



# Partial Face Recognition

## Face Forensics Inc.

Until now, face recognition systems have treated a face as a homogeneous entity. Face Forensics' Partial Face Recognition technology is unique in that it takes just part of a face and matches it against the same part in a database of complete faces.

This is of real value in forensic and investigative environments where only part of a face may be available, for example surveillance images, body parts after an explosion, burn victims, a photograph where only part of a face is visible, etc.

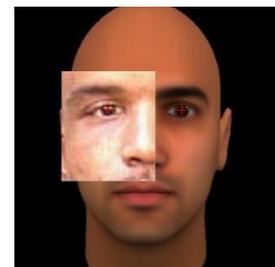
Partial face recognition is also invaluable when only a "mailbox" view of a face is available, e.g. when a criminal is wearing a balaclava or other head-covering..



Partial face recognition is a module within the Face Forensics face recognition application. All the functionality of full face recognition is available to recognize and match the partial face.

The process involves the following steps:

- Selecting "Partial Mode" displays a facial template. The template is a computer-generated generic face. A frontal shot is pasted on to the template
- Once the image is placed over the relevant area it's resized to match the template. The scroll wheel on the mouse is used to make the image larger or smaller
- The template itself can then be adjusted to change the distance between the eyes, and the position of the nose, so that it matches the characteristics of the facial part
- Once the partial face is deemed to be in the most realistic position the eye centres are manually marked using the mouse
- The face is then automatically encoded. The resulting encode array or string is matched against strings of the same areas on the faces in a pre-encoded database or watchlist.



Facial Part Positioned  
on the Template

Matches above a predefined threshold are displayed as thumbnail images. Any thumbnail can be selected and magnified alongside the partial image.

The match list on the right shows the result of a search against the partial face on the template. The eyes on the template have been moved slightly apart using the controls on the right of the image to match the face being searched. Images 2 and 4 out of 5000 are the owner of the partial face.

Any thumbnail can be selected and compared alongside the partial image. They can be magnified together automatically, as below.



Actual Matches (out of 5000) are Images 2 & 4

Face Forensics can search static images, real-time video, video files, and websites, in any authorized computer on the network. Search speeds are extremely fast – because the strings are held in memory, and searches can be split across multiple cores/processors, well in excess of 1m records per second can be searched with an appropriate hardware configuration.



Areas of both Images can be Selected and Magnified

When searching a large database it's likely that false positives, i.e. other faces that have similar characteristics to the face being searched, are interspersed with real matches. Text filters, e.g. gender, can significantly reduce this. In any event the number of possible matching faces will be a small subset of the total number in the database, making it straightforward and quick for an officer to visually confirm the match.

Face Forensics Full and Partial Face Recognition work with all major databases, including Oracle, SQL Server, and DB2, and are accessed in read-only mode - the system keeps its own database of encode arrays so data integrity is assured. Face Forensics supports 64-bits, enabling extremely large databases to be accessed.

## System Requirements

Face Forensics is available within the f2 Image Recognition Suite as a stand-alone/networked application, as a .NET SDK, and as a web service. It runs under Windows 10. The user interface can be switched to any language. Face Forensics is downloadable from our website for evaluation for 30 days at no charge.