SpotIt![1] an interactive identikit system

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Abstract

SpotIt! is a system for browsing large mug–shot databases and the creation of identikits of photographic quality. The two functions are interrelated: the available database provides direct feedback to the user building the identikit and the identikit itself can be used as an access key to the image database. SpotIt! provides a virtually unlimited set of alternative features that can be browsed efficiently in the appropriate context, interactive holistic feature modification coupled to syntactic access to a feature database, and quantitative, automatic computation of face similarities, providing real–time feedback of the system which constantly shows the most promising matches to the identikit being built.

The application context

Eyewitnesses play an important role in the investigative aspects of police work and their description of suspects may help the investigators. When a suspect is unknown to the witness and not in custody, there are two main methods to obtain a description. The first one consists in showing to the eyewitness a set of photographs from the available police archives while the second method is based on the pictorial reconstruction of the facial features of the suspect. Police archives may be very large: the size of the albums to be shown to an eyewitness is one of the major drawback of the first method. Successful scanning of thousands of pictures requires an uncommon ability in keeping one's attention focused for a long period.

On the other side, the pictorial reconstruction of the suspect has two major drawbacks: the first one is related to the inherent difficulty of recalling a good mental image and the second one to making this description explicit. The interaction of the eyewitness, usually not a professional drawer, with the operator actually constructing the identikit represents a delicate point of the process. The eyewitness must textualize the visual description he/she retains, and interact with the drawer who translates the description back to visual data. This requires good verbal capacity and positive interaction with a skilled operator.

SpotIt! Innovative features

SpotIt! is an attempt at overcoming the many limitations of the available identikit systems. The innovative features of SpotIt! are:

- An easy–to–use graphical interface from which the user can access all system functionalities.
- Quantitative, automatic computation of face similarities, providing real–time feedback of the system which constantly shows the most promising matches to the identikit being built with the possibility of assigning a different importance to each facial feature (useful when the eyewitness does not recall with the same confidence all of the facial features).
- A virtually unlimited set of alternative features that can be browsed efficiently in the appropriate context: eyes, nose, mouth, chin, and hair visual appearance can be varied continuously, in place, using innovative face cursors without the need to work on gallery of features represented out of their natural context of a complete face.
- The possibility of acting both at the pictorial feature level and at the configural level of features layout: both the visual appearance and the position of the facial features can be

1 http://spotit.itc.it

changed effortlessly with an easy–to–use graphical interface. The pictorial and configural levels are both considered when comparing the identikit to an archive of faces, providing extended flexibility in searching for images and in the construction of the identikit.

– Different levels at which facial features can be created and modified, ranging from the traditional use of galleries of characteristic samples, to the modification using face cursors or predefined deformation lattices, to the use of photo–retouching programs. As a result, SpotIt! can be used effectively by users with varying artistic capability.
– Possibility of using internal SpotIt! compact face representation for image compression to manage very large databases, outperforming available compression technologies such as jpeg and wavelets.

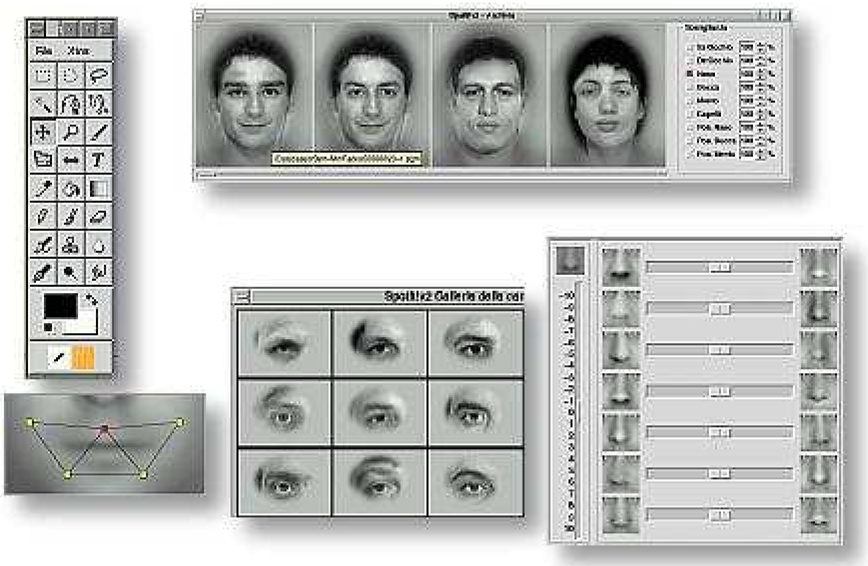

Figure 1: SpotIt! offers different tools for building an identikit image.

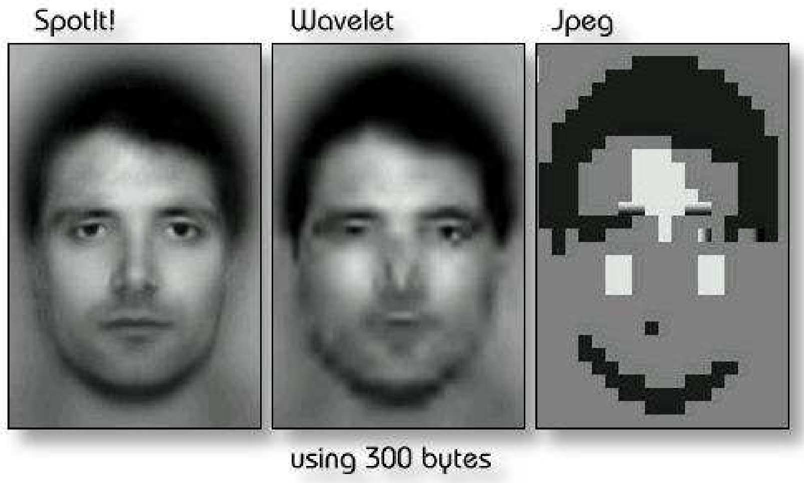

Figure 2: SpotIt! compact face representation outperforms other compression techniques.