

Unique Biometrics Using Dorsal vein

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Overview

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Introduction

- Biometric authentication is a process of identifying and differentiating individuals for security purpose.
- Dorsal vein pattern is the biometrics used here for authentication purpose.
- It is implemented for identifying individuals on the basis of their vein pattern of dorsal hand.
- The goal is to establish a method with better Correct Recognition Rate (CRR), low False Acceptance Rate (FAR) and low False Rejection Rate (FRR).

Existing System

- Fingerprints, facial images, retinal images, palm print etc are the existing biometric recognition system.
- For fingerprint, physical sensor disadvantage causes deterioration in performance.
- For facial image, slight change in facial expression can restrict access.
- In case of iris recognition, the constant use of infrared light may cause harm to the iris because it is constantly being scanned with infrared light.

Proposed System

- Near Infrared (NIR) image of dorsal hand is used for image acquisition.
- Proposed system can be divided into data collection, image acquisition, model building, feature extraction, model training, learning, testing and matching.
- Finally authentication is done using Deep learning, neural networks and Support Vector Machine (SVM) classifier.
- A multi-class SVM classifier was used to classify between the persons.

System Design

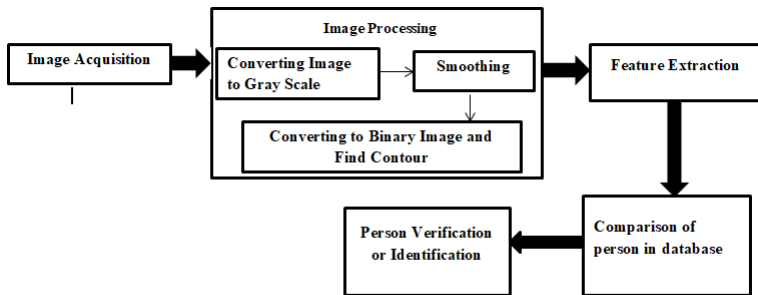


Figure: System Design

Product backlog

| S.No | As a | I want to | Priority | Status |
|------|--------|-----------------------------|----------|----------|
| 1 | Member | Data Collection | Must | Not Done |
| 2 | Member | Image Acquisition | Must | Not Done |
| 3 | Member | Model Building | Must | Not Done |
| 4 | Member | Feature Extraction | Must | Not Done |
| 5 | Member | Model Training and Learning | Must | Not Done |
| 6 | Member | Model Testing and Matching | Must | Not Done |

Figure: Product backlog

Sprint backlog

| SPRINT BACKLOG | | | | | |
|----------------|------------|--|-----------------------------------|----------------------------|------------------|
| S.No | Date | What I have done since the last scrum meeting? | What will I do in the next scrum? | Are they difficulty faced? | Status |
| 1 | 07-04-2021 | Topic selection | Topic selection | Yes | Not done |
| 2 | 08-04-2021 | Topic selection | Topic discussion | No | Done |
| 3 | 09-04-2021 | Topic discussion | Topic discussion | Yes | Not done |
| 4 | 10-04-2021 | Topic discussion | Requirement Analysis | Yes | Not done |
| 5 | 11-04-2021 | Requirement Analysis | Image Acquisition | No | Done |
| 6 | 12-04-2021 | Image Acquisition | Image Acquisition | yes | Work on progress |

Figure: Sprint backlog

Version Control System

The screenshot shows a web browser with multiple tabs. The active tab is 'Issues · sreelakshmyremesh/biometricusingdorsalvein'. The browser address bar shows 'github.com/sreelakshmyremesh/biometricusingdorsalvein/issues'. The GitHub interface includes a search bar, navigation links for Pull requests, Issues, Marketplace, and Explore, and a user profile icon. The repository name 'sreelakshmyremesh / biometricusingdorsalvein' is displayed, along with statistics: 1 Unwatch, 0 Stars, and 0 Forks. The 'Issues' tab is selected in the navigation bar. A message box states: 'Label issues and pull requests for new contributors. Now, GitHub will help potential first-time contributors discover issues labeled with good first issue.' Below this, there is a search bar with 'is:issue is:open' and filters for Labels (9) and Milestones (0). A green 'New Issue' button is present. The main content area displays 'Welcome to issues!' with a sub-header 'Issues are used to track todos, bugs, feature requests, and more. As issues are created, they'll appear here in a searchable and filterable list. To get started, you should create an issue.' At the bottom, a 'ProTip!' suggests adding 'no:assignee' to see everything that's not assigned.

productsprint - lakshmyree190 x Issues · sreelakshmyremesh/bio... Biometric Authentication Using C x seminar3 - Online LaTeX Editor C x +

github.com/sreelakshmyremesh/biometricusingdorsalvein/issues

Search or jump to... Pull requests Issues Marketplace Explore

sreelakshmyremesh / biometricusingdorsalvein

Unwatch 1 Star 0 Fork 0

<> Code Issues Pull requests Actions Projects Wiki Security Insights Settings

Label issues and pull requests for new contributors

Dismiss

Now, GitHub will help potential first-time contributors discover issues labeled with good first issue

Filters is:issue is:open

Labels 9 Milestones 0 New Issue

Welcome to issues!

Issues are used to track todos, bugs, feature requests, and more. As issues are created, they'll appear here in a searchable and filterable list. To get started, you should create an issue.

ProTip! Add no:assignee to see everything that's not assigned.

Hardware and Software Specifications

- Hardware Specifications
 - Processor: Intel-core i5
 - RAM: 4GB and above
 - Harddisk: 250GB
 - Infrared Camera
- Software Specifications
 - python
 - Tensor Flow

Conclusion

- Biometric using dorsal vein pattern shows really good performances in discriminating among people for better security.
- Deserves a chance of adoption in the cases where biometric authentication is required.
- Good quality NIR images of dorsal hands will increase the accuracy of our system.

References

- ① <https://www.tensorflow.org/learn>
- ② <https://www.w3schools.com/python/>

Thank You