**Motivation**

- Growing demand for biometrics-based authentication of infants (0-12 months old)
- 500 ppi fingerprint readers work well for children > 12 months old
- In collaboration with NEC, we developed a compact (7 cm X 3 cm X 7.5 mm) and high-resolution (1,270 ppi) fingerprint reader to capture infant fingerprints

**Custom Fingerprint Reader**

- 500 ppi fingerprint readers work well for children > 12 months old
- In collaboration with NEC, we developed a compact (7 cm X 3 cm X 7.5 mm) and high-resolution (1,270 ppi) fingerprint reader to capture infant fingerprints

**Fingerprint Data Capture**

- Data collection was done in Dr. Bhatnagar’s office at Saran Ashram hospital, Agra, India
- 500 ppi left thumb print
- 1,270 ppi left thumb print

**Image Enhancement & Matching**

- We designed an algorithm to enhance infant fingerprint images to improve feature extraction (minutiae points) and matching
- We conducted verification (1:1 comparison) and identification (1:N comparisons) experiments using a state-of-the-art commercial fingerprint matcher

**Verification Results (1:1 comparison)**

<table>
<thead>
<tr>
<th>Age group</th>
<th>True Accept Rate (%)</th>
<th>False Accept Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 4 weeks</td>
<td>43.43</td>
<td>0.1</td>
</tr>
<tr>
<td>&gt; 4 weeks</td>
<td>79.72</td>
<td>0.1</td>
</tr>
</tbody>
</table>

**Identification Results (1:N comparisons)**

<table>
<thead>
<tr>
<th>Age group</th>
<th>Rank-1 (%)</th>
<th>Rank-10 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 4 weeks</td>
<td>38.44</td>
<td>44.05</td>
</tr>
<tr>
<td>&gt; 4 weeks</td>
<td>73.98</td>
<td>79.95</td>
</tr>
</tbody>
</table>

**Future Work**

- Design better enhancement and matching algorithms
- Conduct longitudinal study for infant identification
- Determine the youngest age for identifying infants with acceptable accuracy (95% TAR at 0.1% FAR)

We thank VaxTrac and Bill & Melinda Gates Foundation for their support