Vision for Intelligent Vehicles & Applications Face-Off Challenge: Dataset Creation and Balancing Privacy

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Why Faces?

- Driver distraction (e.g., talking, and eating) and inattention (drowsiness, fatigue, etc.) are some of the prominent causes of crashes in the US. One way to observe driver behavior is through facial analysis.
- The Face-Off challenge is one of a three-part challenge in the Vision for Intelligent Vehicles & Applications (VIVA) aimed at building robust and accurate vision algorithms for facial analysis.
- Goals of the challenge:
  1) Present the issues and challenges in vision from real-world driving scenarios [1]
  2) Highlight deficiencies in current approaches and progress the development of future algorithms [2]

LISA Face Detection and Head Pose Dataset

**Dataset:** Images from 23 videos, 20 vehicles, subjects of varying age, ethnicity and gender

**Challenges:** Illumination, occlusion, image quality, camera perspective, motion blur, deformation, etc.

**Tasks:** Robustly and accurately do *face detection* and *head pose estimation*

Yield to Privacy! It’s the Law.

- A common pool of naturalistic driving data is necessary to develop and compare algorithms in order to improve driving safety but it comes at the cost of privacy invasion.
- There is a need for deidentification filters which will protect the identity of drivers while preserving sufficient details to infer driver behavior (e.g. eye gaze, head pose and hand activity).

<table>
<thead>
<tr>
<th>De-Identification Method</th>
<th>Sample</th>
<th>Recognition Rate</th>
<th>Gaze-zone Estimation Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-Eye</td>
<td></td>
<td>5%</td>
<td>65%</td>
</tr>
<tr>
<td>Two-Eyes</td>
<td></td>
<td>8%</td>
<td>71%</td>
</tr>
</tbody>
</table>

References

