Image Deformation Using Moving Least Squares

Matthew Douglass-Riley
Computational Photography
Fall 2007
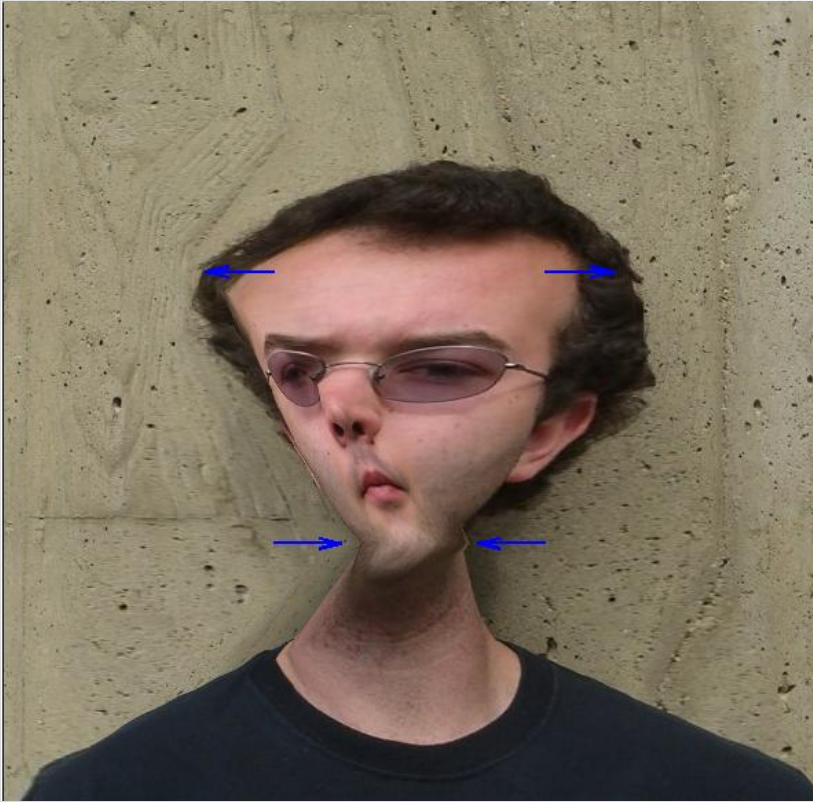
Credits

- Based on a paper from SIGGRAPH '06
  ◦ Schaefer, McPhail, and Warren

- Guidance from David Martin's course pages
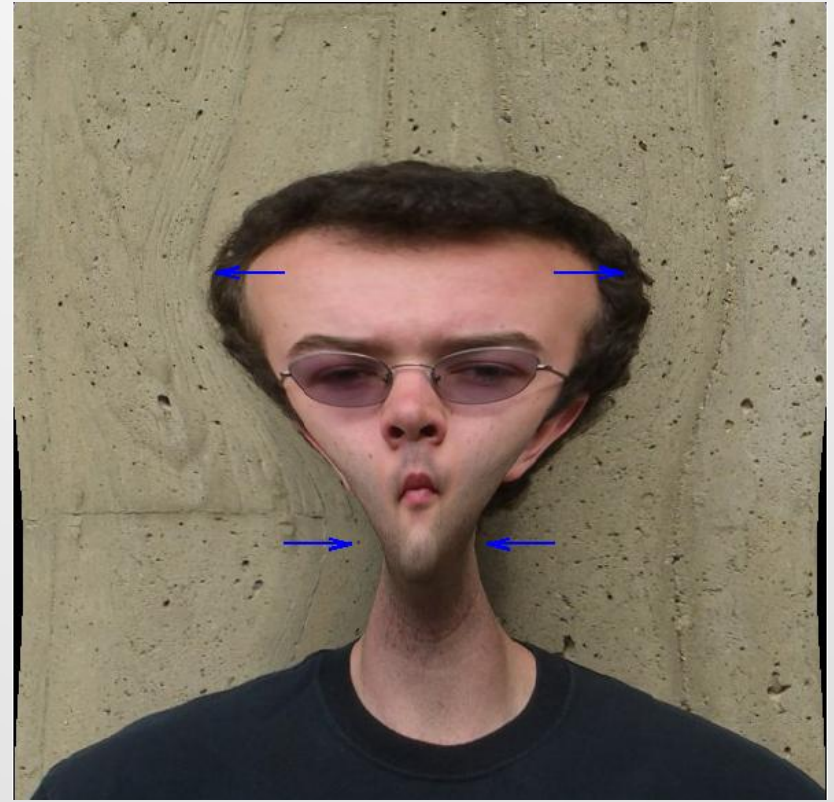 ◦ Computational Photography at Boston College

Objective

- Given image *im*, sets of points *p* and *q*

- Transform *im* such that
  - p_i has been moved to q_i for each *i*
  - The transformation is **smooth** and **realistic**
  - The operation happens (reasonably) fast

Realism

Project 3
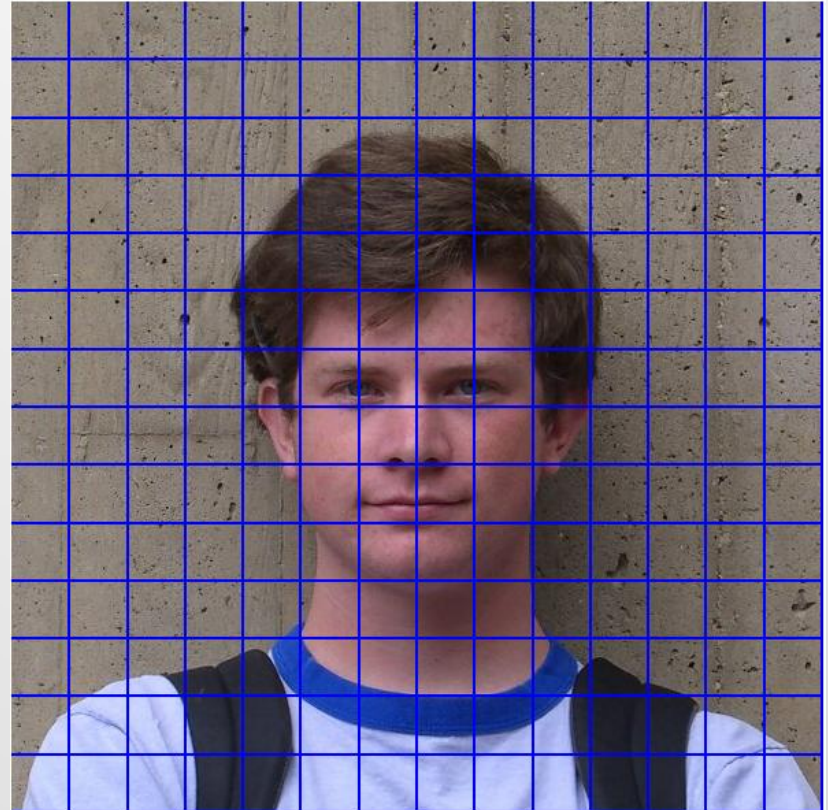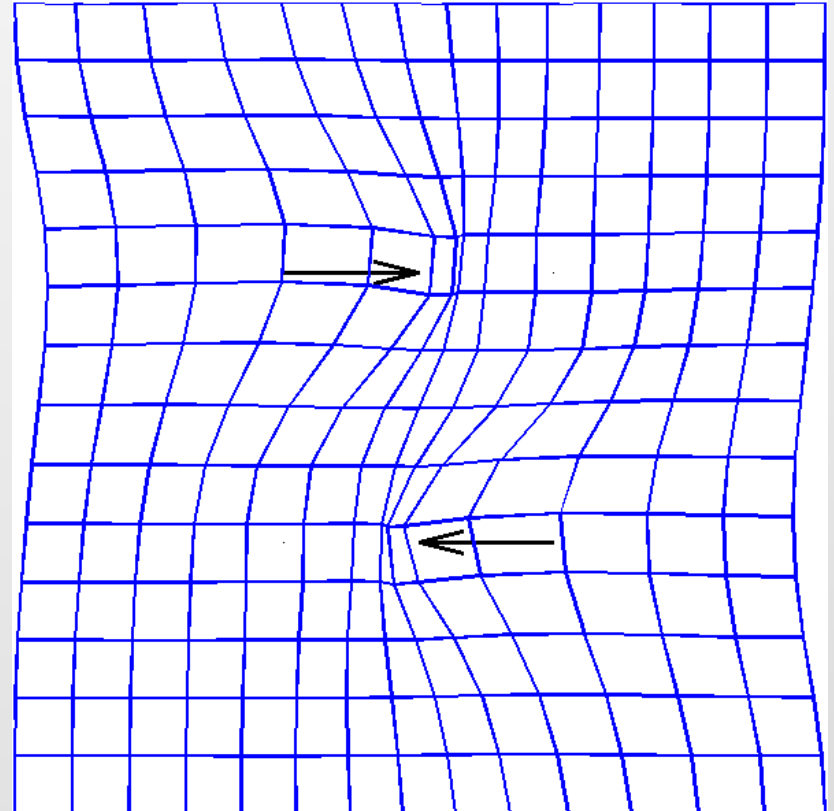
Moving least squares

Method

Method

- Load image

Method

- Load image
- Overlay mesh

Method

- Load image
- Overlay mesh
- **Deform mesh**

Method

- Load image
- Overlay mesh
- Deform mesh
- Find homographies
- Transform destination points
- Sample from original image

Result
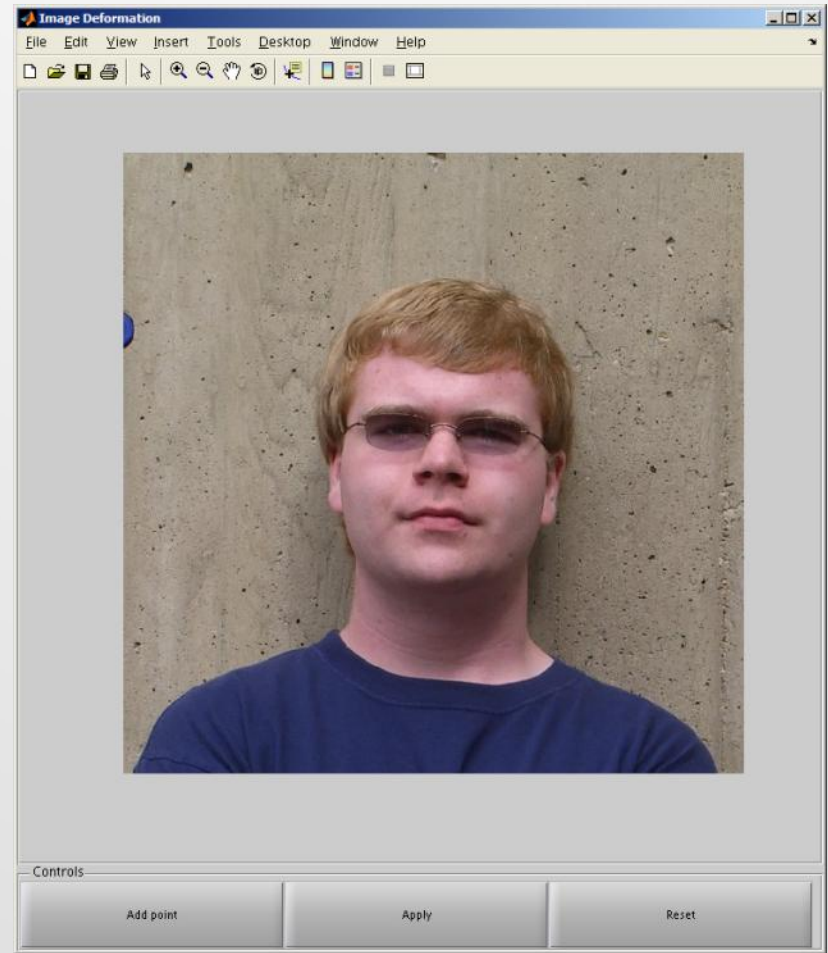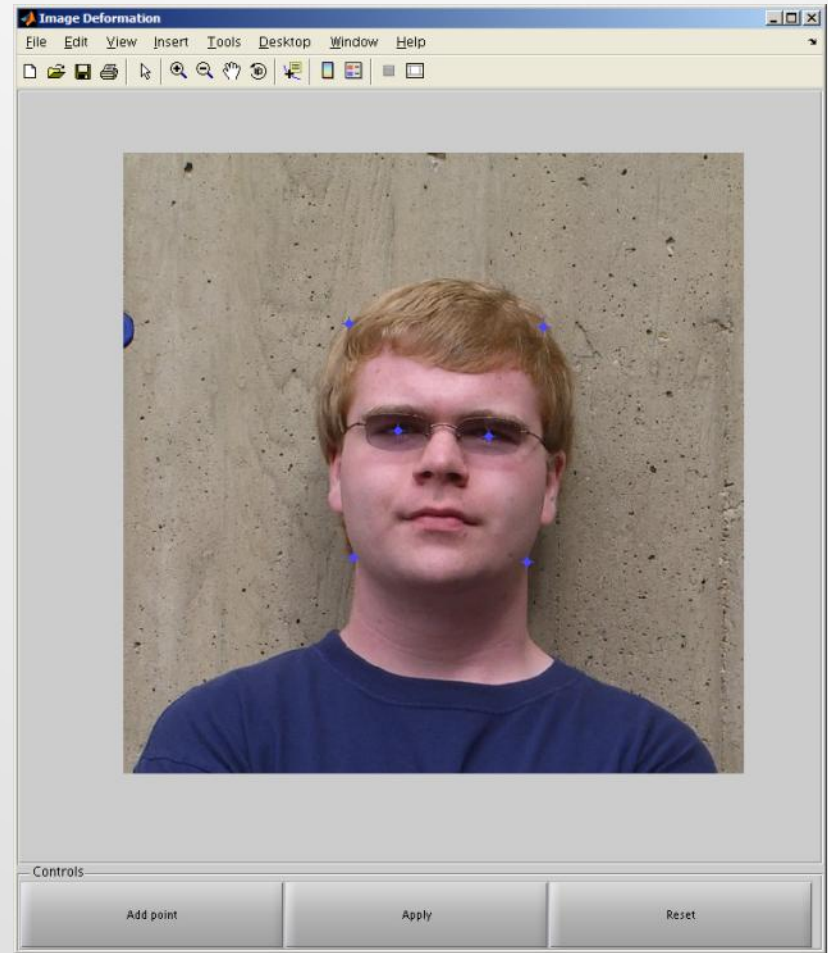
Interactive Image Deformation

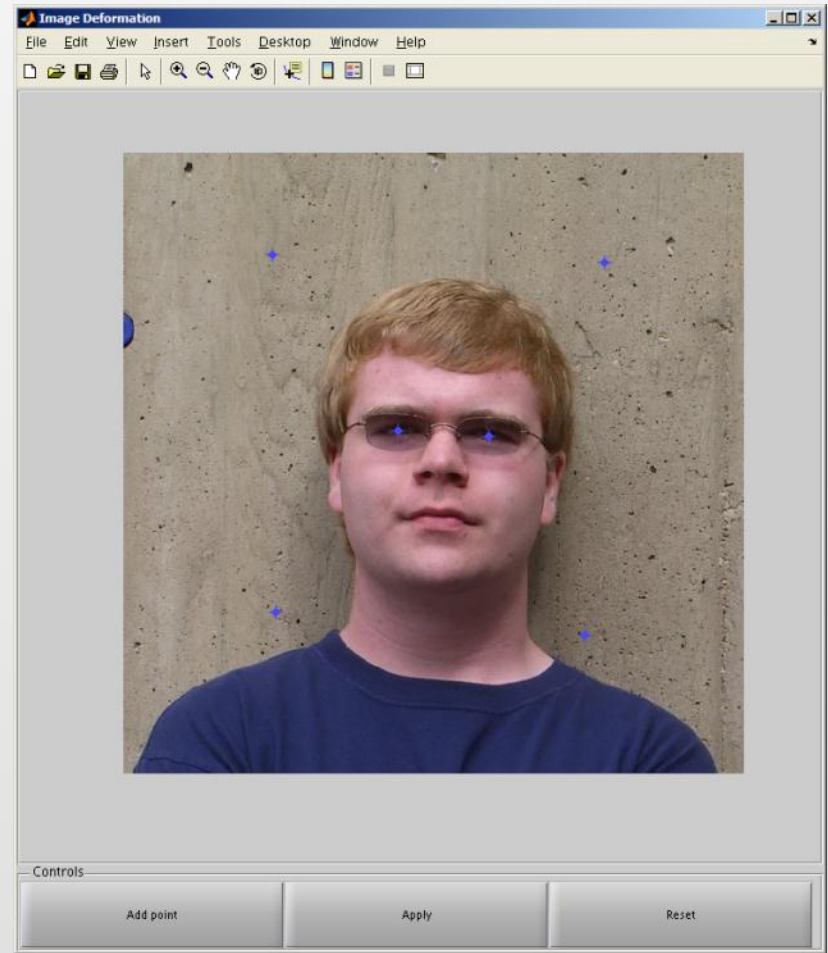» MATLAB : GUI :: ? : ?

Interactive Image Deformation

- Load image

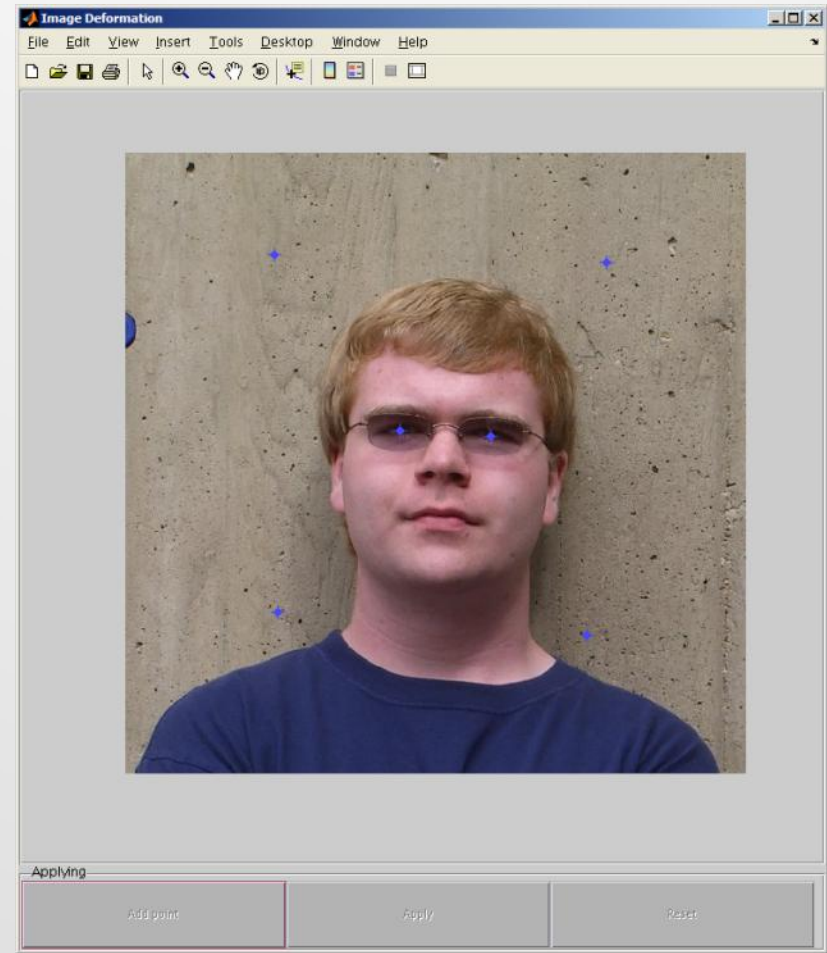# Interactive Image Deformation

- Load image
- Pick "from" points

Interactive Image Deformation

- Load image
- Pick "from" points
- Pick "to" points

Interactive Image Deformation

- Load image
- Pick "from" points
- Pick "to" points
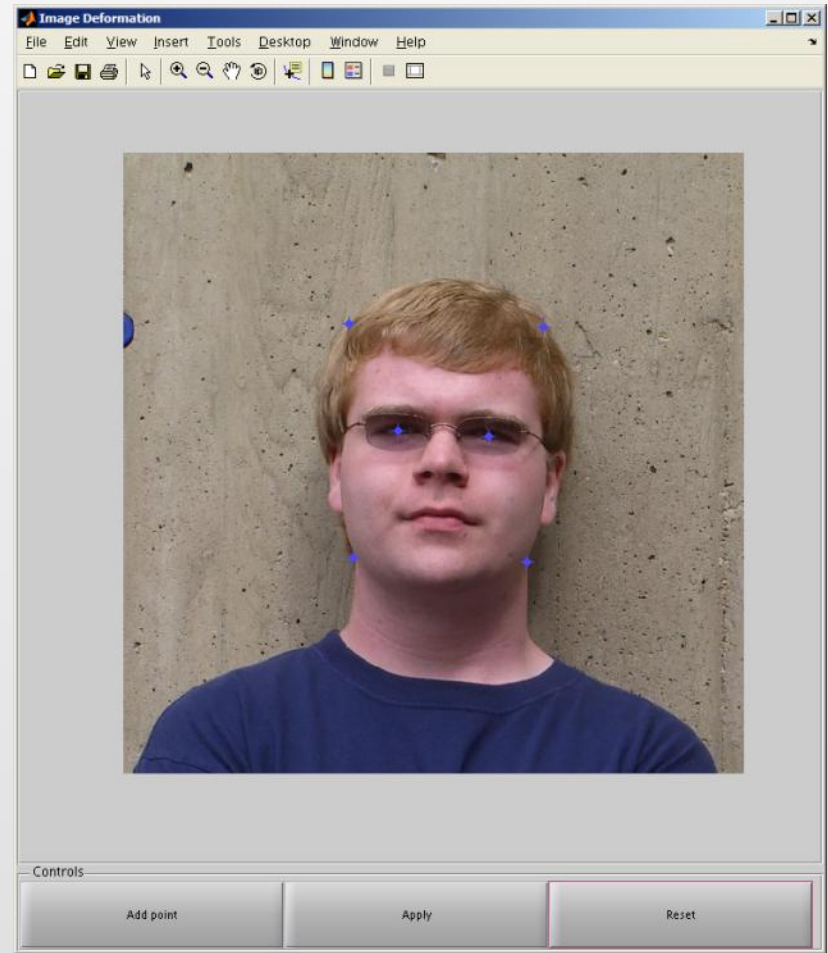- Apply (and wait)

Interactive Image Deformation

- Load image
- Pick "from" points
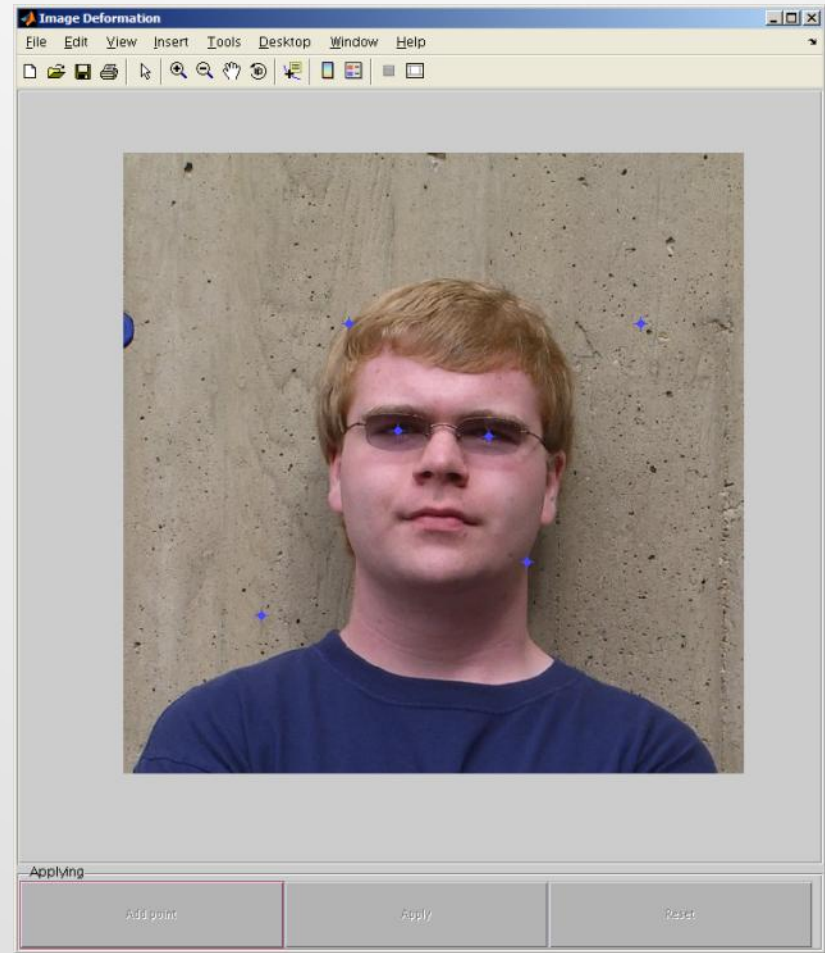- Pick "to" points
- Apply (and wait)
- Stand aghast

Interactive Image Deformation

▸ Load image
▸ Pick "from" points
▸ Pick "to" points
▸ Apply (and wait)
▸ Stand aghast
▸ Reset

Interactive Image Deformation

- Load image
- Pick "from" points
- Pick "to" points
- Apply (and wait)
- Stand aghast
- Reset
- Choose, apply, and wait (again)

Interactive Image Deformation

- Load image
- Pick "from" points
- Pick "to" points
- Apply (and wait)
- Stand aghast
- Reset
- Choose, apply, and wait (again)
- **Stand aghast**

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