

UNCOOPERATIVE 3D FACE RECOGNITION FOR INTELLIGENT SURVEILLANCE APPLICATIONS

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Abstract

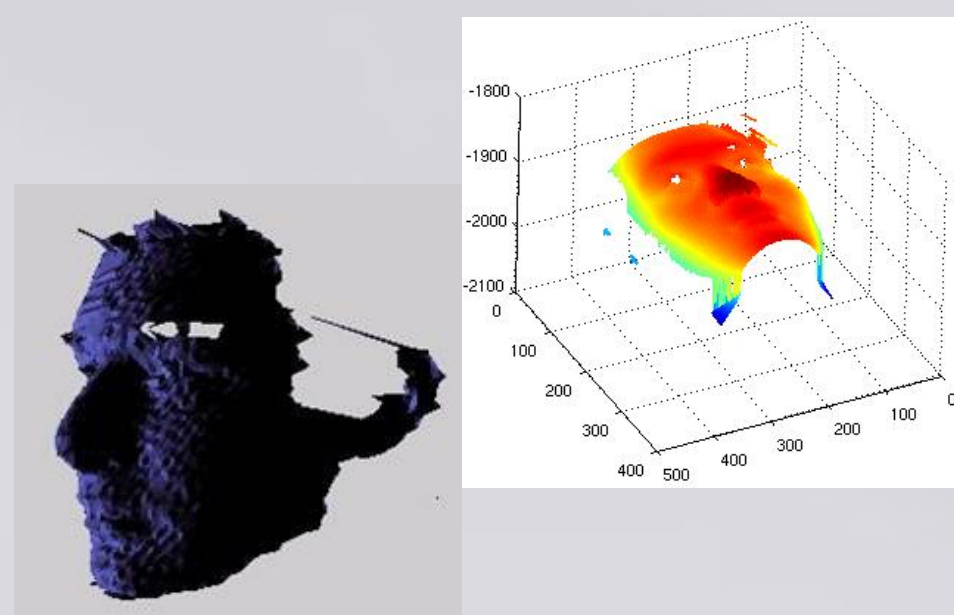
Uncooperative face recognition at a distance is a challenging problem since subject pose and lighting is not controllable. Compared to 2D approaches, 3D face recognition is

relatively invariant to pose or illumination variations. Existing 3D techniques either rely on special devices or are too computationally expensive. This research aims to develop a 3D face recognition method to identify

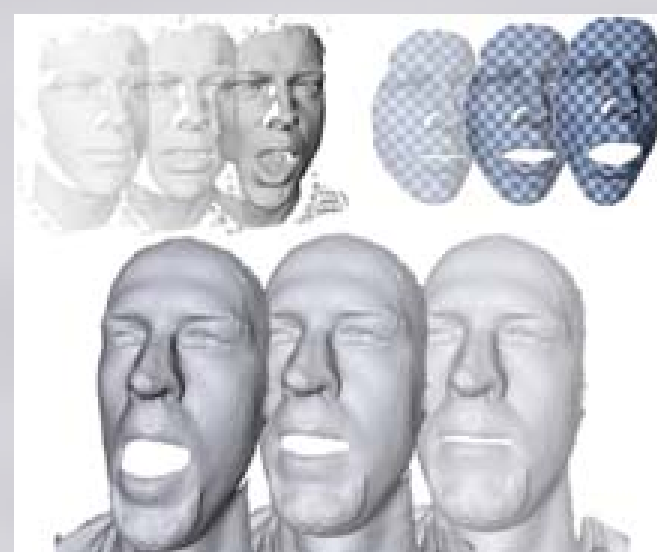
uncooperative subjects from video sequences captured by single or multiple video cameras.

Research Problems

- The investigation and development of algorithms to acquire 3D face models from surveillance video feeds.



- The investigation and development of algorithms to fuse two-dimensional and three-dimensional techniques for better face recognition.

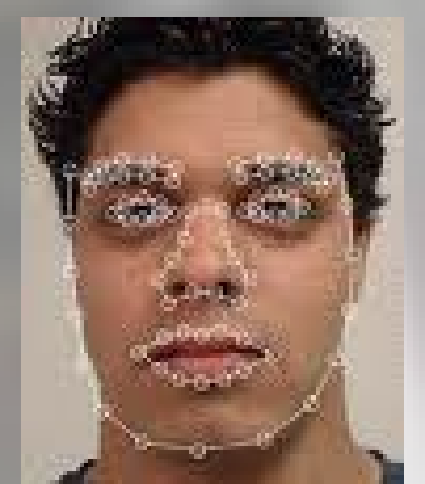


- The investigation and development of new face data normalisation techniques.

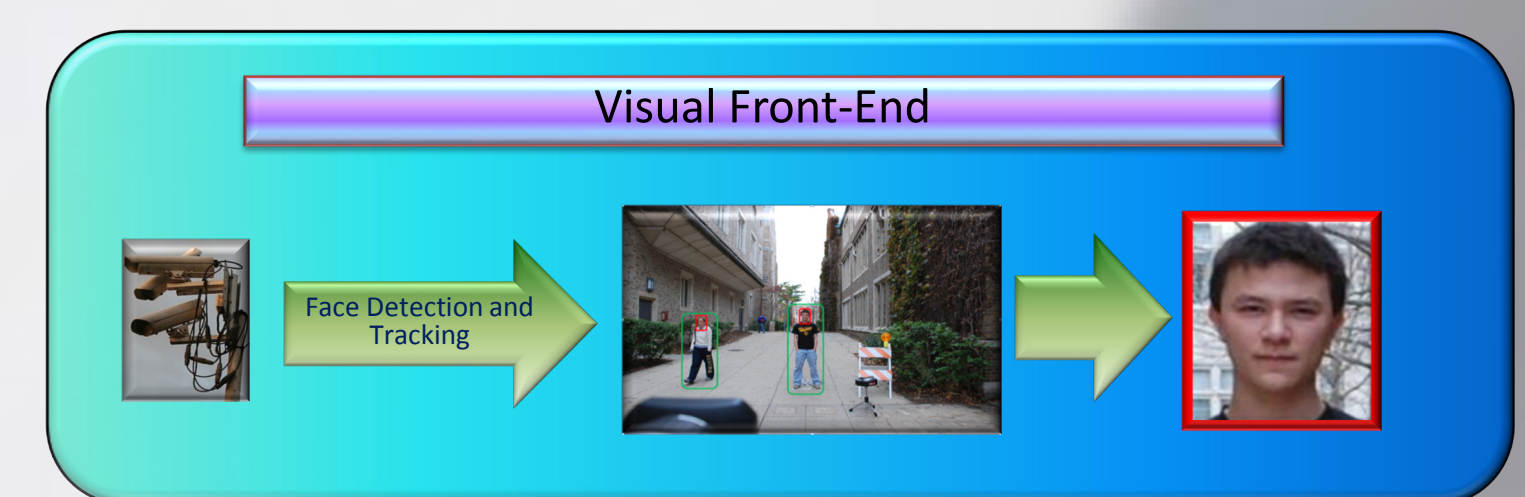
- The research of 3D non-rigid registration algorithms to account for deformations and variations in expression and viewpoint.



- The investigation and development of algorithms to extract features from face in surveillance video



- The development of efficient visual front-end approach for high resolution video inputs.

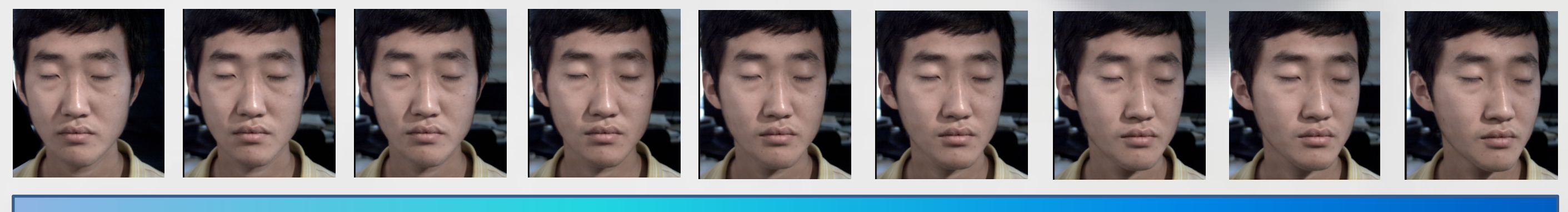


3D face by SfM

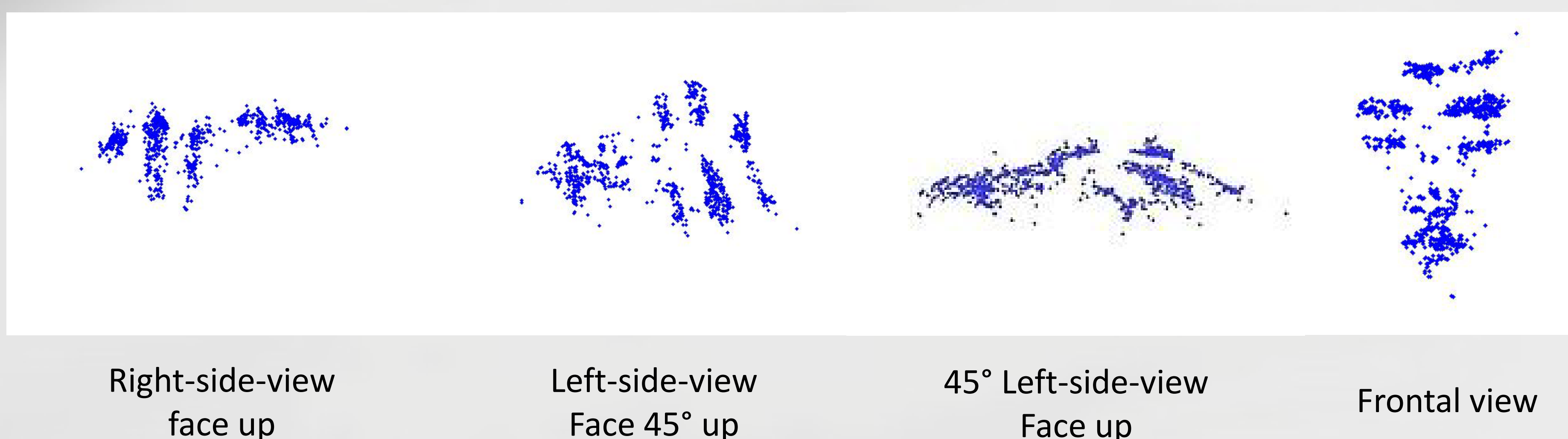
Structure from Motion is of particular interest because:

- No specific hardware required (using single camera).
- No constraint on subject's pose.

Test Sequence:



Structure from Motion result:



- Reconstructed Points

The 3D face model reconstructed using Structure from Motion. The figure on the left illustrates the 3D face in various view angles.