PlasmoScan: AI-Powered Malaria Detection

AI-driven precision for faster, affordable malaria detection.".

Team members-

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Problem Ttheame

[WHHM01] Affordable Diagnostics: Many rural areas lack access to affordable diagnostic tools. How can technology make healthcare diagnostics more accessible and cost-effective

The Problem: Malaria's Devastating Impact

"Imagine a world where malaria can be detected instantly with just a simple image. Malaria is a life-threatening disease that affects millions globally, especially in underdeveloped regions where access to medical experts is limited."

"Traditional malaria diagnosis relies on manual examination of blood smear images under a microscope. This process is time-consuming, requires trained professionals, and is prone to human errors."

"Our solution? 🚀 ***PlasmoScan – an AI-powered malaria detection system that provides fast and accurate results using deep learning!"***

How PlasmoScan Works:-

🎯 **Step 1:** The user uploads a microscopic blood smear image to our system.
🎯 **Step 2:** Our AI model, trained on thousands of malaria-infected and healthy cell images, analyzes the input using deep learning techniques.
🎯 **Step 3:** The AI predicts whether the sample contains malaria-infected cells or not and assigns a confidence score.
🎯 **Step 4:** The result is displayed instantly, along with an animated progress bar for user engagement.

"With this approach, PlasmoScan makes malaria detection faster, more reliable, and accessible even in remote areas."

Use Case: How PlasmoScan Works in a Real-Life Scenario

1. **Patient Visits a Local Clinic**
   - A patient in a rural area shows symptoms like fever, chills, and fatigue.
   - The local healthcare worker suspects malaria and decides to test for it.
2. **Blood Sample Collection**
   - A small blood sample is taken from the patient.
   - The sample is prepared as a blood smear on a glass slide.
3. **Microscopic Image Capture**
   - The slide is placed under a microscope.
   - The healthcare worker captures an image using a mobile camera or digital microscope.
4. **Image Upload to PlasmoScan**
   - The captured image is uploaded to PlasmoScan via a mobile or web-based interface.
5. **AI-Powered Analysis**
   - PlasmoScan processes the image using deep learning algorithms.
   - It detects malaria parasites and calculates the confidence score.
6. **Instant Diagnosis Result**
   - The system provides an immediate result:
     - **Positive for Malaria** → The patient is advised to begin treatment.
     - **Negative for Malaria** → Further medical evaluation may be needed.
7. **Faster Treatment & Improved Healthcare**
   - The healthcare worker prescribes the necessary treatment.
   - The patient receives timely care, reducing complications and risk of severe malaria.

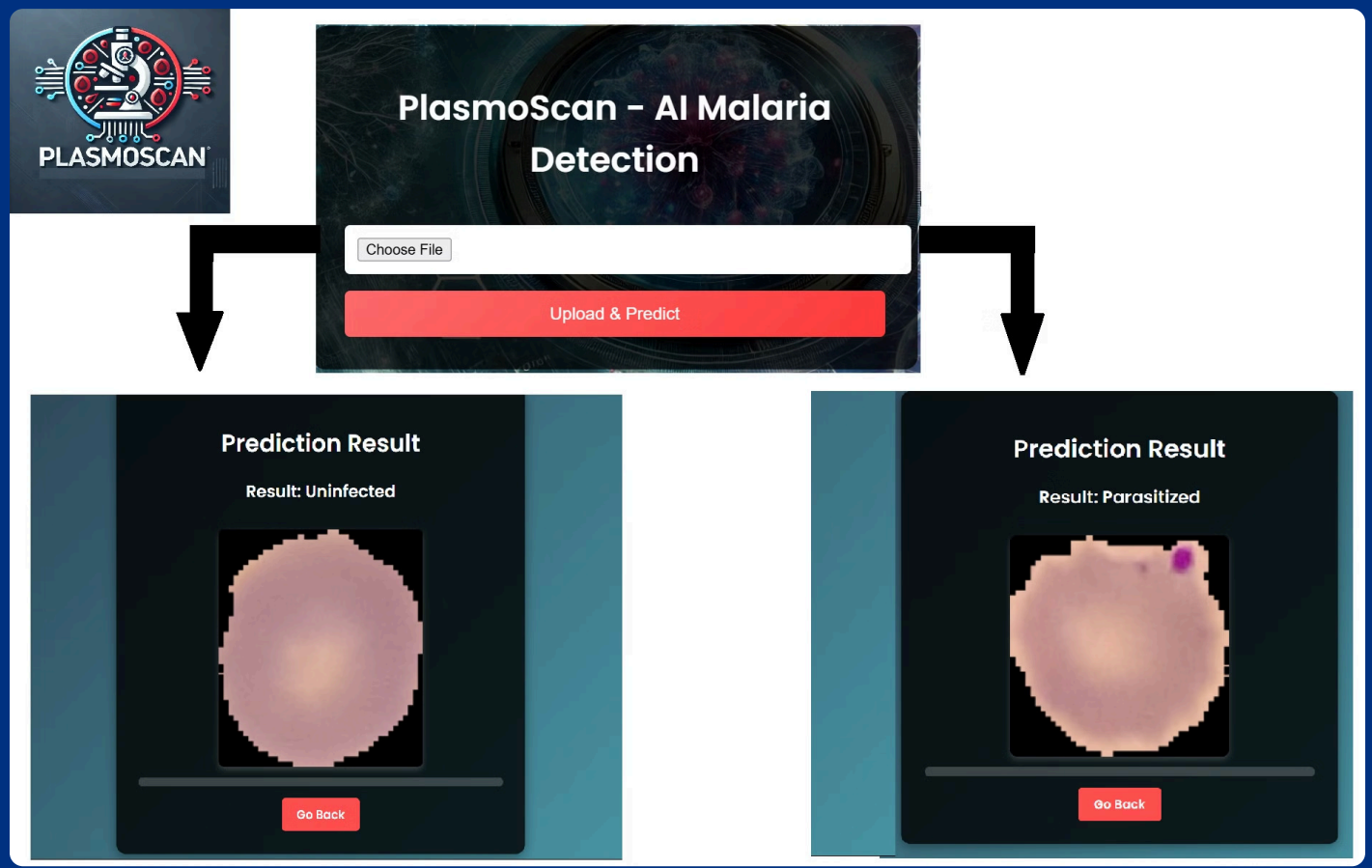
This process eliminates delays, reduces dependence on expert technicians, and brings affordable malaria detection to remote areas.

PlasmoScan: Our Solution

"Now, let's see PlasmoScan in action!"

"Here's our web-based interface. We simply upload a blood smear image, click 'Predict,' and within seconds, our AI model processes the image and delivers the result."

- **(Showcase the prediction appearing, along with the confidence score and progress bar animation.)**



*"As you can see, the system has identified the result with a confidence score of {{ **confidence** }}%. This helps doctors and healthcare professionals assess the reliability of the prediction."*

*"We trained our AI model using a publicly available **malaria dataset** containing thousands of cell images. By leveraging machine learning techniques, we improved the model's accuracy to detect malaria with high precision."*

Technology Stack

- Machine Learning & AI:

- TensorFlow and Keras – For training and running the malaria detection model
- OpenCV – For image preprocessing and enhancement

- Backend & API:

- Flask– To serve the AI model as a web application
- REST API – For sending images and receiving predictions

- Frontend & UI:

- ·HTML, CSS, JavaScript – For building the web interface
- Bootstrap – For responsive UI design
- Jinja2 – For dynamic HTML rendering with Flask

- Data & Storage:

- Dataset: Malaria cell images from NIH Dataset
- NumPy & Pandas – For data handling and processing
- GitHub – For storing large model files

Thank you

Thank You

Thank you for your time and attention. We hope PlasmoScan can contribute to eradicating malaria.