

# Mike Fairhurst

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Head, Image Processing and Vision Research Group

- High performance image analysis
- Multiple expert classifiers
- Handwritten document processing
- Medical image processing
- Biologically-inspired engineering
- BIOMETRICS AND SECURITY

External profile

- International Association for Biometrics
- European Biometrics Forum
- International Association for Pattern Recognition
- Institution of Electrical Engineers
- Engineering and Physical Sciences Research Council
- International Editorial Boards
- International Conference/Workshop organisation
- DTI Biometrics Mission to US (2001)
- DTI Biometrics Mission to Japan (2003)



*"Any other references?"*

# Some current research issues in biometrics

- Performance and characteristics of individual modalities
- Multimodal biometrics
- Human behaviour and HCI issues
- Biometric attack and countermeasures
- Biometrics in document processing
- Standards for biometrics
- Towards a National Centre for Biometrics ?

# Individual modalities

- Evaluation of modalities
- Errors, error sources and error patterns
- Performance, accuracy and limitations
- Resistance to attack
- User-related issues
- Scalability
- Cost-effectiveness

# Multimodal biometrics

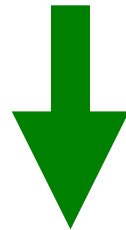
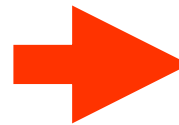
- Individual profiles and global performance
- Local decision-making strategies
- Decision fusion algorithms
- Optimisation
  - Empirically-based (e.g. Genetic algorithms)
  - Theoretical framework
- Incorporation of *a priori* information
- Adaptive environments

# User Interaction

Enrolment



Verification



How can this problem be addressed efficiently ?

# Attack and countermeasures

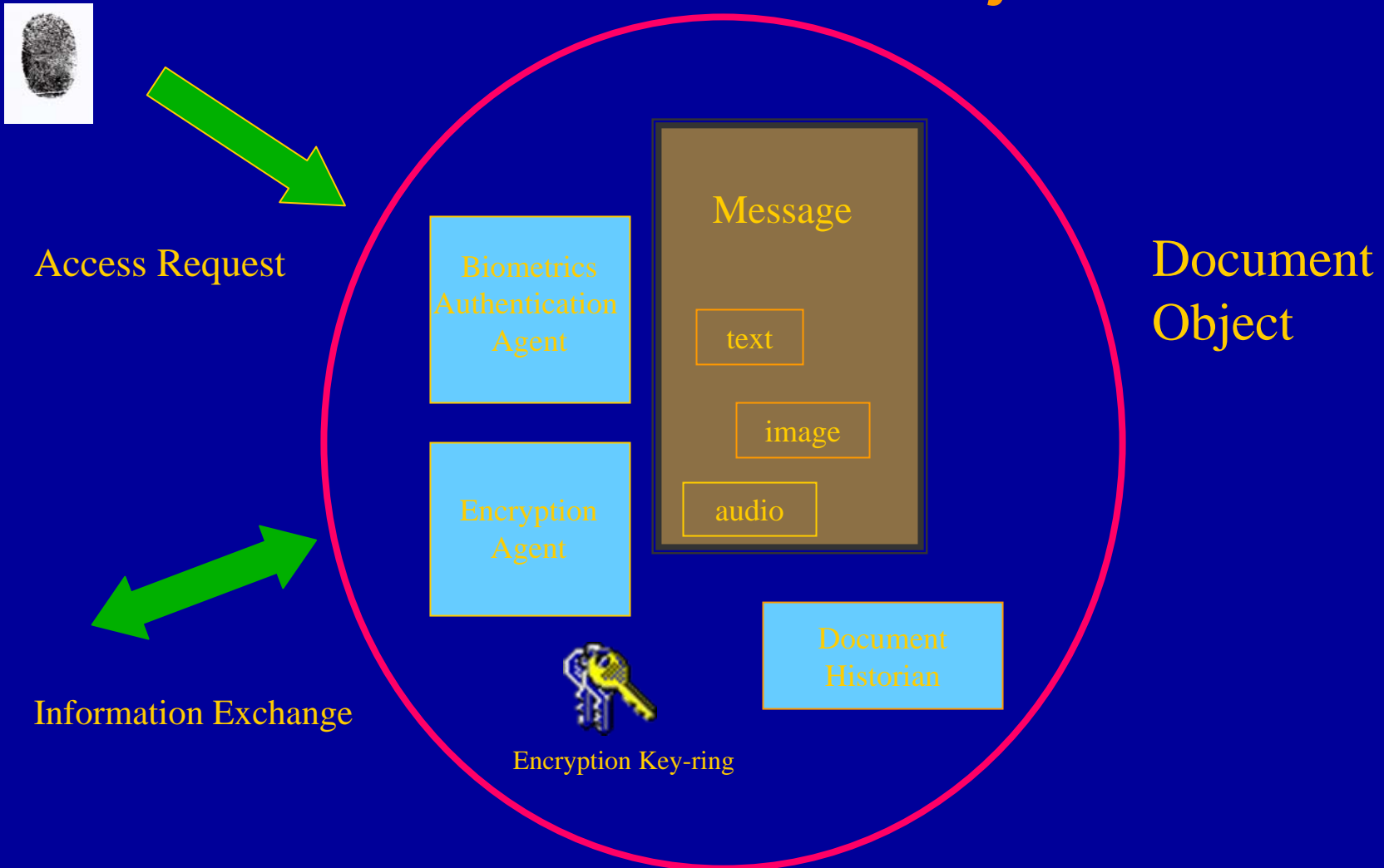
*Traditionally:*

- Liveness detection
  - => Temperature in fingerprint sensing
  - => *Hippus* in iris scan
  - etc

*BUT, also consider indirect methods*

- Context analysis
  - => Message content in voice recognition
  - => Exploitation of *a priori* information
- Challenge/response methods
- Synthetic data

# Documents as Autonomous Objects



# Standards in biometrics

- Rush to standards since 9/11
  - First batch published in 2005
- Interoperability is unproven
  - ILO tests on fingerprint minutiae format
  - May need revisions – already !
- Effective standardisation for rapidly evolving technology
  - Greater involvement of research community ?
  - Funding for expert input to the process ?

# A National Centre for Biometrics and Identification Services ?

## *The Vision*

The emerging vision for the Centre is to deepen the cooperation and exchange of knowledge between the science base, Government, industry and public, to inform the development of public policy and its effective implementation, to help ensure that technologies and applications are available to deliver the solutions required and to enable UK industry to maximise its contribution and its share of the benefits.

**Co-operation and Coordination  
Independent—Objective—Impartial**

# Opportunities to facilitate:

- Vibrant and robust collaborations
  - International cooperation
  - Interdisciplinary partnerships
  - Industry/academic secondments
  - Undergraduate/postgraduate programmes
  - Training/skills base development
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- Independent advice
    - Research strategies
    - System evaluation and testing
    - Advice to Government
    - Addressing public concerns

# Ambient biometrics ?



# Where do we go from here ?

- Setting the research agenda ?
- Knowledge transfer mechanisms ?
- Opportunities for industry/academia collaboration ?
- Role of Government ?
- Coordination among stakeholders ?
- Engaging the public ?
- International awareness ?
- etc

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