INCITS: Technical Committee M1 Biometrics Standards Leveraged by Aadhaar System in India[1]

Background

India has over 1.2 billion residents, many of whom do not have identification documents. Beginning in 2009, India began one of the world's largest identity assurance systems utilizing biometrics technologies and open systems standards.

Problem

Many residents of India lack documentation to establish their identity such as a birth certificate or a proof of address. Particularly affected are India's underprivileged citizens. For many years, the Indian government has sought to document these citizens but the government has lacked the infrastructure to ensure that such services reach the intended recipients. Without identification these citizens are unable to access services and resources such as opening a bank account or renting a house. The challenges increase when people move across state lines as most identification documentation is provided by a local administration and is invalid when the person moves to a new state. Furthermore, many of the existing physical identity tokens can only be authenticated manually because the token can only be verified when the photo of the individual is printed on the token. Additionally, the government had no authenticated audit system in place resulting in a high rate of fake documents and unauthorized copies.

Approach

In 2009, the Indian government established the Unique Identity Authority of India (UIDAI) to establish identification for all of the country's residents in need so that they would no longer be excluded from the financial and medical systems. UIDAI developed the Aadhaar (translation: foundation) system, which allows social services, government agencies, financial institutions, and other registrars to collect basic biographic information as well as fingerprint, iris, and facial images from residents. This system provides online, cost-effective, ubiquitous authentication services across the country.

The system has provisions for supplying a robust, reusable ID to those who currently do not have proof of their identity. The goal of Aadhaar is to provide a common platform that can be used across all applications and serve to clean up existing databases through the uniqueness of the ID, improve targeting and delivery of services to the intended beneficiary, and reduce the cost of delivering these services. Additionally, Aadhaar has been designed as a service delivery platform to make the process more cost effective, accountable, and transparent. Authentication through the use of biometrics facilitates achieving all of these objectives.

Reliance upon biometrics enables uniqueness checks through one-to-many multimodal

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[1]Based on: Exclusive Interview - Nandan Nilekani, Chairman of the new Unique Identification Authority of India (UIDAI), Planet Biometrics, May 2010, www.planetbiometrics.com; Guest Interview, Catherine Tilton, ISO Focus+ February 2011, www.iso.org/isofocus+; and Aadhaar Creating Identities for 1.2 Billion Indians and Technology behind Aadhaar, R.S. Sharma, Director General & Mission Director, Unique Identification Authority of India, and Biometric Consortium Conference, September 2012, Tampa, FL, www.biometrics.org/bc2012/program.pdf.

biometric matching as well as one-to-one identity verification. The uniqueness checks, or de-duplication, ensure that each person exists once and only once in the system and is assigned only one unique identity number. Verification allows an identity to be authenticated at the time that services are being provided to ensure they are going to the authorized recipient. Multiple biometrics are needed to ensure broad population coverage and sufficient matching accuracy for such a large population. Since the system involves numerous registrars who enroll and authenticate clients across the entire country, the biometrics must be interoperable and reliable. Once these residents enroll for an identity number linked to their biometric data, they can subsequently prove their identity multiple times, anywhere in the country, to any agency by providing their demographic details or biometric scan.

The international standard ISO/IEC 19794, *Information Technology - Biometric data interchange formats,* plays a major role in this program. In addition to requiring the same iris, fingerprint, and face image standards used in e-passports, Aadhaar also utilizes ISO/IEC 19794-2:2011, *Information Technology - Biometric data interchange formats - Part 2: Finger minutiae data*, for authentication purposes; and ISO/IEC 19785, *Information Technology - Common Biometric Exchange Formats Framework (CBEFF)*, for packaging the biometric data, providing common structure, metadata, and security. The use of multimodal biometrics improves de-duplication accuracy using multiple modalities (ten fingerprints, two irises, and the face). To address risk mitigation, the Aadhaar system is designed using a multi-vendor approach for the integration of the multimodal biometric matchers as well as the storage, management, and security of the biometric data.

Outcome

Enrollment by Indian residents is ongoing via this large ecosystem comprised of registrars, enrollment agencies, operators, device manufacturers/suppliers, certification agencies, and station operators. Enrollments are being performed all over the country by over sixty thousand active enrollment stations. Over sixty registrars are currently participating including state governments and service providers, financial institutions, and the postal system. More than 200 million citizens from nearly all states have been enrolled in the system using biometric tools. Projections estimate that over six hundred million citizens will be enrolled in the Aadhaar system by 2014.