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Data Interchange Formats for Biometric Fusion – Fusion Information Format Project Proposal

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Project Proposal

ANSI/INCITS Data Interchange Formats for Biometric Fusion - Fusion Information Format

1 Source of the Proposed Project

1.1 Title

ANSI/INCITS – Fusion Information Format

1.2 Date Submitted

June 8, 2005

1.3 Proposer

INCITS Technical Committee M1, Biometrics

2 Process Description for the Proposed Project

2.1 Project Type

D - This is a standard development project.

2.2 Type of Document

The project is expected to result in an ANSI/INCITS standard.

2.3 Definitions of Concepts and Special Terms

Fusion - is the umbrella term for a wide range of methods for the combination of multiple pieces of biometric data. These may be raw samples such as images, processed data such as templates, matcher similarity scores or distances, verification decisions, and identification candidate lists or ranks. Fusion generically covers the combination of data from multiple samples, multiple (imaging or biometric) modes, or multiple algorithms. Fusion is usually conducted to improve matching performance.

Score level fusion - is the most readily implemented form of fusion. It combines the similarity score outputs of the two or more matching algorithms. The algorithms may be operating on the same input sample (for example two fingerprint minutiae algorithms) or on samples from completely separate modes (face, and hand geometry, for example). It is generally the case that a fusion module is driven by prior knowledge of the statistical properties of its inputs.

2.4 Expected Relationship with Approved Reference Models, Architectures, etc.

The fusion information format defines a data structure that could be passed to and from an application and BioAPI BSPs as standardized by INCITS 358-2002. A proposal to include support for fusion in BioAPI has been proposed to M1.2

2.5 Recommended INCITS Development Technical Committee

INCITS Technical Committee M1 – Biometrics

2.6 Anticipated Frequency and Duration of Meetings

It is anticipated that this project would require one-day meetings approximately four times annually.

2.7 Target Data for Initial Public Review

It is estimated that the draft document would be ready for submission to INCITS for Milestone 4 processing in January 2006.

2.8 Estimated Useful Life of Standard

The standard will have an estimated life of 5-years.

3 Business Case for Developing the Proposed Standard

3.1 Description

The proposed standard will define a data interchange format record that vendors or users of matching algorithms would provide to any score-level fusion device. The purpose of this would usually be to improve matching performance. It may also be used to contingently determine the need to acquire a sample from another biometric mode. The format is needed to establish a uniform statistical markup of the score information needed to effect post-match fusion.

3.2 Existing Practice and the Need for a Standard

Existing Practice: Biometric technologies are currently fused at the application level using proprietary, possibly ad hoc, rigidly embedded data passing techniques. The proposed format will modularize the multi-biometric problem in the sense that a matcher may be replaced if it is accompanied by an appropriate instance of the proposed interchange format.

The proposed standard is needed to allow application developers to realize multimodal, multi-algorithmic and multi-sample fusion. The format may also assist, for example, in the offline analysis of a system behavior, robustness, efficiency and overall performance.

3.3 Implementation Impacts of the Proposed Standard

3.3.1 Development Costs

Technical editor labor is expected to total about two months of a staff-year.

3.3.2 Impact on Existing or Potential Markets

The standard would establish a common format for the statistical properties of score data. It will support the multimodal market and further delineate the inherently modular nature of contemporary biometric implementations. It would create a niche for companies that seek to supply dedicated fusion modules to application builders and system integrators.

3.3.3 Costs and Methods for Conformity Assessment

The proposed should provide a stronger basis for the development of uniform interchange of biometric technologies. Conformity assessment would be assessed by one: byte level compliance to the base standard by means of appropriate test assertions; and two by assessing relevance of the statistical information to the underlying matcher technology.

3.3.4 Return on Investment

There is no known data on which to make an estimate.

3.4 Legal Considerations

3.4.1 Patent Assertions

Determination of patents relevant to this proposed amendment will be dependent upon the selection and specification of options in base standards for use in this application profile.

3.4.2 Dissemination of the Standard

Drafts of this amendment will be distributed electronically. There may be distribution constraints as this document reaches different stages of development and processing within INCITS and ISO/IEC JTC1.

4 Related Standards Activities

4.1 Existing Standards

Existing base standards, which may be referenced in the proposed data interchange format standard, include:

INCITS 398-2004, CBEFF – Common Biometric Exchange Formats Framework

INCITS 358-2002, BioAPI – Biometric Application Programming Interface – Part 1: BioAPI Specification

4.2 Related Standards Activity

Related standards activity include: BioAPI INCITS Technical Committees M1.2

4.3 Recommendations for Close Liaison

BioAPI Consortium
IBIA

5 Units of Measurement used in the Standard

Indicate units of measurement used in the Standard:

- ___ International Systems of Units (SI)
- ___ Inch/Pound
- ___ Both
- ___ Other
- XX Not Measurement Sensitive