“Face Recall Systems”

Jennifer Shieh
jcshieh@mit.edu

Overview

• Motivation
• Face Recall Systems
  - Identikit
  - Photofit
  - Minolta Montage Synthesizer
  - Strip systems
  - Sketch artists
• Laboratory Studies
• Psychological Factors

Motivation

• Alphonse Bertillon and his *portrait parlé*
  – Designed to help detective retain info about known criminal
  – Also used as witness aid
• Considerations
  – Difficulty generating good verbal descriptions, witness drawings
  – Economical and convenient
  – But, does it work well?

Face Recall Systems

• Break face down into component features
• Operator assists witness in selecting components
• Features integrated by a variety of techniques
• Effectiveness?
  – Identikit: aid in clearing 5-10% cases (Venner, 1969)
  – Photofit: 25% “greatly assisted” cleared cases (Dambrough, 1977)

Laboratory Studies

• Issues
  – Establish system accuracy limits
    (under controlled laboratory conditions)
  – Sensitivity to factors that normally influence accuracy
    (e.g. performance fluctuations due to effects of sex and race)
  – Correlations of successful performance

The Identikit

• Studies done by Laughery *et al* (1977)
• Method
  – Pairs of subjects (witnesses) talked to target person for 7-8 min, informed of required recall
  – Witnesses constructed likenesses of target from memory, one with sketch artist and one with Identikit technician
  – Artist and technician constructed likeness with target present (optimum performance)
  – Panels of judges rated similarity of sketches & Identikits to photos of target; computerized search algorithm to detect target in a “mug file”
  – 3 studies, 3 different types of targets: white males, white females, black males
Identikit
• Results
  - Significant overall advantage for sketches compared to Identikit
  - Neither method effective for computerized search
  - Sketches made with target present significantly better than those from memory, but no corresponding difference for Identikits in study with white targets
  - For study with black targets, both sketch and Identikits made from view had higher likeness ratings than those from memory

Photofit
• Studies
  - Encoding accuracy (Ellis et al., 1975)
    • In Photofit, construct white male face that was itself a Photofit composite, with composite in view or after 10-s observation.
    • Construct from photos of white males from memory
  - Effect of delay between observation and construction (Davies et al., 1978)
    • Construct from photos of white males seen for 10 s from memory immediately after observation, one week later
    • Construct three weeks later; also, recognize Photofit face among 36 mugshots to provide measure of trace strength for face
  - Ability of Photofit to reflect fluctuations in trace strength and availability (Ellis)
    • Observe video of white male reading a passage; ½ attend to passage, ½ to face
    • Answer questions on passage and make Photofit impression

Photofit
• Results
  - Encoding accuracy
    • Low: no subject completed a face entirely correctly but accuracy higher when task was done from view than from memory
  - Effect of delay
    • Overall accuracy was low, but no effect was found for delay
    • While there was no effect for delay in construction of a Photofit, significant decline in recognition accuracy with a 3-week delay. Trace strength had great decline but this was not reflected in Photofit accuracy.
  - Fluctuations in trace strength and availability
    • Subjects attending to passage had higher test scores but Photofits made by face-oriented subjects were rated no better than those made by passage-oriented subjects

Photofit
• Sketches vs. Photofit (Ellis)
  - Witnesses sketched from photos; ½ with target in view, ½ from memory
  - Influence of sex and race of witness (Ellis)
    • Male and female witnesses constructed likenesses of male and female target from memory, 10-s observation of each target
    • White Scottish and black African students made Photofits from memory of one black and one white face, 15-s observation

Relevance to Field Experience
• Both Identikit and Photofit have low sensitivity, demonstrated by failure to show superiority when construction made in presence of target; also, do not show expected fluctuations in performance
• However, both were capable of generating identifiable images, and, on occasion, showed expected sensitivity
• But, how relevant are the experiments to field operation?
  - Effect of emotive context when trying to encode face during a crime
  - Adverse character traits attributed by witnesses to criminal, distort composite
  - Training of technicians
  - Nature of the accuracy criteria in laboratory studies: too high?
Psychological Factors

- Interference effects in face recall
  - Don’t appear to be any interference effects, maybe facilitation
  - Systems produce varying effects upon subsequent recognition, depending on style of operator (~verbal interrogation)

- Mode of representation
  - Line-drawn systems: not very life-like appearance
  - Photo: interpret composite as specific individual, not approx. likeness; study showed higher ID rates for photos
  - More like a real face composite becomes, greater the probability of identification despite any increase in specificity of image

Psychological Factors

- Range and representativeness of features
  - Photofit Library analysis: some redundancies and gaps in range of available features
  - Division of face may not accord with attributes to which witnesses attend, but studies suggest that no one feature or set of features is necessarily salient under all conditions
  - Allow greater freedom for independent manipulation of features

- Global versus analytic processing
  - Assumption of remembering faces by constituent features
  - Try systems allowing witnesses to operate on global strategy (Facefit)