Emerging Applications in Commercial Face Recognition

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Growth in commercial face recognition (FR) applications is outpacing government applications

- **Enabled by massive improvements in face recognition accuracy and efficiency**
Improvements in accuracy and efficiency

Accuracy / error is measured on unconstrained facial imagery, characterized by natural variations in illumination, resolution, facial pose, expression and occlusion.

Error rate is the identity verification False Rejection Rates at a fixed False Acceptance Rate of 1 in 10,000.
How are commercial industries using face recognition?

And how can NIST tests evolve to better assess effectiveness on these use-cases?
ID Proofing and “Know Your Customer” (KYC)

- The shift to digital payments and platforms requires the need to digitally validate a customer’s identity
ID Proofing and KYC

- Requirements:
  - Highly accurate on “selfie” images
    - Pitch variations, inconsistent illumination, lens distortion
  - Highly accurate on scanned ID card photos
    - Holograms, printer artifacts, low-resolution, time lapse
  - Robust anti-spoof (liveness validation) using commodity sensors
Real-time screening

• Real-time FR screening provides a great value proposition to secure stadiums, airports, schools, and critical infrastructure
Real-time screening

• Requirements:
  ✓ Accuracy in semi-unconstrained and semi-cooperative setting
    • Near frontal, semi-controlled lighting
  ✓ Budget sensitivity
    • Hardware (compute and cameras)
    • Software licensing
  ✓ Ease of integration / use
  ✓ Watch-list identification (1:N+1)
Access control

- Authentication systems are increasingly relying on biometrics
- Face recognition is particularly appealing given contactless nature and sensor interoperability

- Mobile device unlock
- Facility access
- Network authentication
Access control

- Requirements:
  - Accuracy on selfie-style images
  - Extreme power efficiency
  - Minimal binary footprint (RAM)
  - Robust anti-spoof
Slower Emerging Applications: Internet of Things

- Expectations are that our devices and surroundings know when we are present and adapt accordingly.
- Requirements:
  - Strong accuracy in unconstrained setting
  - Extreme efficiency and support for low cost hardware (e.g., ARM)
Slower Emerging Applications: Smart Retail

• Retailers want to know who is buying what products; both for individuals and demographic cohorts
• Customers want rewards
• Payment providers want reduced fraud
• Requirements:
  ✓ Strong accuracy in semi-constrained setting
  ✓ Low hardware and software costs
Slower Emerging Applications: Medical Industry

- Accurate patient identification reduces fraud and streamlines services

- Requirements:
  - Efficiency for use in mobile devices
How NIST FRVT can better support these applications

• Measure accuracy on additional datasets:
  – Selfie to ID scan (ID Proofing)
  – Selfie to Selfie (Device unlock)
  – Semi-constrained imagery to ID scan (e.g., FIVE data)

• Add more comprehensive efficiency metrics:
  – SDK binary size / peak memory usage
  – Enrollment and comparison speeds on ARM chips

• Include additional scenarios into Ongoing benchmarks:
  – Demographic estimation, anti-Spoof using generic sensors, watch-identification

• More collaboration with industry groups
  – Potential funding and data source
Questions?

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