

TEAM 3

BLOOD TYPING ESSENTIALS

METHODS AND APPLICATION

IN

BLOOD GROUP IDENTIFICATION

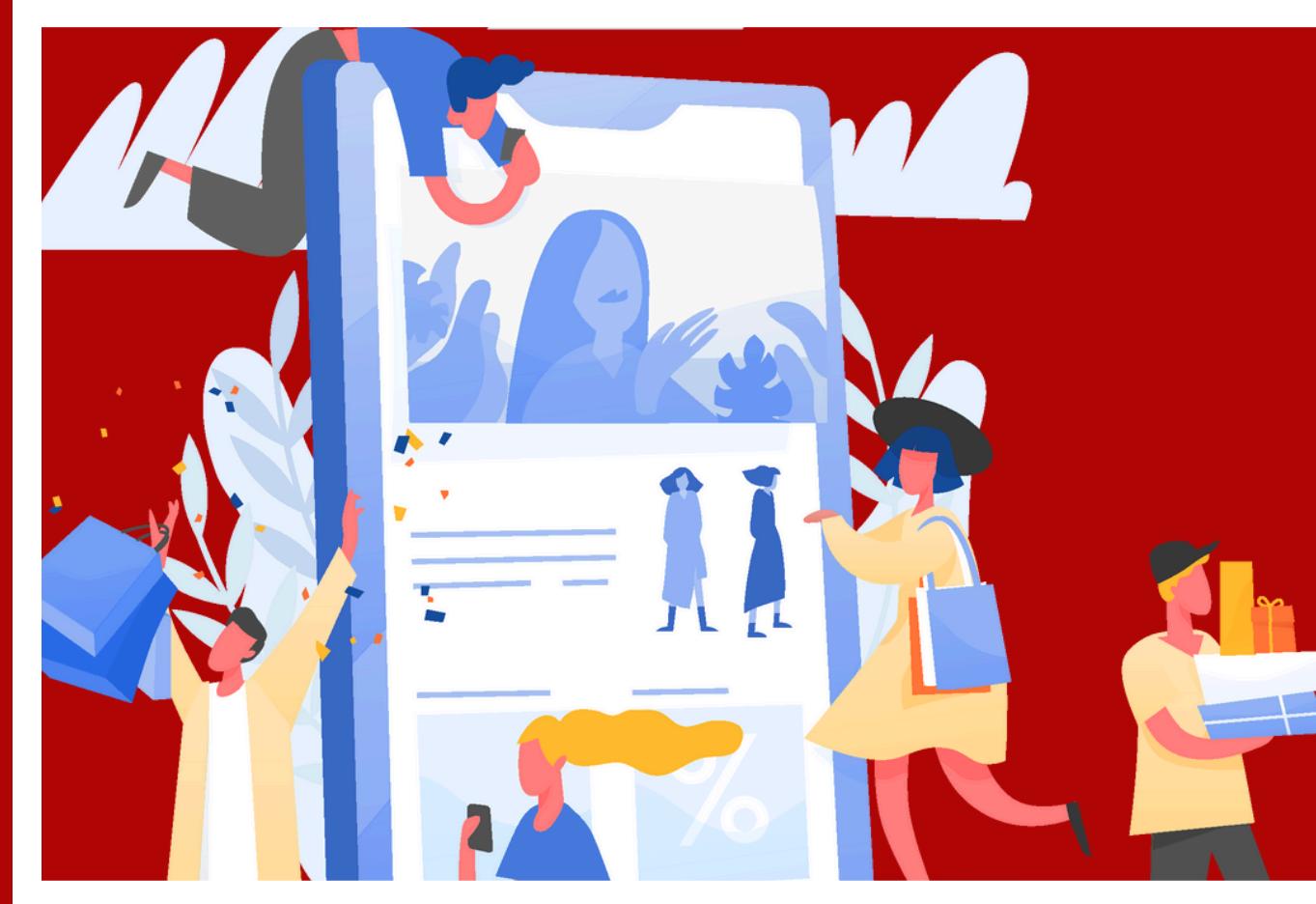


INTRODUCTION

- The goal of the Blood Group Identification Project is to create a web-based program that can reliably determine a person's blood type, guaranteeing effective and secure blood transfusions.
- Using state-of-the-art technology, this project offers a safe, dependable, and easy-to-use platform for both individuals and medical professionals.
- By using web development to construct a centralized, user-friendly system, this project offers a revolutionary method to blood group identification.



CUSTOMER FEATURES



USER REGISTRATION

Secure registration process with username, email, and password
Validation and verification processes for accurate user information

1

LOGIN AND AUTHENTICATION

Secure login process with username and password
Authentication mechanisms:password hashing, session management

2

BLOOD GROUP IDENTIFICATION

Algorithm for identifying blood group based on user input
ABO and Rh blood type identification

3



FLAG MILESTONES

MILESTONE 01

- Building the UI part of the project.
- Building Registration and login pages for the users to securely create their accounts and authenticate themselves.

MILESTONE 02

- Exploring the Open-CV part of the project.
- Different techniques to get the blood cell Image, convert it to grayscale, smoothing it, calculating the threshold and finding the contours

MILESTONE 03

- Connecting the UI part to the openCV code.
- The blood cell image uploaded through the profiles page needs to reach the openCV code for the blood type to be identified.

MILESTONE 04

- The blood cell Image uploaded has to be applied with morphological operations.
- The image has to be divided into 3 regions for screen A, B and D and processed separately to detect the blood type.

OPENCV OPERATIONS IN THE BLOOD GROUP IDENTIFICATION PROCESS

The OpenCV operations transform the image step by step to focus on the blood test's essential features. These steps remove noise, enhance the important regions, and identify patterns (agglutination) to determine the blood group.

IMAGE READING:

- The uploaded image is read using OpenCV (`cv2.imread`) for further processing.

GRAYSCALE CONVERSION:

- Converts the color image to grayscale using `cv2.cvtColor` to focus on intensity values.

MORPHOLOGICAL PROCESSING

- The image is further morphologically Processed for better vision.

GAUSSIAN BLUR:

- Smoothens the grayscale image using `cv2.GaussianBlur` to reduce noise and irrelevant details.

CONTRAST ENHANCEMENT:

- Enhances image contrast with `cv2.equalizeHist`, making features like blood cells more prominent.

THRESHOLDING:

- Converts the image into black and white using Otsu's method (`cv2.threshold`), highlighting objects like cells against the background.

MORPHOLOGICAL OPERATIONS:

- In image processing, morphological operations like Opening and Closing are used to modify the shapes of objects in a binary image. These operations help clean up noise or refine objects in the image.
- Opening removes small white noise(spots), and Closing fills small black holes(spots) in the white background using `cv2.morphologyEx`:

IMAGE SEGMENTATION:

- Splits the binary image into three regions (A, B, and D) based on the test areas for blood type and Rh factor analysis.

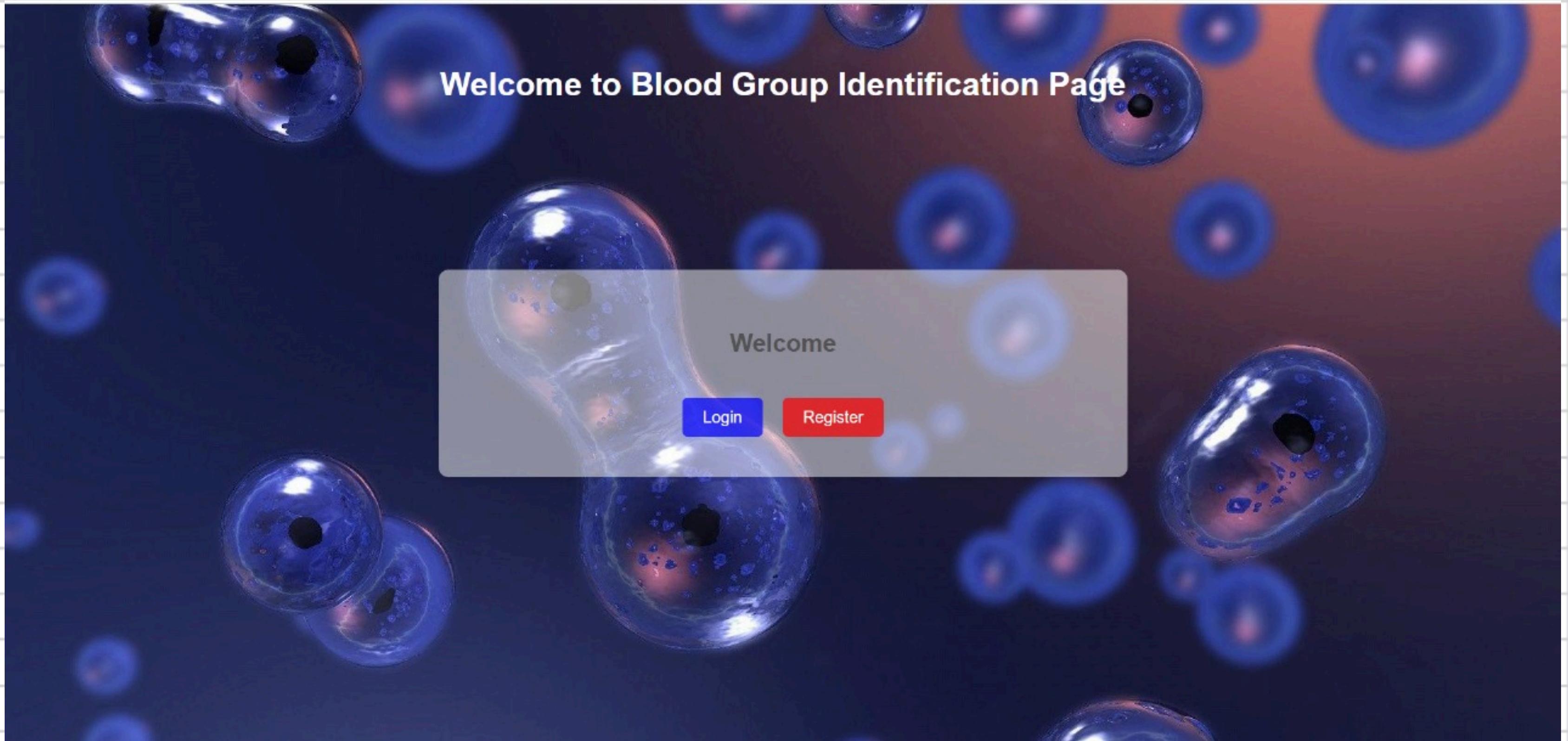
AGGLUTINATION COUNTING:

- Identifies connected white regions (agglutination) in each area using `cv2.connectedComponentsWithStats`.

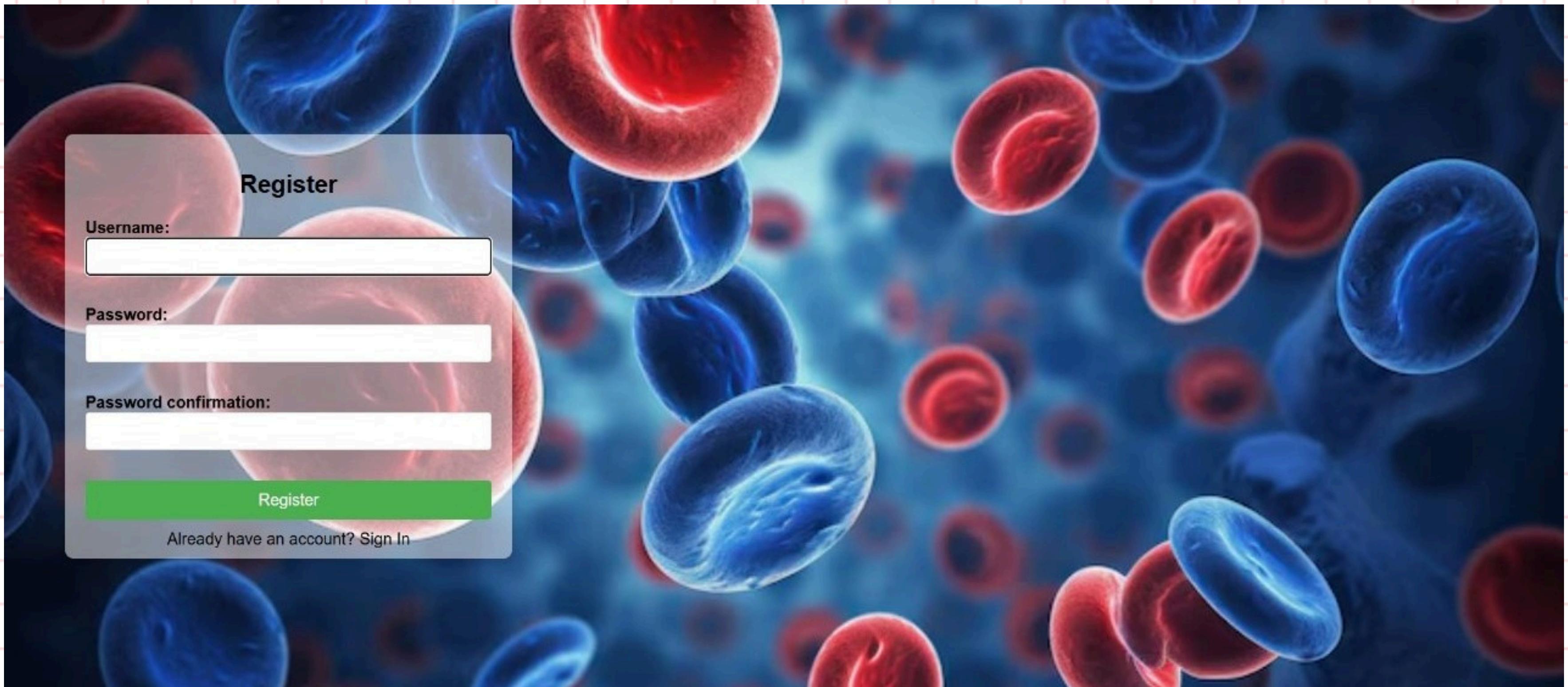
BLOOD GROUP DETECTION:-

- Counts the agglutination in regions:
- Region A → Type A
- Region B → Type B
- Both A and B → Type AB
- Neither A nor B → Type O
- Region D indicates positive (+) or negative (-) Rh factor.

HOME PAGE



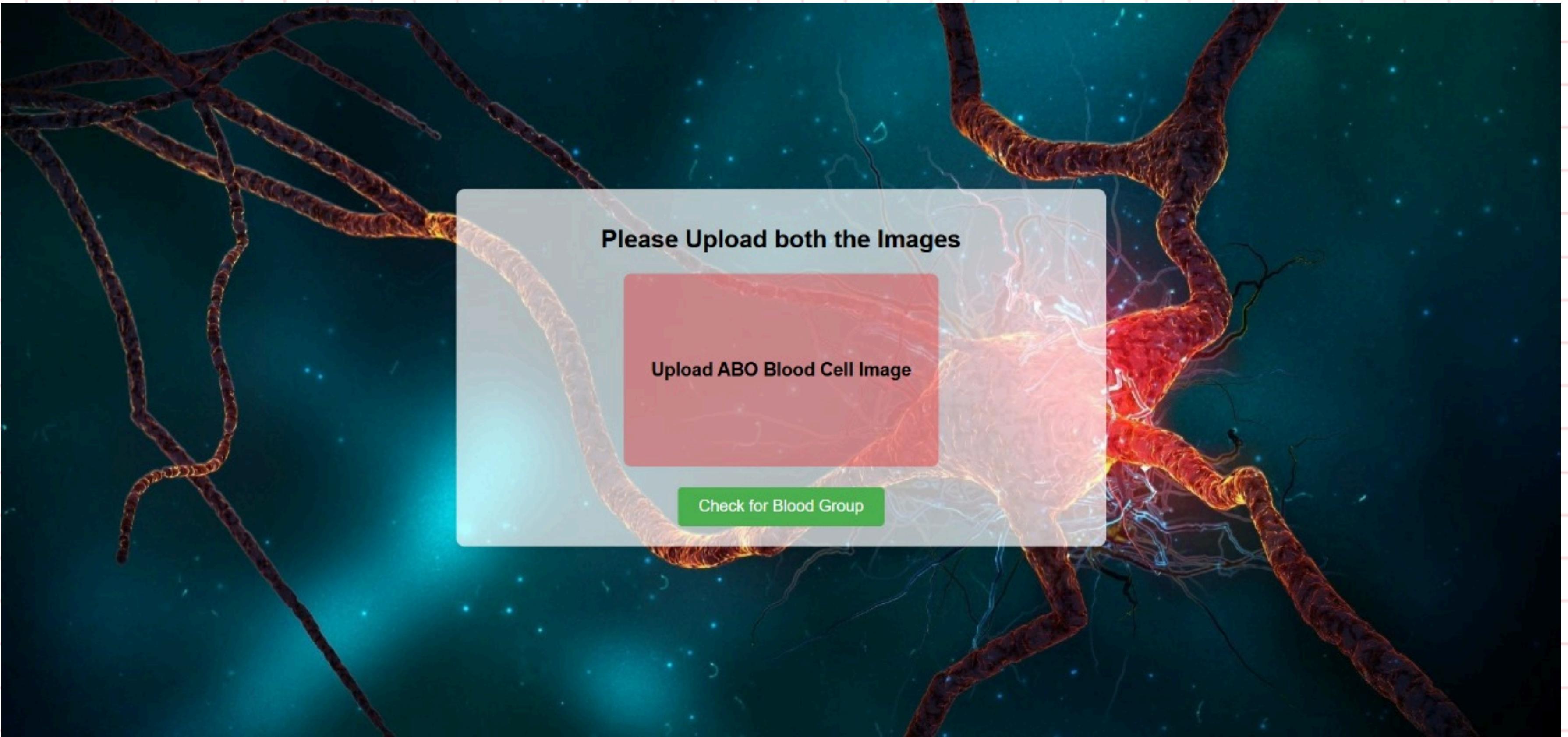
REGISTRATION PAGE



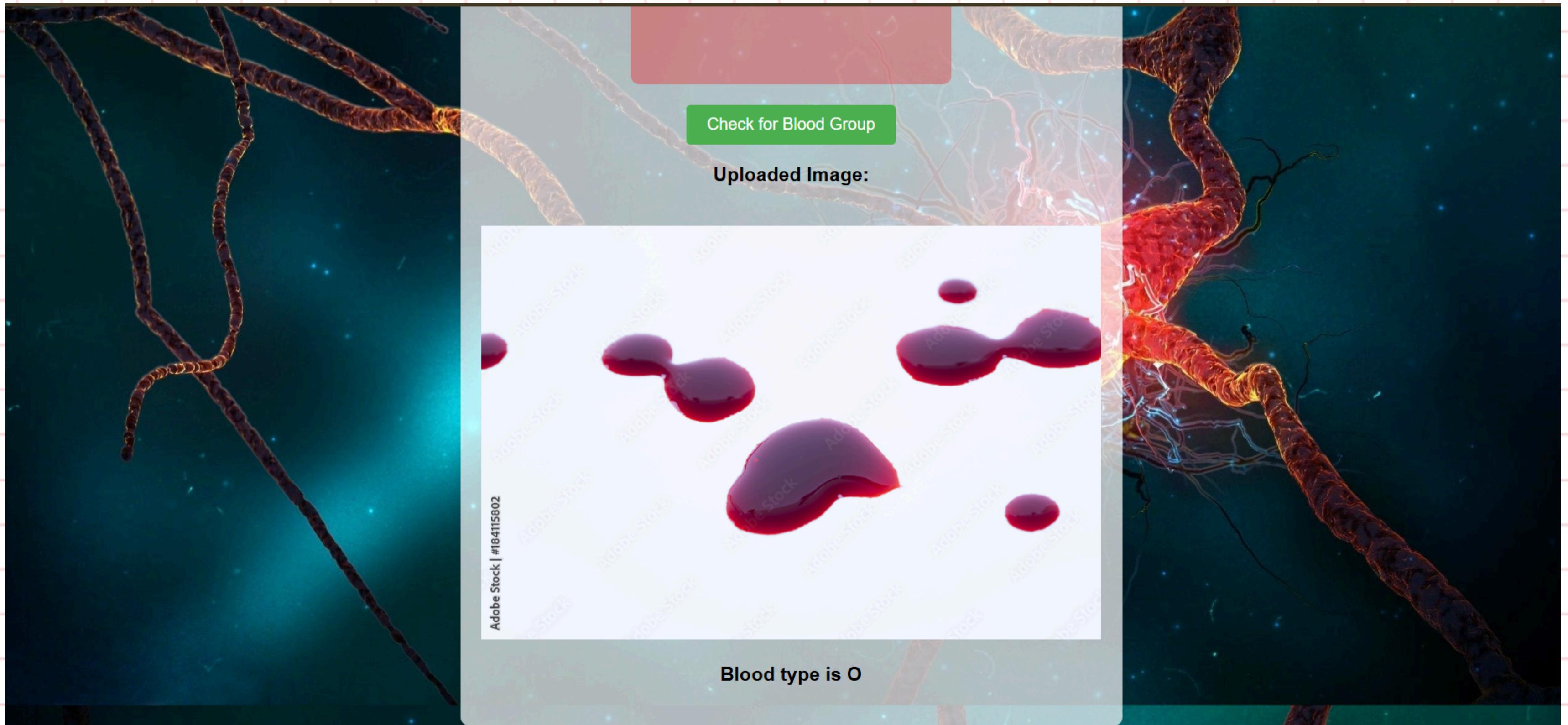
LOGIN PAGE



PROFILES PAGE



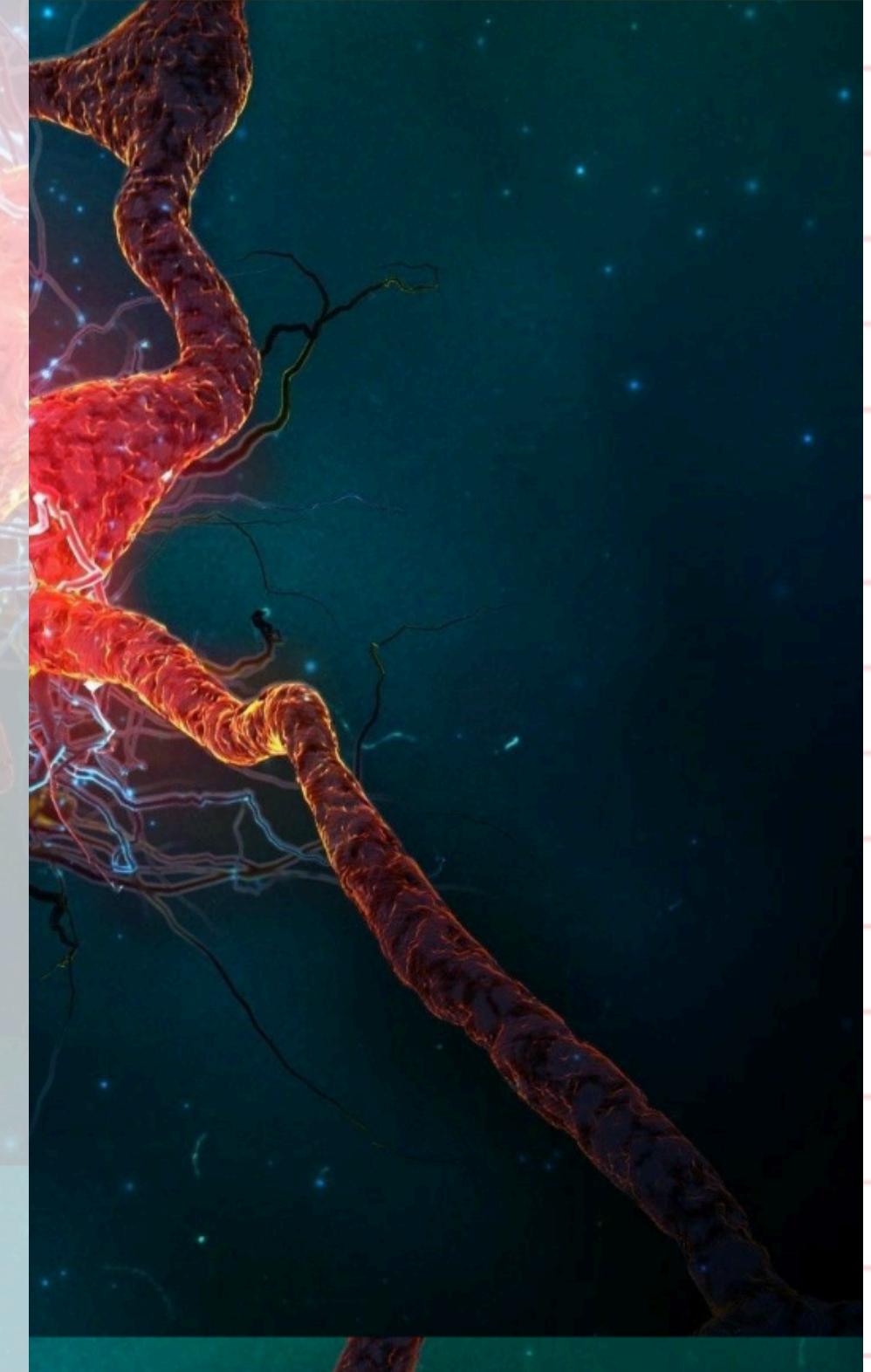
PROFILES PAGE WITH RESULTS



PROFILES PAGE WITH MORPHOLOGY IMAGE RESULTS



Blood type is AB+



CONCLUSION



- The blood group identification project is successfully built using Python's extensive framework **Django**.
- The project integrates essential components, including secure user registration, authentication protocols, by incorporating validation, password hashing, and session management, the system safeguards user data and maintains confidentiality.
- Based on user input, the blood group identification algorithm reliably classifies Rh and ABO blood types, offering a rapid and accurate evaluation.

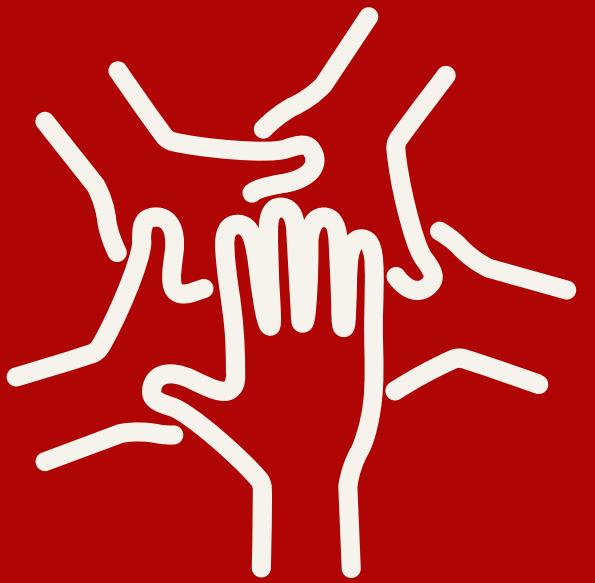
TEAM 3

TEAM MEMBERS

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CREW

Thank You!