Fingerprint match solution

Building a better working world

Introduction

Problem Statement

The requirement is to create a biometrics matching solution using new technologies.

1. The target solution will be applicable to check for duplicate registrations by the same person to identify potential identity fraud.
2. It is also applicable for KYC in SIM registration/new customer
3. The solution has to be scalable and can be integrated in any existing database

Key objectives for the Project:

1. Evaluate and understand the complexity of the images (finger prints) available for verification
2. Features to be extracted from the images
3. The extracted information needs to be validated as per standards given by NIST
4. Propose an end to end feasible solution which can perform the validation considering all the checks prescribed above

Feasibility

Steps

1. Preliminary image feature conditions for every fingerprint image as asked by any client can be fulfilled for further processing and matching

2. We have followed the 2007 standards of the National Institute for Standards and Technology (NIST) Information Technology Laboratory (ITL) for fingerprint matching

Any pre-requisite image conditions

NIST Standard for KYC fingerprint

NFIQ (1-3)	✓
AFIQ (>=70)	✗
Too Dark Check (<5% of TB)	✓
Too Light Check (<= 5% of TB)	✓
Total Quality Blocks (>= 70% of TB)	✓
Total Blocks, TB (>=500)	✓
Poor Ridge Flow (<= 5% of TB)	✓
Not part of print (<= 70)	−
Each record to contain minimum 4 distinct finger prints	−

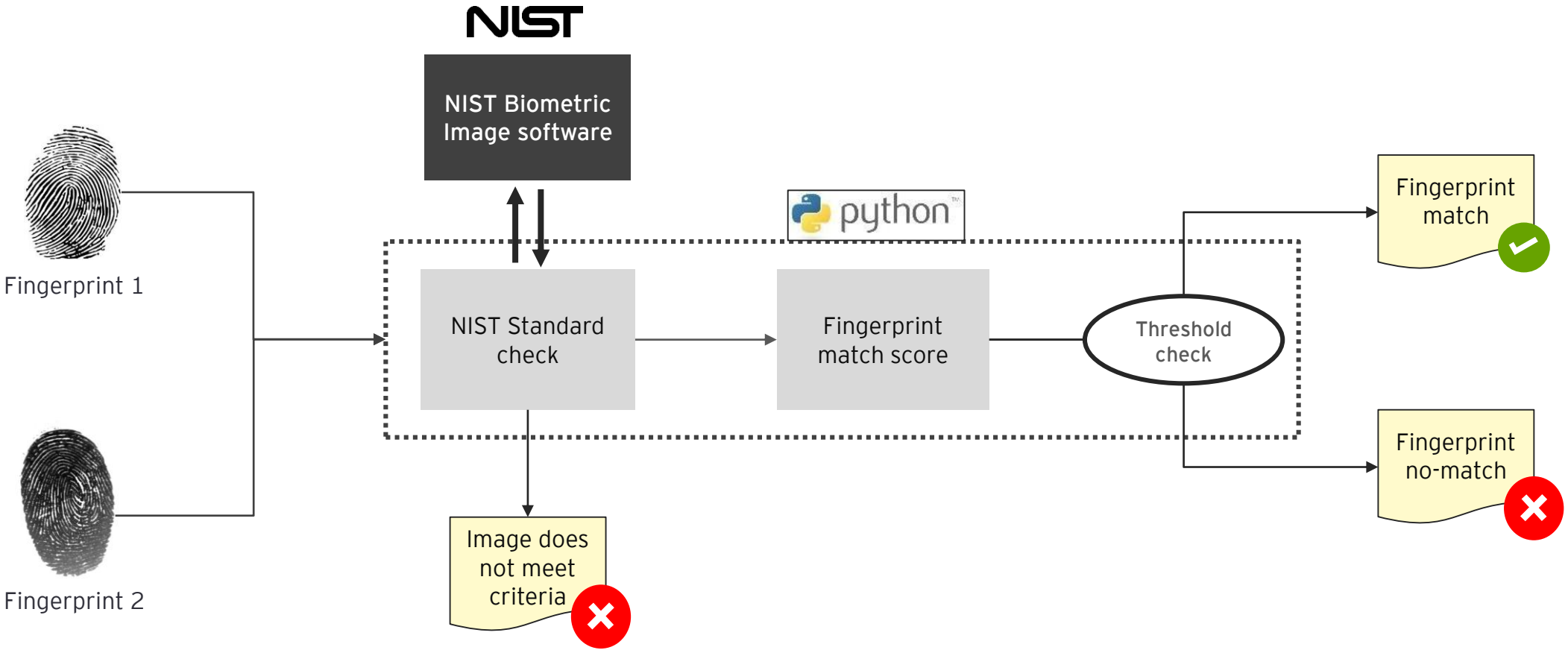
✓ Present in current solution − In-scope ✗ Not feasible currently

Process workflow

Processed fingerprint image

NBIS software integrated with python for standard checks

Custom made python algorithm along with NBIS open source algorithm has been used in python to check the match score between two fingerprint images



Technology requirements

Tools required

1. NIST Biometric Image Software 4.1.0
2. Python 3.6
3. MSYS Shell Software1.011
4. Cmake 3.15.0
5. MinGW 4.5.2

Python packages

1. PIL
2. Imageio
3. Subprocess
4. OpenCv
5. SkImage