR, natural language processing, and a modern web interface, the system transforms complex handwritten prescriptions into clear and structured medical information. This helps patients, especially seniors, follow their treatments more safely and accurately. The project also shows the importance of intelligent data processing beyond simple text extraction. Overall, SeniCare AI highlights the potential of AI to enhance patient safety, accessibility, and the quality of healthcare services.