

IRIS RECOGNITION

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INTRODUCTION

- **Iris Recognition:** A biometric identification method based on unique iris patterns.

Project Highlights:

- Pure image processing approach.
- Focus on efficiency and accuracy.

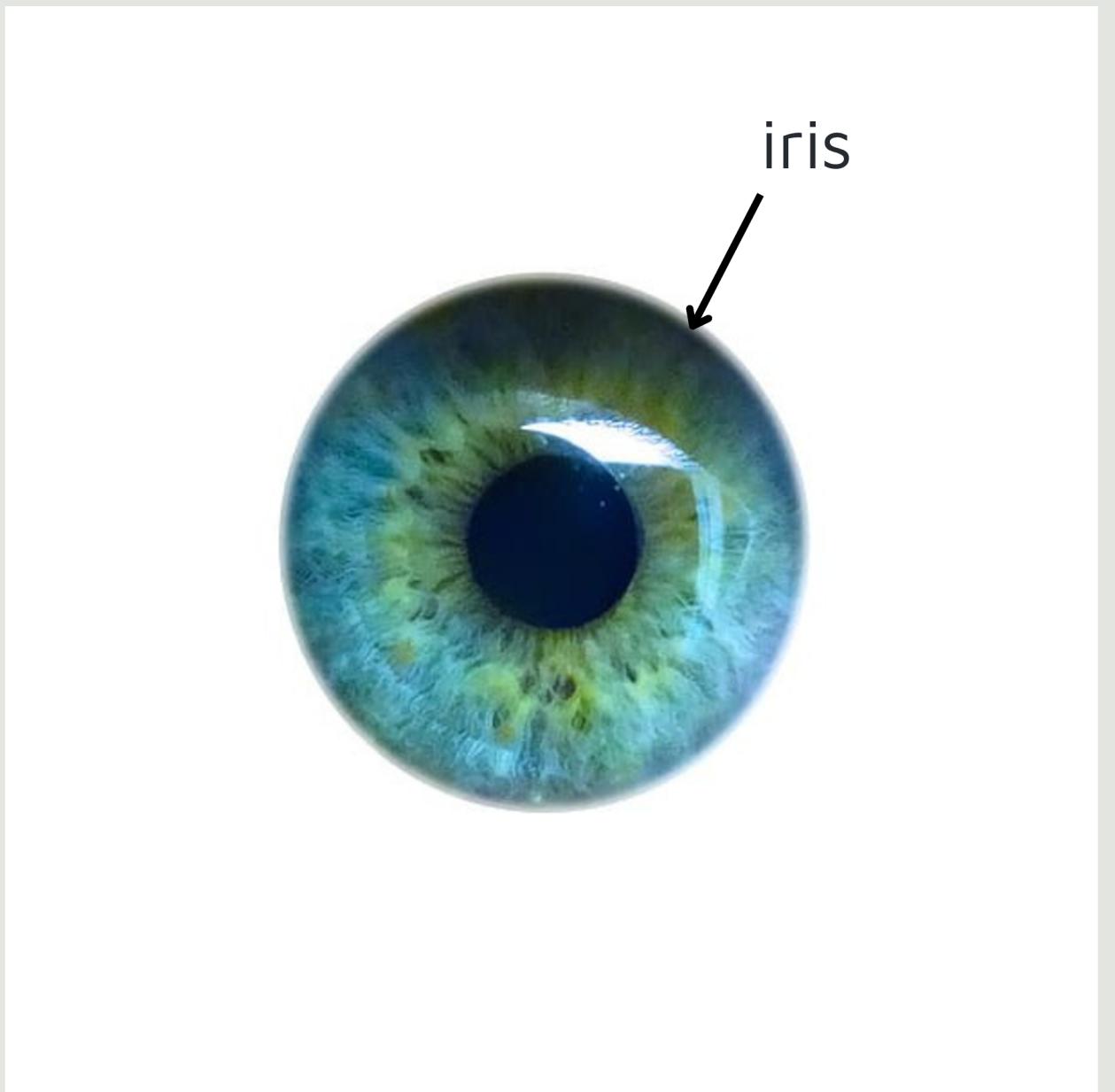


IMAGE ACQUISTION

- **Dataset Link:** <https://bit.ly/3Pan4LG>
- **Dataset Details:** Images from 15 participants, each with left and right eyes.

PREPROCESSING

- **Function name:** “preprocess_image”
- Resize images to uniform dimensions (256x256).
- Convert images to HSV color space for better feature isolation.
- Apply circular mask to isolate the iris region.
- Calculate and normalize histogram (scale values in range between 0 and 1).
- **Goal:** Ensure clean and focused input for feature extraction.

FEATURE EXTRACTION

- **Feature extraction using average histogram:**
- **Function name:** “compute_average_histograms”.
- Empty dictionary to store each person’s folder name and average histogram between left and right eye.
- Iterate over the folders to calculate average histogram between left and right eye.
- Save histograms in a binary file.
- **Result:** Distinct iris feature for each person.

MATCHING

- **Function name:** “recognize_person”
- Load Stored average histograms.
- Process the input test image to extract the suitable histogram.
- Compare with each person's average histogram to find best match from file.

ACCURACY

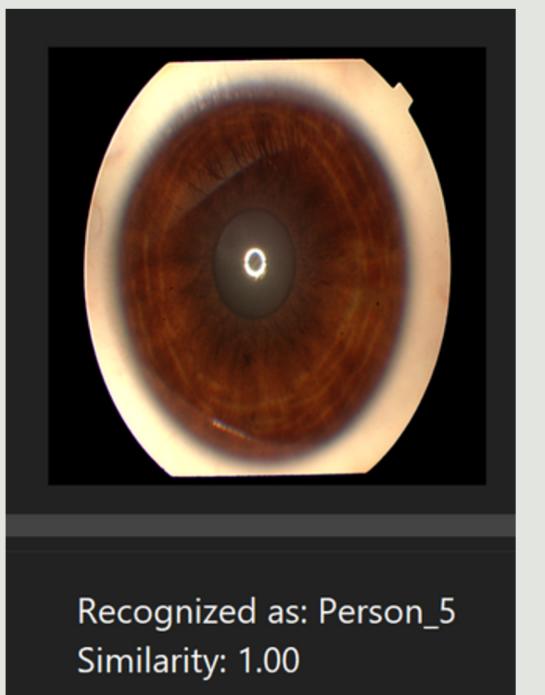
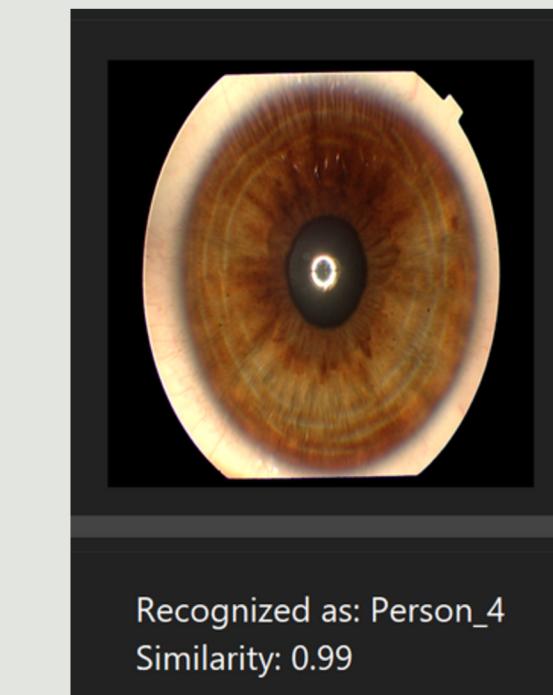
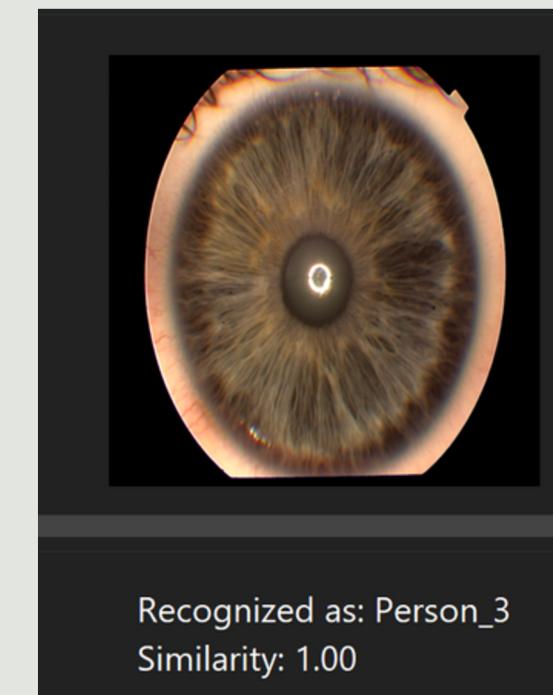
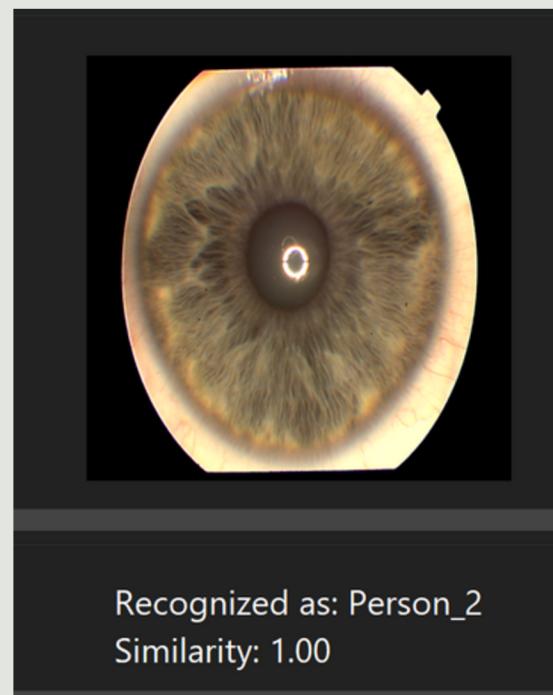
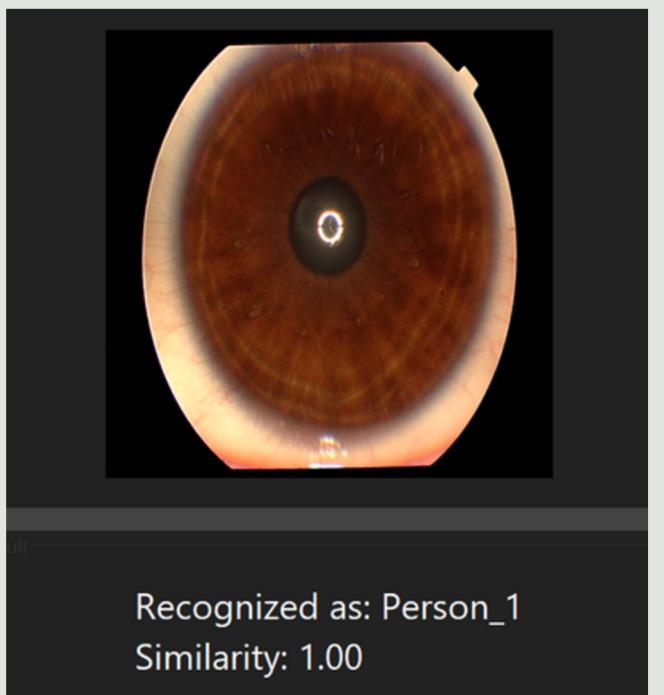
Performance Metrics:

- **Dataset:** 15 participants, both eyes, 2 pictures for left eye and 2 pictures for right eye.
- **Accuracy:** 0.97 correlation reflects the system's ability to accurately match the unique iris patterns across all participants in the test dataset.

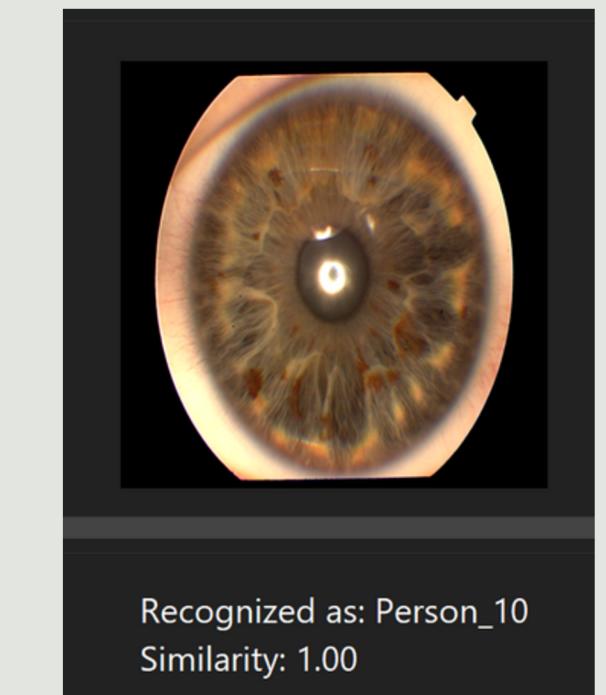
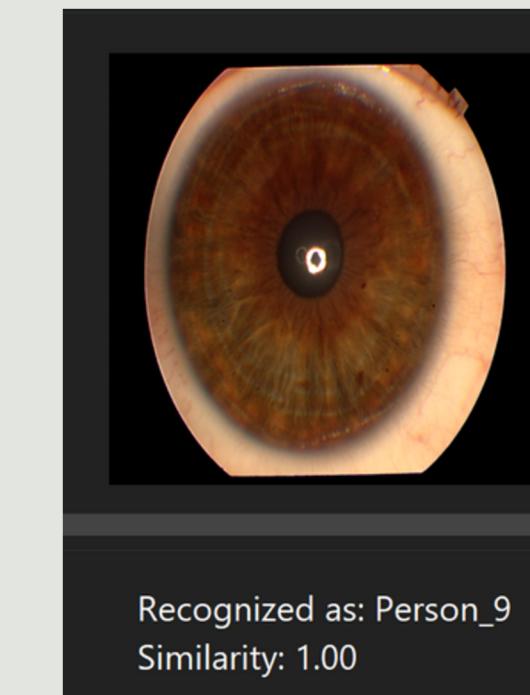
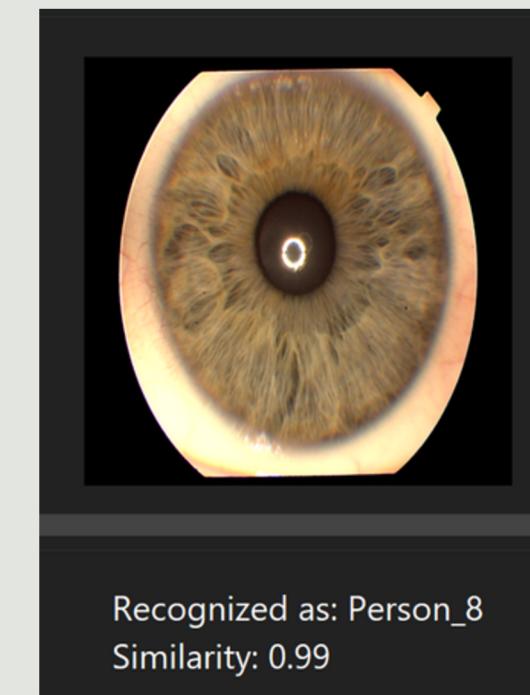
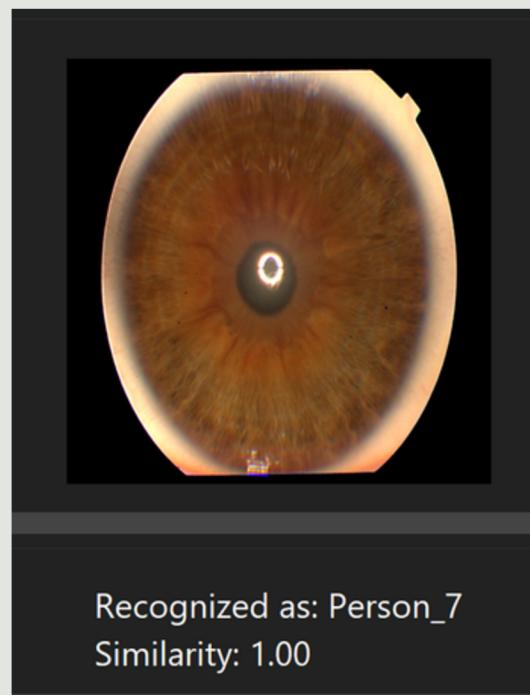
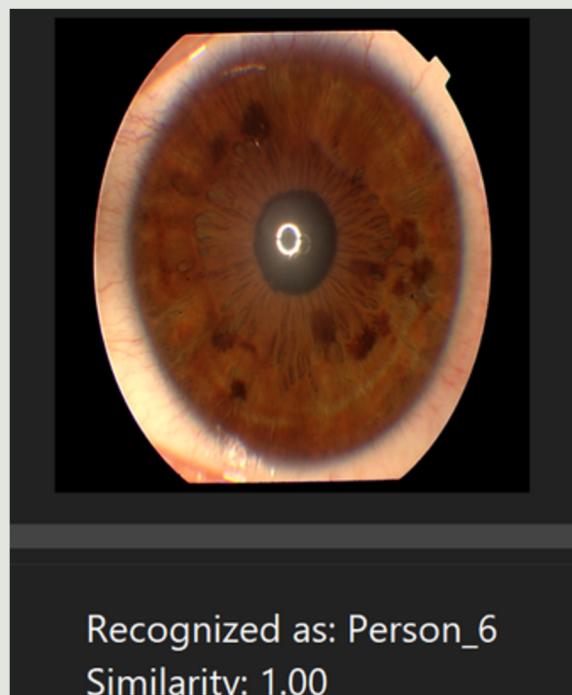
Evaluation Details:

- Confusion matrix analysis to evaluate performance.

TEST CASES: PERSON 1 TILL 5



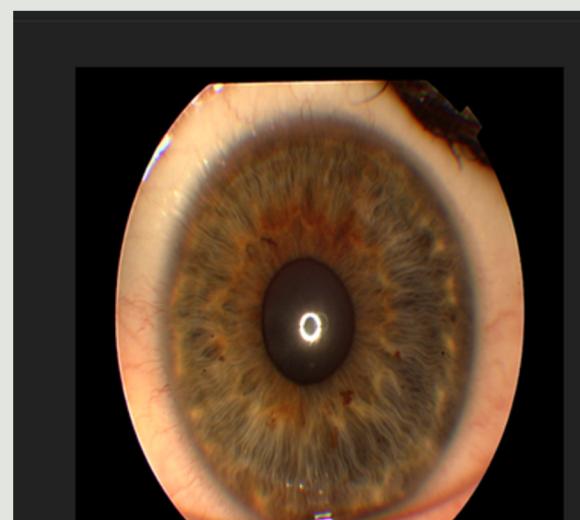
TEST CASES: PERSON 6 TILL 10



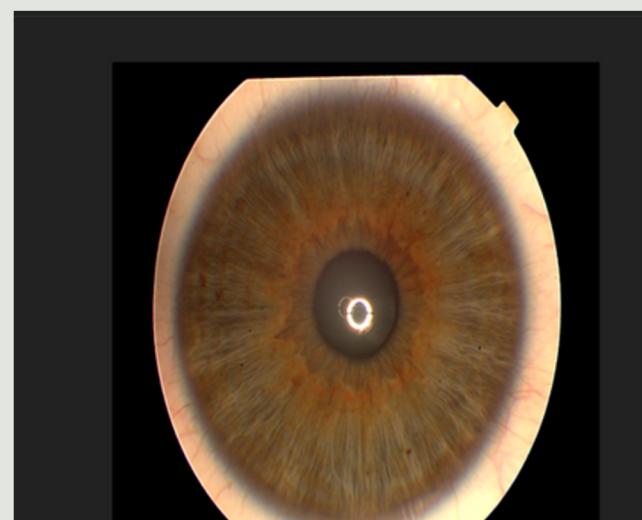
TEST CASES: PERSON 11 TILL 15



Recognized as: Person_11
Similarity: 1.00



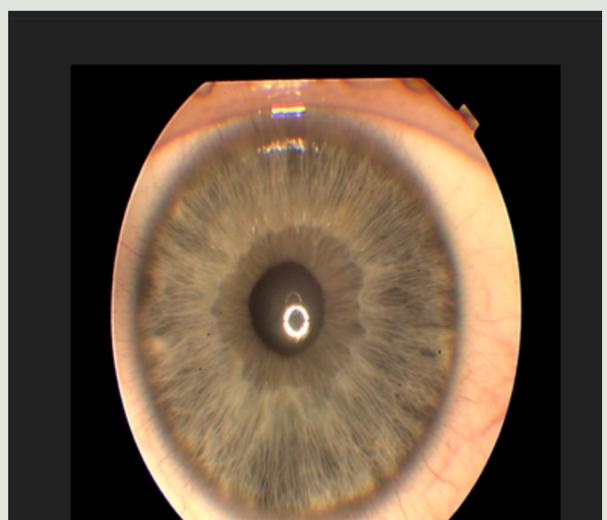
Recognized as: Person_12
Similarity: 1.00



Recognized as: Person_13
Similarity: 1.00



Recognized as: Person_14
Similarity: 0.98



Recognized as: Person_15
Similarity: 1.00

CONCLUSION

Project Summary:

- Developed a pure image processing-based iris recognition system.
- Achieved high accuracy without AI or machine learning.

Future Enhancements:

- Improve preprocessing for varied conditions.
- Extend dataset to support larger populations.

Thank You