Biometric Identification in Financial Inclusion in South Africa

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Biometric Fundamentals

- Physically tie the presence of someone to a device
- Identification versus Verification
- Authentication versus Access
  - Authentication through the presentation of a credential that is either unique or secret
  - Access through providing a credential that is physically part of a person present to control access either physical or logical
- Live-tissue verification

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Use of Biometrics for providing service

- Avoidance of duplication
  - National ID registration
  - Electoral schemes
  - Employment and salary payments
  - Benefit pay-outs – CCTs, Pensions
  - Driver licensing
  - Industry-wide loan exposure management
- Certainty of presence
  - Digital
  - Legal
  - Physical
- Lack of numeracy and or device use
- Proof of life

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Issues with the application of Biometrics

- Uniqueness
  - Cloning and theft
  - Not like a password can't be reset, only disabled
- Use as prime and single authenticating factor
- Changes over time
  - Aging – growth, change and deterioration
  - Damage
- Requires custom electronics
  - Power
  - Electronics in the field
  - Maintenance
- Not suited to simple mobile phones (other than voice)

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Biometrics – Technicalities

- Main users are nation states for the provision of identity services and crime management
- Public Information:
  - Unique Identification Authority of India (UIDAI)
    - evaluations for AADHAAR national identification number
    - 10 finger and Iris
  - USA NIST on Fingerprint, Face, Iris and Multiple Biometrics http://www.nist.gov/itl/iad/ig/biometric_evaluations.cfm

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Technology Choices

IDEALLY

- Use international standards
  - Widens the supplier pool
  - Prevents technology lock-in
  - Some protection against obsolescence
- Open technology (readers, templating, processes)
- Aim for use of pervasive supporting technology
- Low maintenance overhead essential
- Common core between multiple agencies and users

ISSUES

- Proprietary Technology and processes restricting source of technology and closing market to current service providers
- Monopoly pricing (cards and readers)
- Commercial and Operational Risk
- Cost of exit rises continually
- Inappropriate use

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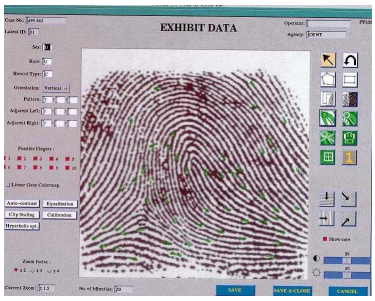
Fingerprint Biometric

- Dermatoglyphics - is the scientific study of fingerprints
- A fingerprint sensor
  - electronic device that captures a digital image of the fingerprint pattern
  - Technologies have been used including optical, capacitive, RF, thermal, piezoresistive, ultrasonic, piezoelectric
  - Captured image is called a **live scan**
  - Digitally processed to create a **biometric template**
  - Template used in search and match operations
- A good starting point on detail NIST Biometric Image Software at http://www.nist.gov/itl/iad/ig/nbis.cfm



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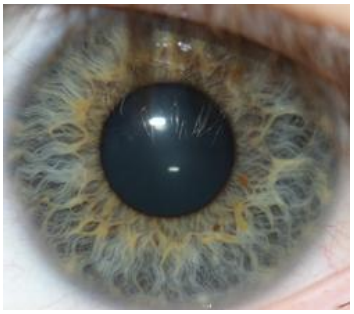
Iris Biometric

- John Daugman developed and patented the first actual algorithms to perform iris recognition
- Fundamental biometric of the Aadhaar national ID in India
- Most flagship deployments of iris algorithms have been at airports
- False march rates are extremely low
- Early technology was bulky and difficult to use at scale



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Examples of Biometric Enabled Payments

- South Africa
- Nigerian
- Congo
- Indian

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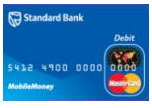
MTN Banking - voice biometric

- Launched in August 2005
- MTN Banking JV – Standard Bank and MTN MNO in South Africa
- **Target market FINANCIAL INCLUSION**
- First Asserted Identity KYC scheme in world
  - **No in person registration for an account**
  - Validation of provided name and ID number against national database
  - Selection of PIN
  - voice biometric on registration
- The technology was not good enough and abandoned as it stopped registration and customer service



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Investec Voice Biometric -2015

- HNW personal BRANCHLESS banking service
- Branchless banking
  - Signup and registration with a personal banker face to face with full KYC (Official ID document and utility bill)
  - 10 Personal Questions and answers
  - Courier delivered bank cards
- Customer channels
  - Web
  - E-mail with personal banker
  - Call centre
  - National ATM network (none of their own)
  - Cash and cheques via sponsor bank
- Call Centre Authentication
  - 10 questions random and transaction history
  - Introduced voice biometric
    - Recorded voice signature after standard authentication
    - A few correlations during subsequent calls
    - On sufficient match moved to voice authentication
  - Call initiation process sufficient discussion to authenticate - ask for account number and then discuss what clients wants to do.

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Capitec

- Bank for the people
- **Major full scope financial inclusion player**
- Target is the poorer market
- **Branches run as retail shops**
- All deposited cash goes into drop safes
- No cash out in branch
- Fingerprint biometric and photograph as authenticator in all branches
- Technology leader – enabled all electronic channels
- Market entry success story

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Government Benefits in Andhra Pradesh, India

- 2008 Delivery of government program disbursements - National Rural Employment Guarantee Scheme and the Social Securities Pensions Scheme
- Enrolment - all ten fingerprints, a photo, the signature, and other details of each potential beneficiary
- Fingerprints are verified centrally to remove multiple registrations by individuals
- Smartcards have account details and fingerprint biometrics stored on them allowing for offline authentication

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DRC - IRIS

- PNDDR – DRC
- Civil war combatant demobilisation
- Iris de-duplication
- Use of Mobile to receive funds
- Cash-out an issue
- ID cards for disbursement

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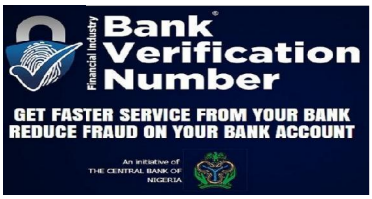
Nigeria – Bank Verification Number

- 23,000 Ghost Workers identified - federal and state government
- Banks can now provide accurate numbers of accounts they manage
- Check crime, fraud and corruption – large unclaimed
- No reckless loan grants
- Track all account activities cross banks



Followed from successful voter registration campaigns 10 years ago

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India – AADHAAR

AADHAAR

1 200 million (1.2B) biometric registrations

- **Biometric Devices** - Testing and Certification, cost and rollout
- **Biometric Data** – Facial image, iris scan and fingerprints collected by the Registrar from the enrollees
- **De-duplication** – Demographic and Biometric data collected from an enrollee is checked against existing Aadhaar data so as to avoid duplicate enrolments
- **Demographic Data** – personal information is collected or verified by the Registrar
- **Enrolment** – The collection of demographic data after verification, collection of biometrics, and the allocation of the UID number after de-duplication

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India biometrics for the poor

- AADHAAR Number
  - Basis for inclusive banking accounts
  - e-KYC automated against a pre-registered identity
- Uses
  - Direct Benefit transfer (DBT) – e-transfers via Aadhaar number to bank accounts – LPG and CCTs
  - Aadhaar-enabled biometric attendance systems
  - Fingerprint and Iris biometrics
- Concerns
  - Cost-benefit or feasibility studies
  - Prevention of benefits reaching the most needy
  - Lack of legislation and privacy concern
  - Legality of sharing data with law enforcement
  - Managing errors

सत्यमेव जयते

From https://en.wikipedia.org/wiki/Aadhaar

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South African Social Security Agency

- **21.8 Million beneficiaries paid monthly**
  - Social Relief of Distress
  - Grants-in-aid
  - Child Support Grant
  - Foster Care Grant
  - Care Dependency Grant
  - War Veteran's Grant
  - Disability Grant
  - Grants for Older Persons
- Registration
  - Card
  - Biometrics – 10 fingerprints and voice
- Monthly proof of life
- **Payments must operate through the whole South African Payment system**

sassa
SOUTH AFRICAN SOCIAL SECURITY AGENCY

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Enrolment

- Administrative requirements and approval of eligibility
- Registration of biometrics and issuance of card (V, F Pic)
- Biometric challenge 3 month old children to pensioners in 90s
- Card contains
  - Recipient's data
  - Entitlements
  - Biometric template data for all 10 fingers of 4 people
  - EMV payment functionality
  - Offline wallet
- Card works
  - Online as EMV Debit card
  - Offline as a Wallet

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SASSA Services

- Payment distribution to all beneficiaries
- Re-registration of 21.8 million social grant recipients comprising of beneficiaries, children and procurators by capturing biometric data
  - preferably 10 fingerprints
  - photograph
  - voice recording
- SASSA smart payment card underwritten by Grindrod endorsed by MasterCard can be used to access payment any where, anytime, using multiple payment channels
- "proof of life" certification by either authentication of the beneficiaries fingerprint or voice

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SASSA Challenges

- Facilitating the ability to move benefits out of the Grinrod bank accounts electronically to other banks
- Voice proof of life for electronic disbursement
- Peak loads on the national ATM switch
- 1st of month crowds at retailers
- Mandatory card requirement and difficult replacement thereof

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Biometrics and SIM Swap Fraud

- Two Factor Authentication Hack
  - Keyboard log/shoulder surf/phish/social engineer credentials
  - Move phone network identity to fraudster (SIM swap)
  - Access to web and mobile banking!
- **The VULNERABILITY – Banks rely on authentication credentials which they do not control the integrity of**

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