BreastCare AI - User Guide

Overview

BreastCare AI is an intelligent assistant designed to provide reliable, evidence-based information about breast cancer. The system uses Retrieval-Augmented Generation (RAG) technology to answer questions based on medical documents and scientific literature that you provide. It also includes advanced tools for breast ultrasound image analysis, appointment scheduling, medication reminders, and a medical glossary.

Getting Started

System Requirements

- Ollama installed and running on your system
- At least one of these models available in Ollama: llama3:8b, phi2-breast-cancer, or breast-cancer-llama3
- PDF documents with breast cancer information for the knowledge base

Initial Setup

1. Configure your patient profile in the sidebar
2. Upload relevant medical documents through the "Conversation & Documents" tab
3. Process the documents to create a searchable knowledge base

Main Features

1. Conversation & Documents

This integrated tab allows you to:

- Upload and process medical documents
- Ask questions about breast cancer
- Receive evidence-based answers from your documents
- Save medical terms to the glossary
- Schedule questions for later consultation

Document Management

- Create different collections for various types of documents
- Upload PDFs to specific collections or to the permanent knowledge base
- Process documents to extract searchable information

Conversation Features

- Ask questions in natural language

- Get responses based on your uploaded documents
- Identify and explain medical terms
- Save important questions for appointments

2. Breast Ultrasound Analysis

This tab provides AI-powered analysis of breast ultrasound images:

- Upload ultrasound images in common formats (JPG, PNG)
- View AI segmentation of potential abnormalities
- Get BI-RADS classification with confidence scores
- See detailed explanations of model decisions
- Export comprehensive reports

BI-RADS Classification

The system uses a weighted rule-based approach to classify findings on a standardized scale:

- BI-RADS 1: Negative (no significant abnormality)
- BI-RADS 2: Benign finding
- BI-RADS 3: Probably benign
- BI-RADS 4: Suspicious (A: low, B: moderate, C: high suspicion)
- BI-RADS 5: Highly suggestive of malignancy

3. Calendar

Manage your medical appointments:

- Save questions from conversations for discussion with doctors
- Create and schedule appointments
- Integrate with Google Calendar (if configured)
- Set reminders for important medical events

4. Medication

Track and manage medication schedules:

- Set up medication reminders

- Track adherence to medication regimens
- Receive notifications about upcoming doses

5. Medical Glossary

Build your personalized medical dictionary:

- View medical terms collected from conversations
- See clear definitions of complex medical terminology
- Add custom terms and definitions

Settings and Configuration

Patient Profile

Configure your profile to get personalized information:

- Age: Helps tailor age-appropriate recommendations
- Cancer Stage: Customizes information to your current situation:
  - Pre-diagnosis: General information and screening recommendations
  - Recently diagnosed: Treatment options and initial steps
  - In treatment: Side effect management and care during therapy
  - Post-treatment: Recovery and follow-up care
  - Survivor: Long-term monitoring and quality of life
- Information Preferences: Controls the level of detail in responses

Model Settings

Configure how the AI generates responses:

- LLM Model: Choose the language model for responses
- Embedding Model: Select the model for processing documents
- Temperature: Adjust response creativity (higher = more variation)

Document Processing Options

- PDF Loading Method: Choose between fast or robust document processing
- Chunk Size: Adjust how documents are divided for processing
- Chunk Overlap: Set how much context is shared between chunks
- Retrievals: Set how many document chunks are used to answer questions

Frequently Asked Questions

General Questions

Q: What kind of documents should I upload?
A: Medical literature about breast cancer such as clinical guidelines, research papers, patient education materials, and treatment protocols. The quality of answers depends on the documents you provide.

Q: Is my data secure?
A: Yes, all processing happens locally on your machine. Documents and conversations are not sent to external servers.

Q: How accurate is the information?
A: The system provides information based solely on the documents you upload. It includes confidence indicators and disclaimers for medical information.

Technical Support

Q: What if the system can't answer my question?
A: Try rephrasing your question or upload more relevant documents. The system can only answer based on information contained in your uploaded documents.

Q: How do I update the system?
A: Visit the GitHub repository for the latest updates and instructions: https://github.com/higlesiasvd/breast-cancer-analysis.git

Q: Can I use this on any computer?
A: The system requires Ollama and compatible models to be installed. It works on most computers that can run Python and Streamlit applications.

Important Disclaimer

This application provides educational information based on verified medical documents, but **does not replace professional medical advice**. Always consult with your medical team before making decisions about your health.

Information is automatically extracted from loaded documents, and while every effort is made to ensure accuracy, it may contain errors or be outdated.

Technical Reference

Command Line Installation

```
# Clone the repository
git clone https://github.com/higlesiasvd/breast-cancer-analysis.git

# Install dependencies
pip install -r requirements.txt

# Install Ollama models
ollama pull llama3:8b
# Optional specialized models
ollama pull phi2-breast-cancer
ollama create breast-cancer-llama3 -f ./Modelfile

# Run the application
streamlit run app.py
```

Model Recommendations

- **llama3:8b**: General-purpose model with good performance
- **phi2-breast-cancer**: Specialized model fine-tuned for breast cancer
- **breast-cancer-llama3**: Custom model with oncological context awareness

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