Identification from Facial Composites

(A New Approach)

Nuffield Foundation, Eyewitness Identification Evidence

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Feature Based Approach to Facial Composite Construction

- Witness describes suspect’s face to operator (cognitive interview).
- Appropriate facial features are selected from databases contained within the facial composite system.
- Features positioned to achieve a likeness to the suspect.
- Image refined – better likeness
Operator Training: Cognitive Interview

- 1. Recreating the context: mental imagery, sounds, smells, feelings relating to the event.
- 2. Focused concentration: Persuading the witness to concentrate on the task of remembering the face.
- 3. Multiple retrieval attempts: Multiple attempts can unlock previously un-recovered detail.
- 4. Varied retrieval: e.g. Try a different chronological order.
Interface for feature based system
Motivation for New Approach

- Witness finds it difficult to recall descriptions of individual faces – weak point in the composite procedure.

- Configuration of features important – feature based system achieves this in an ad-hoc manner. (Turner et al 1999)

- Seek a technique based on recognition of whole faces.
EFIT–V: New Methodology for Composite Construction

- EFIT–V system components:
  - Appearance model (Cootes et al)
  - Evolutionary algorithm

- Whole face approach ✓
- Does not rely heavily on the witness’ ability to verbalise descriptions of features ✓
- On average composites are generated relatively quickly ✓
- Improved image quality ✓
- Easy to use ✓
EFIT-V

Quick Demo

(For upload version have replaced demo with flyer)
The recommended minimum system requirements for EFIT-V are:

- Pentium 4, 1.8 GHz or equivalent
- 512 Mb RAM
- 20 GB hard disk
- 32 Mb ATI graphics—capable of displaying 1024 x 768 in 32 bit colour
- Graphics tablet or mouse
- DVD-RW/CD-RW drive
- Microsoft Windows XP, 2000 and Vista operating systems

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EFIT-V is the new facial synthesis program from VisionMetric, the developers and suppliers of the world-renowned E-FIT facial composite system. It is now available to educational institutions for a wide range of teaching and research activities.

**Forensic science:** Get to the heart of eyewitness identification... Give your students the benefit of the hands-on approach with the world's most advanced composite system.

**Psychology:** What judgments do we make about people based on their facial appearance and why do we make them? Conduct a wide range of experiments investigating mate selection, the aging process, configuration of facial features, caricaturing and its effects....

**Multi-media and graphic design:** Tailor make photo-realistic faces for use as avatars in CGI or use your faces for advertising and product illustration. Export faces to your favourite graphics package for further enhancement....

**Why use EFIT-V?**

EFIT-V is based on a ground-breaking new method, which combines sophisticated facial manipulation tools with an intelligent, evolutionary engine. Developed with support from the Home Office and leading UK police forces, EFIT-V is flexible and easy to use and can quickly produce near photo-realistic images.

EFIT-V can generate an almost infinite variety of faces. No more headaches with data protection and copyright approval - whatever application you have in mind, the faces you produce are yours.

**Key functions**
- One-click evolutionary progression
- Independent feature transformation
- Automatic age progression and caricature
- Dynamic texture overlays for distinctive and realistic skin effects
- Skin tone controls
- Blending and mixing of two or more faces
- Comprehensive libraries of hairstyles, hats, glasses, beards, moustaches

**About EFIT-V**

Developed through a collaboration involving computer scientists, psychologists and police officers, the secret of EFIT-V's highly realistic images originates from a detailed mathematical analysis of human facial appearance. This analysis enables any face to be compactly encoded as a form of e-DNA and the user directs an evolutionary procedure which modifies the e-DNA to produce the desired facial appearance. The evolution can be accelerated through use of a range of powerful tools for making systematic changes to the face.

**License options**

**Single-user:** For focused research, student projects and classroom demonstration.

**Network:** Provides simultaneous use for multiple users, allowing cost-effective instruction of a whole class in the techniques of facial composite construction.

**Evaluation:** Contact us at enquiries@visionmetric.com. Provide the name of your department and educational institution to receive a 28-day evaluation version.
EFIT-V: Outline Method

**Genotype**
Vector of appearance model parameters

**Phenotype**
Generated facial image

**Mutation**
Changing of appearance Model parameters
EFIT-V: Outline Method

Select

Multiply

Population

Mutate
Deployment (user) Feedback

- Instances of deployment
  - “…witness or victim believes that they would recognise an offender again, even if they cannot recall facial features in detail”. v. Burgin, Principal Forensic Services Officer, Derbyshire Police Constabulary

- Facial ID Officers recovered images from witnesses 50% of the time compared to only 25% when using the feature based system.
References