Disease Models: Medical Image Diagnosis App

Welcome! This project is a simple tool that helps you analyze medical images (like X-rays or brain scans) to detect certain diseases using artificial intelligence (AI).

What does this app do?

- You upload a medical image (like an X-ray or MRI scan).
- The app uses AI to figure out what kind of image it is (for example, a brain scan or a chest X-ray).
- It then uses a special AI model to check for diseases in that image, such as Alzheimer's, bone fractures, spine issues, brain tumors, pneumonia, or hair-related conditions.
- The app shows you the processed image and a diagnosis result.

How does it work?

1. **Image Type Detection:**
    - The app first checks what kind of medical image you uploaded using a smart AI model called CLIP.
2. **Disease Detection:**
    - If it's a brain scan, it checks for Alzheimer's disease and tells you the stage (like Mild, Moderate, etc.).
    - If it's an X-ray (bone, spine, chest, etc.), or a hair-related image, it uses another AI model to find things like fractures, tumors, pneumonia, or hair conditions.
3. **Results:**
    - You get a marked-up image and a simple text result explaining what was found.

What models does it use?

- **CLIP Model:** Figures out what kind of image you uploaded.
- **Alzheimer's Model:** Checks brain scans for signs of Alzheimer's disease.
- **YOLOv8 Models:** Looks for problems in X-rays (like fractures, tumors, pneumonia) and now also supports hair-related image analysis.

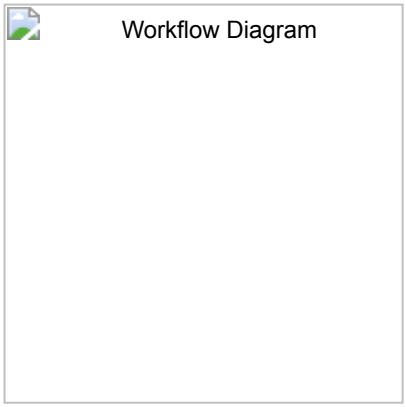
What images can I use?

- Brain scans (for Alzheimer's)
- X-rays of bones, spine, chest (for fractures, tumors, pneumonia)
- Hair/scalp images (for hair-related analysis)

How do I use it?

1. Open the app (it runs in your web browser).
2. Click to upload your medical image.
3. Wait a few seconds for the AI to analyze it.
4. See the results and the processed image.

Workflow Overview



Project Files & What They Do

File/Folder	What it's for (in simple terms)
app.py	The main app: runs the AI, handles images, and shows the web interface.
try_model.py	Lets you test a model on a sample image from the command line.
try_api.py	Lets you test the app's API (for developers or advanced users).
requirements.txt	Lists the software needed to run the app.
images/	Example/reference images for each disease or condition.
testing_images/	Extra images for testing the models (not used by the main app directly).
alzheimers.h5	The AI model for Alzheimer's detection.
bone.pt	The AI model for bone fracture detection.
spine.pt	The AI model for spine issue detection.
brain_tumor.pt	The AI model for brain tumor detection.
Pneumonia.pt	The AI model for pneumonia detection.
Hair.pt	The AI model for hair/scalp condition detection.
train_model_yolo.ipynb	Notebook for training new YOLO models (for developers/advanced users).
train_model_tensorflow.ipynb	Notebook for training new TensorFlow models (for developers/advanced users).

File/Folder	What it's for (in simple terms)
README.md	This file! Explains the project for everyone.
NON_TECH_OVERVIEW.md	A more detailed, business-friendly overview.
TECHNICAL_DETAILS.md	Technical details for developers and students.

What does each part of the main app (app.py) do?

- **Imports & Setup:** Loads all the tools and AI models needed for the app to work.
- **Image Type Detection (CLIP):** Figures out what kind of image you uploaded (brain, bone, hair, etc.).
- **Alzheimer's Model:** If it's a brain scan, checks for Alzheimer's and tells you the stage.
- **YOLOv8 Models:** If it's an X-ray or hair image, checks for fractures, tumors, pneumonia, or hair conditions.
- **Pipeline:** The main logic that decides which model to use and puts everything together.
- **Web Interface (Gradio):** The part you see in your browser—lets you upload images and see results.

New Features & Models

- **Hair Model:** The app now supports hair/scalp image analysis using the new Hair.pt model and reference images.
- **New Scripts:**
  - `try_model.py`: Lets you test a model on a sample image without using the web app.
  - `try_api.py`: Lets you test the app's API directly (for advanced users or developers).
- **Training Notebooks:**
  - `train_model_yolo.ipynb`: For training new YOLO models (object detection, e.g., for new diseases or conditions).
  - `train_model_tensorflow.ipynb`: For training new TensorFlow models (e.g., for Alzheimer's or other classification tasks).
  - *These are for developers or researchers who want to customize or improve the AI models. You don't need them to use the app!*

Who is this for?

- Anyone curious about AI in medical imaging.
- Not for real medical diagnosis—just for learning and demonstration!

For more details or technical info, see the advanced documentation file (TECHNICAL_DETAILS.md).