

National Institute of Standards and Technology

Steering Committee Report

Version 0.1

02/24/2011

(NIST documents are unclassified)

Prepared by:

Steering Committee

Produced for:

Federal Bureau of Investigation



Criminal Justice Information Services Division
1000 Custer Hollow Road, Clarksburg, WV 26306

This report attempts to bring together relevant documents related to the Investigatory Voice Biometrics Project for the benefit of the Steering Committee considering the future direction of the project and eventually for all who are involved with the project or may become involved with it. A roadmap document for the future direction of the project is the intended goal, but considerable work remains to be accomplished to produce a full such document

The short history of the project is summarized in section 2. Subsequent sections review the symposium held in March 2009 and the committees established for the symposium and for ongoing work. The symposium agenda and the committee scope and mission states documents are noted and included as appendices. Further sections note the focus of the work assigned to each of the four topic-area committees and, for three of them the key committee recommendations. Three of the committee reports, one of them, at least, in less than final form, are offered as appendices. The need to move ahead with a decision on having a follow-up workshop this year is noted in the final section.

1. Investigatory Voice Biometrics Project

This project was initiated at NIST in 2009 under the sponsorship of the FBI Science and Technology Branch Biometric Center of Excellence. It was intended to complement past and ongoing work similarly being sponsored at NIST and elsewhere on the development of standards for other biometric modes of identity.

US Government interest in the development of automated techniques to recognize people by their voices has a history of nearly 70 years. While significant challenges remain, enough progress has been made that a number of US Government agencies are fielding or seeking to field speaker recognition technology in support of their missions. The FBI Science and Technology Branch Biometric Center of Excellence (BCOE) therefore asked NIST to launch a program directed toward research and development of voice biometric collection and interoperability standards capable of support the common investigatory needs of all interested US Government agencies.

This program is intended to be a multi-year effort to develop voice biometric collection and interoperability standards. It was initially directed toward defining requirements and research needed to support the development of standards and best practices. As it progresses, it may shift toward refining standards, developing resources, and conducting evaluations.

While this program has a broad scope, it is not intended to address the needs of non-government, largely commercial applications. Neither is it intended to specifically address forensic applications involving admissibility of evidence in courts of law. But it is intended to work openly with the international community and seek input from international partners in developing governmental voice biometric standards.

2. Committees

A Government Steering Committee was established to build an interagency partnership and drive the program forward. It was hoped that it would include representatives from as many relevant US Government agencies as feasible. Those selected to serve on this committee included Alvin Martin from NIST, Hirotaka Nakasone from the FBI, and Jack Godfrey and Stephen Gibbs from the intelligence community. The committee is charged with ultimate responsibility for planning the direction of the program.

Four other committees were established prior to the workshop to help organize corresponding workshop sessions, with the intent that they would follow up with reports on their areas in the period after the workshop. These were the Use Case Committee, the Interoperability Committee, the Collection Standards Committee, and the Science & Technology Committee. A chair was appointed for each committee. These chairs played a leading role in organizing the symposium presentations related to the committee's work. Symposium participants and presenters were then invited to be part of committees in whose work they had an interest.

The committee chairs, listed below, were expected to work closely with this committee to ensure that all information necessary to develop appropriate voice biometric standards and drive the program would be available.

The Committee Scope and Mission Statements summary is included as Appendix A of this document.

3. March 2009 Symposium

The symposium was intended to initiate this program with an open program that offered input from a wide spectrum of potentially interested participants. Information on the symposium was made available to all agencies and individual experts that steering committee members could suggest. This included the email list compiled for the biennial NIST speaker recognition evaluations.

Presentation abstracts were invited from all who were contacted, but were not required for attendance at the symposium. The steering committee reviewed all submitted abstracts and chose the ones that were included in the final program along with a couple of invited presentations. The symposium agenda is included as Appendix B of this document.

The symposium was held at NIST on March 24-25, 2009. On the order of sixty people representing US and foreign government agencies and private sector organizations involved in speaker recognition and biometric processing participated. This was viewed as an excellent turnout, and interest in the program was widespread. Some participants, however, indicated a desire to know more about how the program would be organized and how they might be involved. A fair number of participants agreed to be involved in the work of the several committees.

4. Use Case Committee

The focus of this committee was specified to be:

- To gather and understand government investigatory Voice Biometrics use cases
- To develop a data sharing taxonomy for these use cases
- To determine the data exchange requirements of each use case class
- To identify any gaps between existing standards and the use case data exchange requirements

The chair of this committee is Peter Higgins. The Use Case Committee report is included as Appendix C of this document. Its specific recommendations, in brief, are:

- Develop the report further and convert it into a survey instrument to be circulated to agencies and departments with an interest in voice biometric technologies
- Have the FBI establish a SIG on its LEO system for distributing the survey and sharing its results
- Work with CJIS and the Steering committee to further develop use case information
- Prototype and execute voice sample collection as part of the arrest booking cycle to help determine best practices guidance for collection of voice biometrics

5. Interoperability Committee

The focus of this committee was specified to be:

- To identify the considerations and existing approaches for data storage, transmittal, and other aspects of interoperability
- To develop classification schemas for these considerations and approaches
- To identify the strengths and weaknesses of each approach

The chair of this committee is Jim Wayman. The Interoperability Committee report is included as Appendix D of this document.

A key finding in the report on future options is the following:

Initiating development of interoperability standards will require some decision making about a preliminary direction. The committee sees two potential paths forward: to build a record type for the existing ANSI/NIST ITL-1 “Data Format for the Interchange of Fingerprint, Facial, and SMT Information” format or to move directly to an LEISP-mandated LEXS NIEM-compliant format.

The reports specific recommendations, in brief, are:

- Examine the options presented on paths forward in greater detail to determine: (a) the viability of each; (b) the utility of each for voice; and (c) the impact on interoperability of voice with other biometrics.
- Further investigate what would be required to establish a privacy policy/standard that supports the needed interoperability.
- Investigate the utility of adopting or adapting ANSI and ISO interoperability standards to investigatory interoperability needs.
- Adopt a more proactive role in developing ISO/IEC standards to influence their direction.

6. Collection Standards Committee

The focus of this committee was specified to be:

- To identify the practical concerns involved in collecting government investigatory voice-biometric data
- To develop a taxonomy for these concerns
- Identifying any developing potential strategies for addressing these concerns

The chair of this committee is Joseph Campbell. The committee report is still in progress.

7. Science and Technology Committee

The focus of this committee was specified to be:

- To identify the factors affecting speaker recognition performance
- To develop a taxonomy for those factors
- To determine the current state of knowledge, including the existence of any metrics, for each factor
- To rank the factors for research priority

The chair of this committee is Craig Greenberg. A draft version of this report, intended to be expanded, is included as Appendix E of this document. Its key recommendations include:

- Encourage the collection, annotation, and availability of appropriate speech data.
- Encourage research into simulating speech data to support speaker recognition research.
- Extend current research and evaluation to non-automatic as well as fully automatic approaches.
- Encourage research on factors that are most likely to be encountered and are known to have a large impact on performance.

8. Planning the Next Workshop

The committee reports and this summary document are intended to assist the Steering Committee in assessing what has thus far be accomplished, where we stand in incorporating voice biometrics into the work of the FBI and other government agencies with interests in this area, and how the project may most usefully move forward.

In particular, there is considerable interest in holding a second symposium on Investigatory Voice Biometrics to report on what has been accomplished, pursue suggestions in the committee reports on further work to be done, maintain the interest

of participants in the first symposium, and attract involvement by others involved in U.S. and foreign government work related to voice biometrics. A suggested date for a follow-up symposium is June 2011.