Project 7 Android Face recognition

Raffaele Zippo

Enrico Meloni

Summary

- Android implementation of face recognition using OpenCV

- Face detection with Haar Cascade Classifier

- Face features extracted using VGG2

- Classification performed with weighted kNN

- User interface
  - Live face recognition
  - View database contents
  - Add identities
    - From pictures or videos
    - From faces collected during live recognition
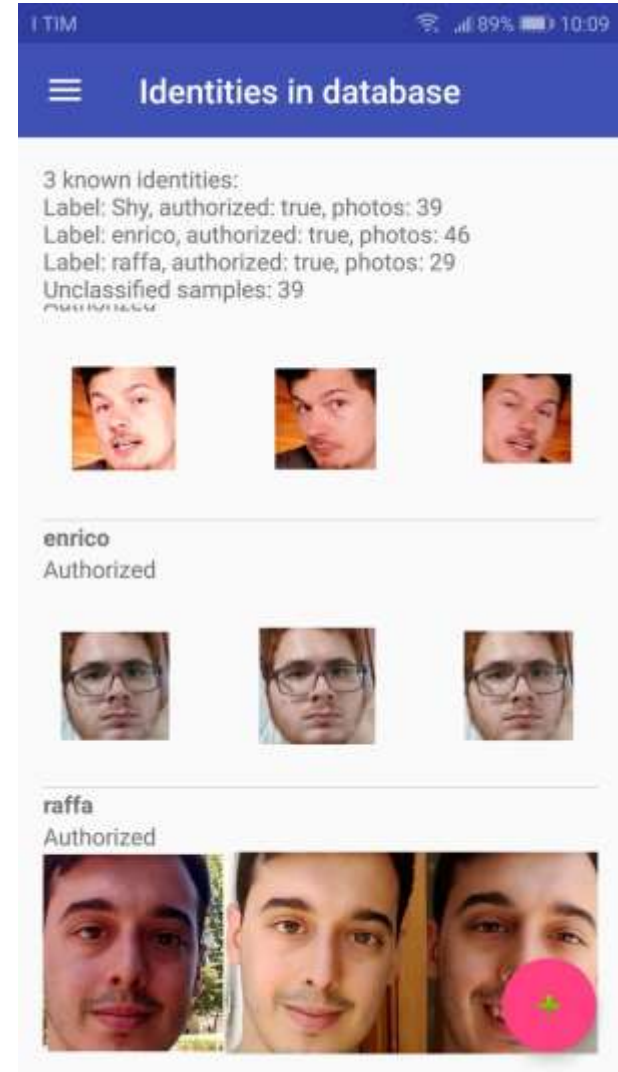   - With optional clustering

Main activity: live face recognition

- Camera feed shows detected faces with boxes

- Labeling is shown in the textbox

- To improve performance, the two operations are independent and run at their best rates

- Distinction between *unknown* and *unclassified*
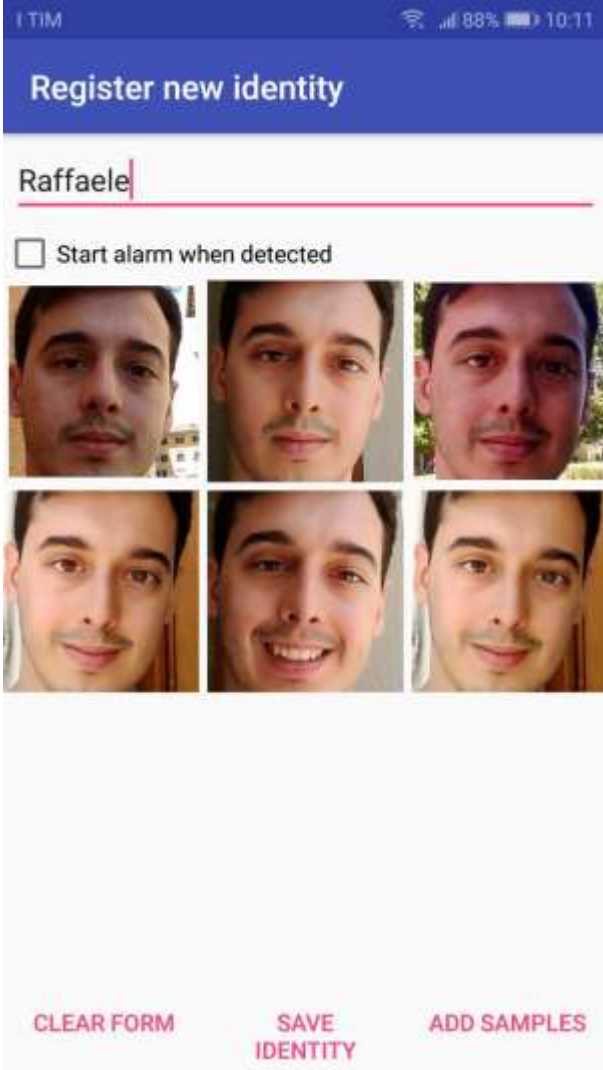 - In both cases the face is recorded to database
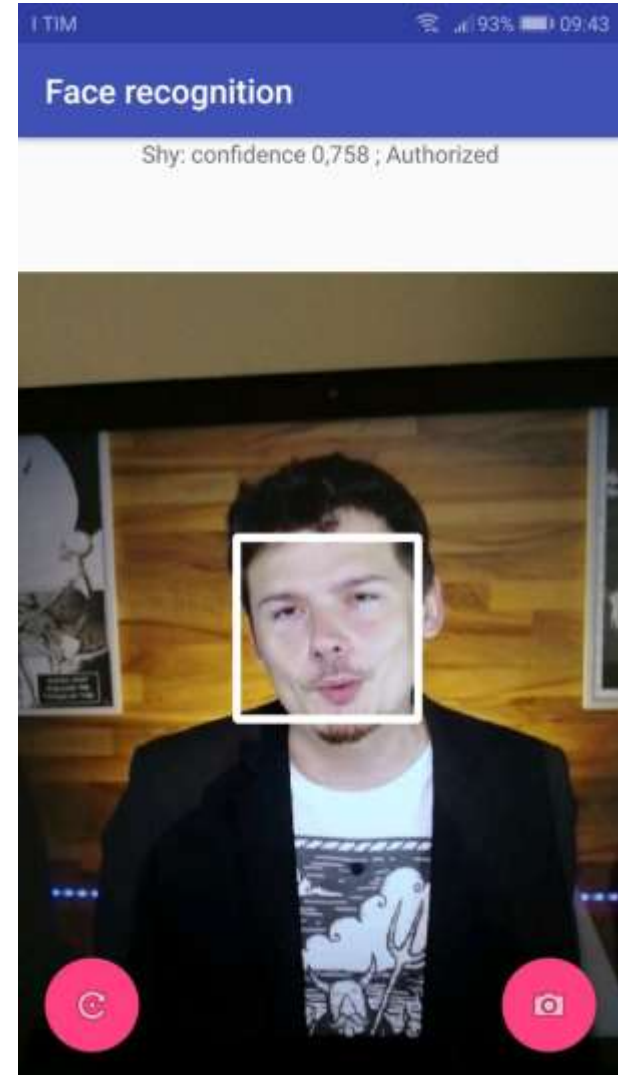
Identity view activity

- Display the current state of the database
- Database utils
  - Import/export
  - Clear
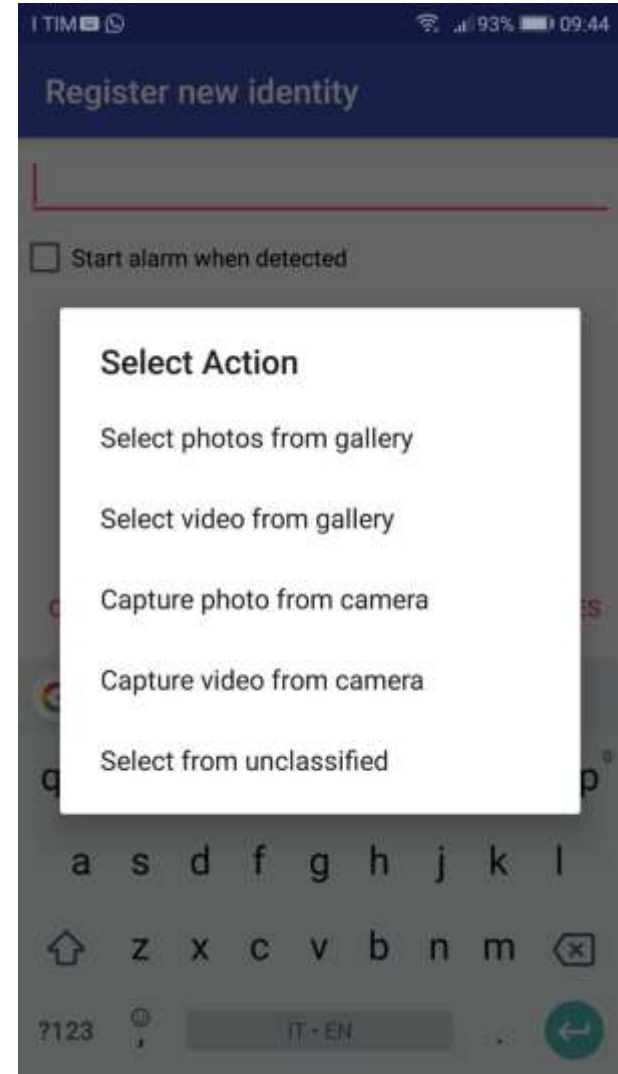
Add identity activity

- Interface to add a new identity to the database

- Can add samples from multiple sources
  - Pictures and videos from gallery
  - Pictures and videos from camera
  - Unclassified faces from live face recognition

- Can be used to add samples to an already existing identity

Add identity activity

- Interface to add a new identity to the database

- Can add samples from multiple sources
  - Pictures and videos from gallery
  - Pictures and videos from camera
  - Unclassified faces from live face recognition

- Can be used to add samples to an already existing identity

Select from unclassified activity

- Shows unclassified faces collected during live face recognition

- Which can be selected to create a new identity

- Optional clustering
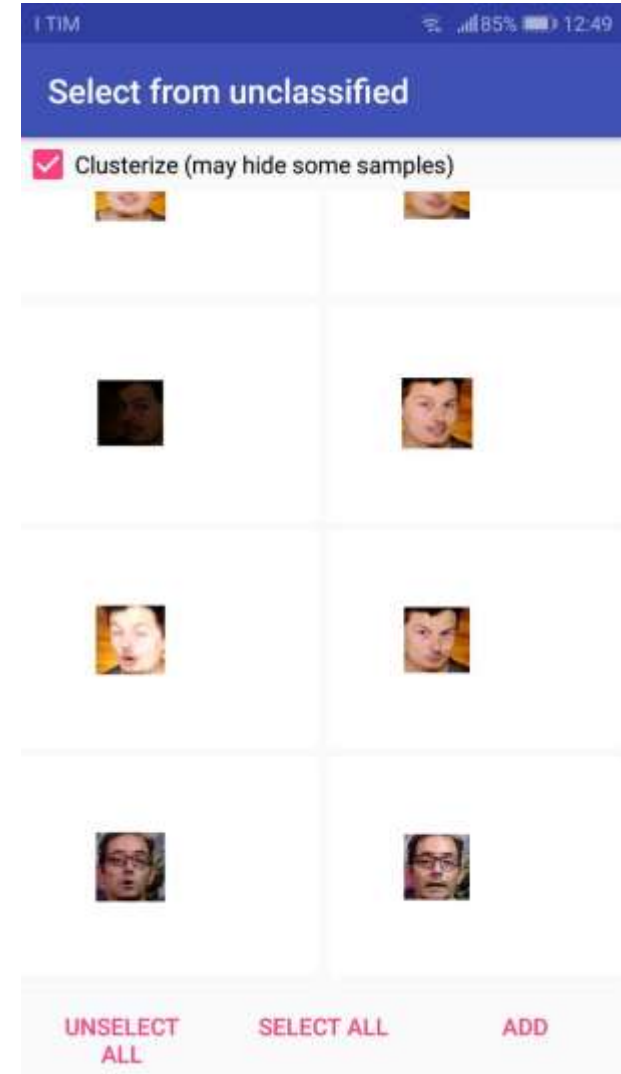 - Hides non-clustered samples
  - Based on DBSCAN
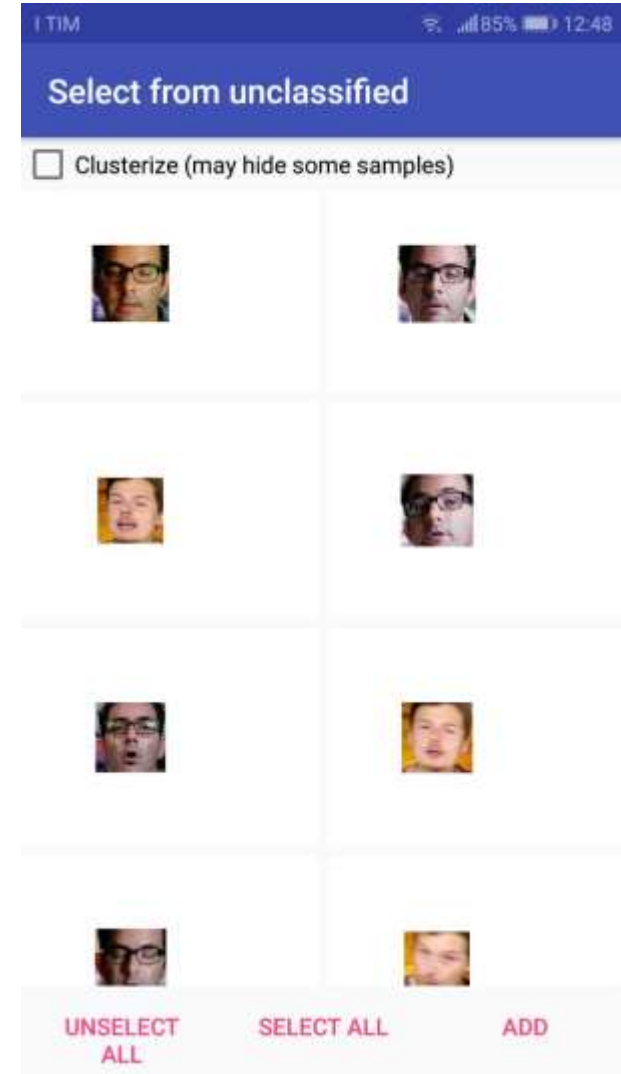
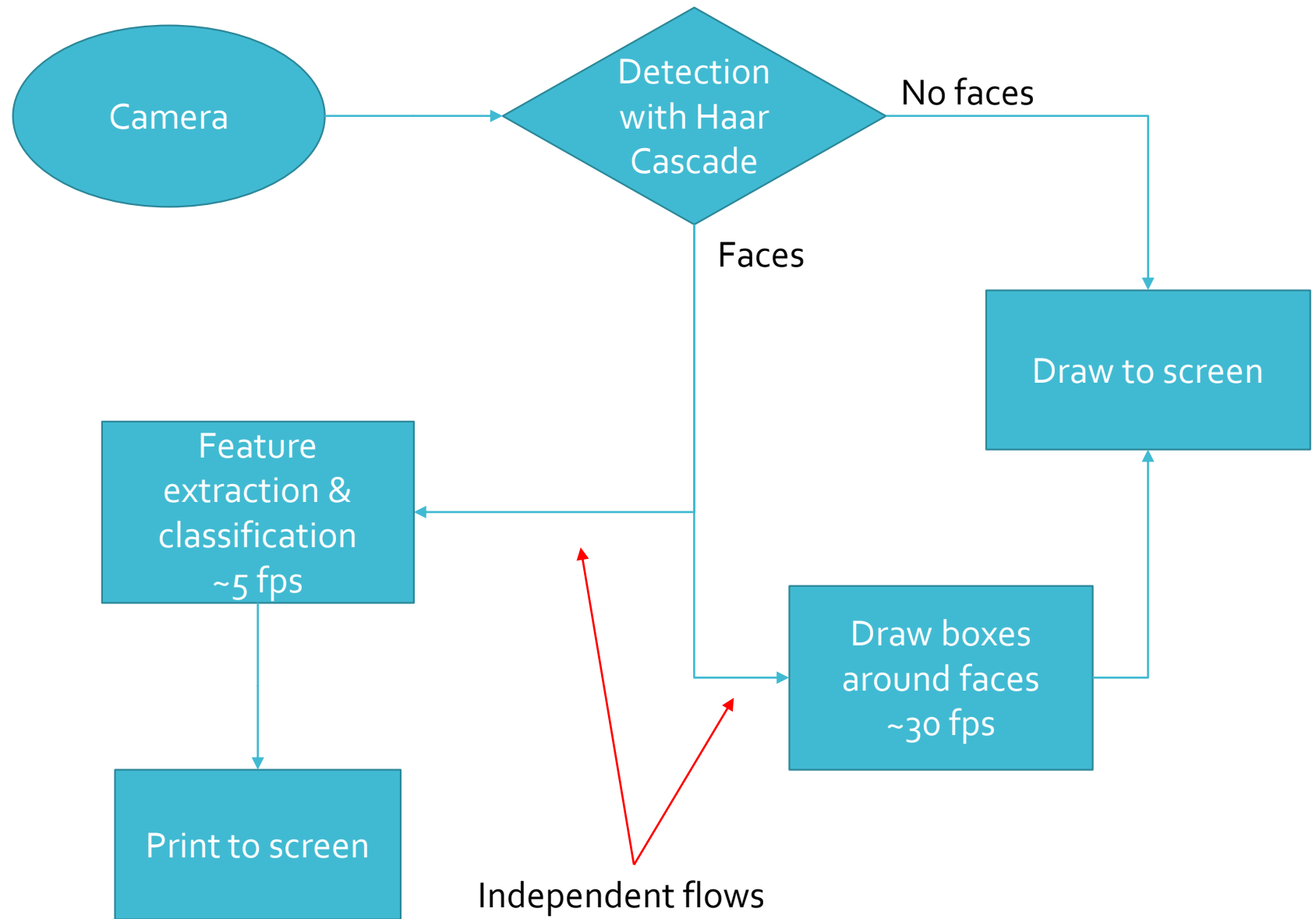# Select from unclassified activity

- Shows unclassified faces collected during live face recognition
- Which can be selected to create a new identity
- Optional clustering
  - Hides non-clustered samples
  - Based on DBSCAN

Implementation overview

- Implemented on Android using Java

- Using OpenCV for Android library

- Live camera feed implemented with Camera2 APIs

- DBSCAN implementation from Apache Math Commons library

- Object-based face database serialized to internal memory when modified

Live face recognition pipeline

Camera → Detection with Haar Cascade

No faces → Draw to screen

Faces → Draw boxes around faces ~30 fps → Draw to screen

Feature extraction & classification ~5 fps → Print to screen

Independent flows

Live demo