Getting the Best Facial Image
The Effect of User Experience on Facial Quality and Matching

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Facial Recognition Algorithms Do Not Stand Alone
The Real World Has Many More Factors To Overcome

Facial Recognition in the physical world requires more than just a robust backend.
Common Facial Technology Challenges: FTA factors

- Pose
- Pan
- Eye Distance
- Lighting
- Distance
- Face Quality

Contributing Factors

A highly quality score means a better match score when comparing faces.
iAIM Platform Concept

NEC I-AIM Platform

- Presentation Portal
  - Data Analytics (Security, Intelligence, Reports)
  - Common Services (Workflow/ Administration/Audit /Policy)
  - Identity Resolution – ES/XM (Biometrics & Meta data)
  - Interoperability

- Data Brokers
- Edge Processing (IoT, Sensors)
- NeoEVA (Video Analytics)
- Neoface Watch (Monitoring)

Video Management Systems

Third-party Physical Access System

User Applications/Solutions

User Data Sources

Sensors & Peripherals
NEC Video Analytics

Senses objects, people, crowd and behavior

- Soft demographics biometrics collection
- Emotion or gaze sensing
- Crowd density, and behavior sensing
- Trip wires, occupancy detection
Information from Cyber/IT World

- External Datasets
  - Background Checks
  - Terrorists/Suspects DB
  - etc.
- Internal Data
  - Employee Profile
  - Customer Data
  - Access and Data Logs
  - Incident History
  - Security Plans
  - Internal Data

Information from Real World

- Image Data Mining
  - Detect Someone seen at suspicious time and locations
- NeoEVA Analytics
  - Detect Someone seen with suspicious behavior
- NeoEVA Watchlists
  - Detect Someone registered at watch list (Terrorist, Suspects)

Common DB

AI

Visualizations (Detection)

Analysis

- Rapid Machine Learning
- Heterogeneous Mixture Learning

Score subjects based on risk-based analysis

#1 Mr. xxxx score 990

extensible
Express Use Cases: Immigration

Facial recognition for Biometric Air Exit TVS program
- Performs 1:N matching
- Integrate with airline systems for one-step boarding

The Express can be used as a capture device for the **US EXIT program.** NEC solutions are deployed in 15 of 18 CBP Exit Airports.
Origins of the Express

Facial recognition for fast pass and park entry

- Different Acquisition Environments
- World-wide deployment
- Minimal Training

Express for Theme Parks
Zoned Performance

- Continuous Accuracy Enhancement
- The closer to the device an image is captured, the higher the accuracy
- Further capture distances mean easier to use with faster match time, but higher Failure-to-Acquires (FTA)

For CBP, NEC optimized for accuracy and minimal FTA while maintaining High TIR and Low FIR

For Biometric Rally, NEC optimized for ease of use and speed while maintaining High TIR and Low FIR, Increasing FTA
## 2018 DHS S&T Biometric Rally Results: Crestone

<table>
<thead>
<tr>
<th>Category</th>
<th>Definition</th>
<th>NEC Express</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency</td>
<td>The average time in seconds volunteers spent between entry and exit beams.</td>
<td>4.66</td>
<td>6.88</td>
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<tr>
<td>Satisfaction</td>
<td>The percentage of “Happy” or “Very Happy” ratings provided by volunteers after using the system.</td>
<td>96.7%</td>
<td>90%</td>
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<tr>
<td>Face FtAR (under 5 seconds)</td>
<td>Failure to acquire rate: the percentage of transactions that failed to acquire or process a face within 5 seconds after the entry beam.</td>
<td>0.80%</td>
<td>32%</td>
</tr>
<tr>
<td>Face mTIR (under 5 seconds)</td>
<td>MdTF true identification rate: the percentage of transactions providing correct identity after the entry beam break within 5 seconds as calculated by the MdTF face matching engine.</td>
<td>97.8%</td>
<td>65%</td>
</tr>
</tbody>
</table>
NEC Body Detection Technology

Detects entire body and tracks the body flow in complex environments

Body detection and tracking in **natural settings**
Sensor Fusion
Use Case

Airlines boarding gate uses **face**, **body** and **gate sensor** data to provide friction-less flow.
Quality Images Through Quality Experience

- Providing a natural **user experience** where users are enticed to look the right direction can help face recognition accuracy.
- Sensor fusion **bolsters confidence** even when face recognition scores aren’t perfect. Low quality data is sometimes all you get.
- Speed vs Accuracy is generally a trade off. All depends on the cost of failure.
- Backend performance is a function of frontend acquisition.
Empowering the Smart Enterprise

REALIZE YOUR CONNECTED POTENTIAL