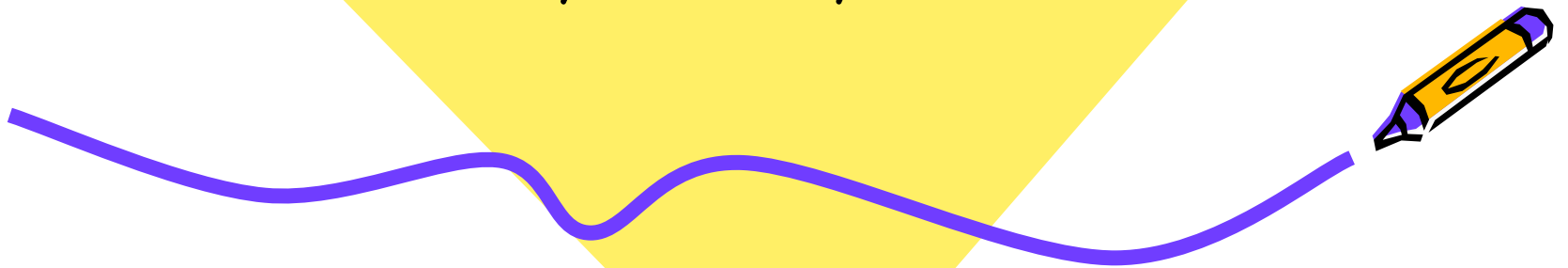


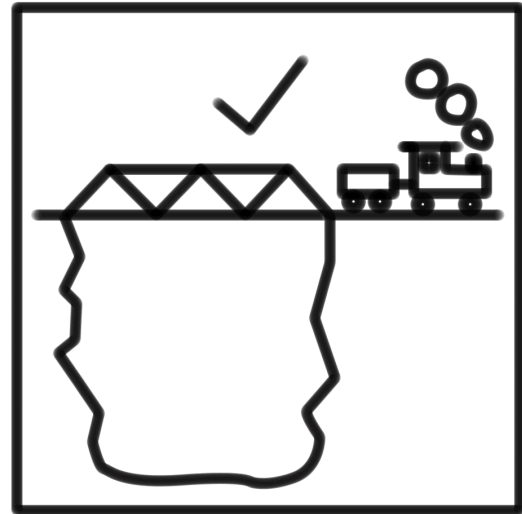
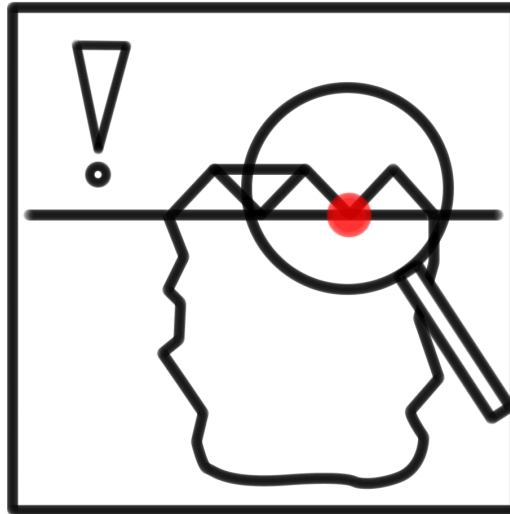


AR Bridge Builder

F. Petzold, J. Pfeil, C. Riechert

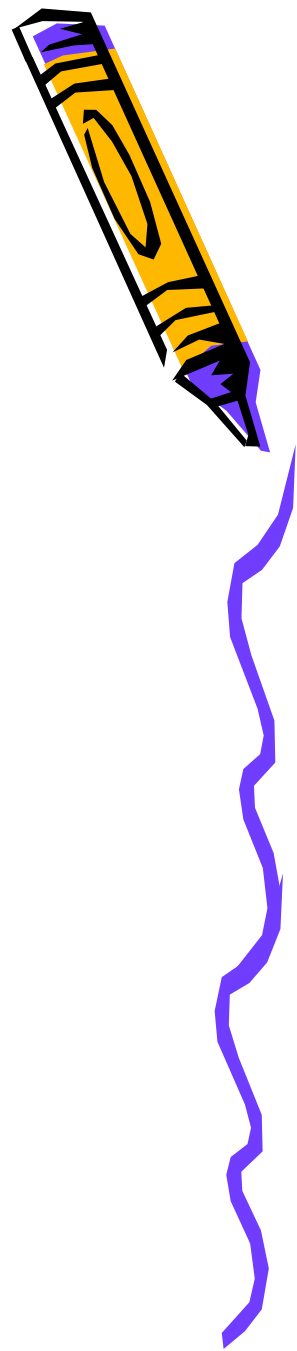


Idea: Overlay of statics information on real world



Video

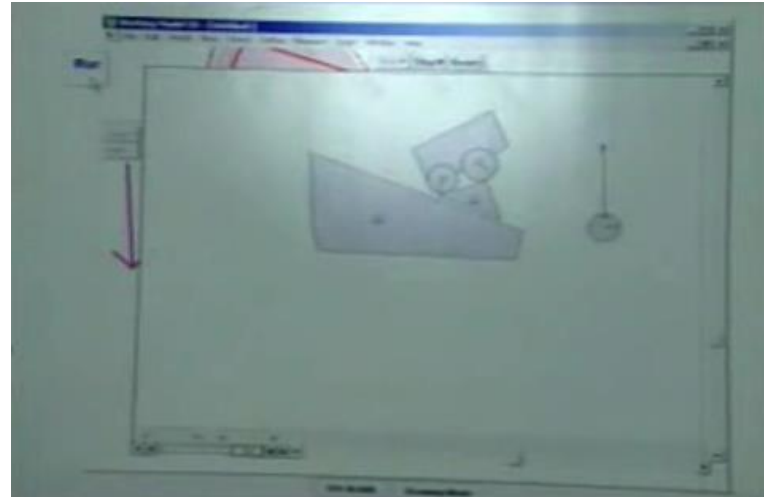
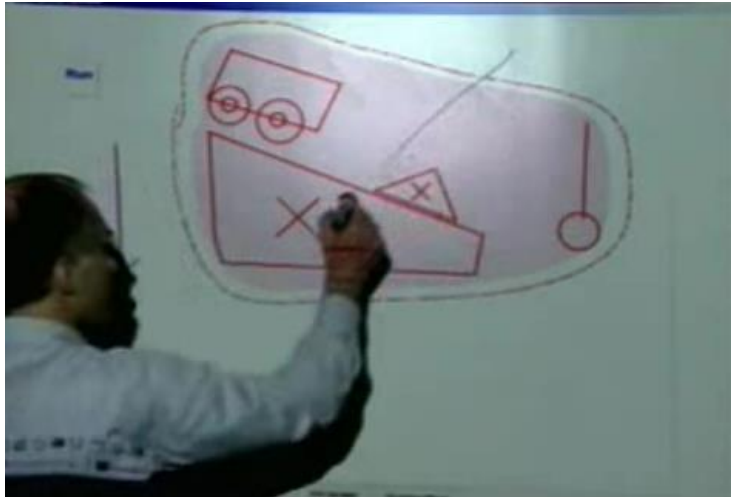
- [AR Bridge Builder Demo](#)



Related Projects



- Microsoft Research's Physics Illustrator

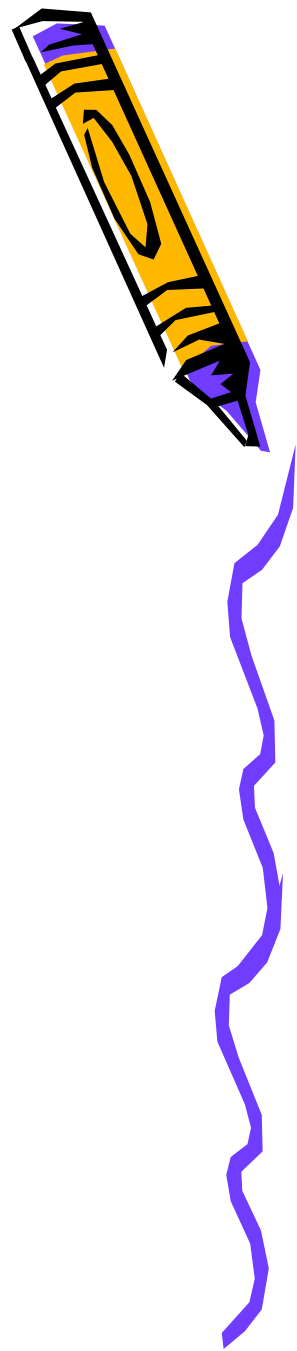


- Flatland User Interface



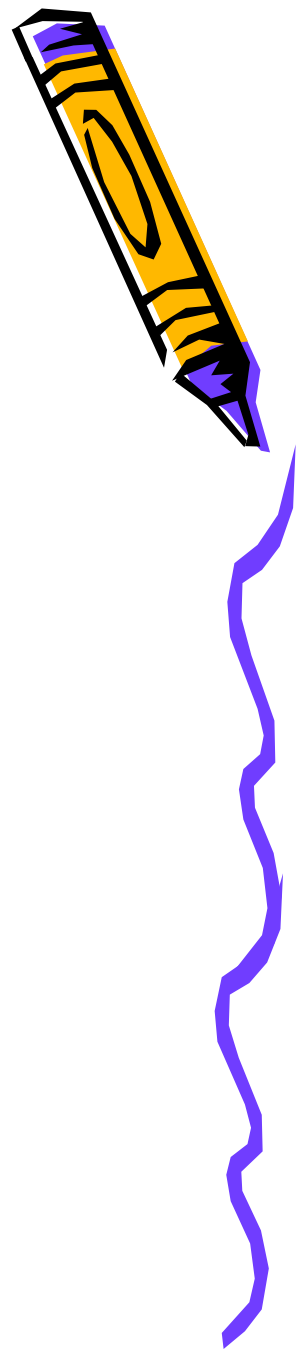
Our Project

- Normal whiteboard or paper
- Normal pens
- Advantages
 - Better contrast; no shadow
 - Intuitive interface
 - Hardware cheap and available



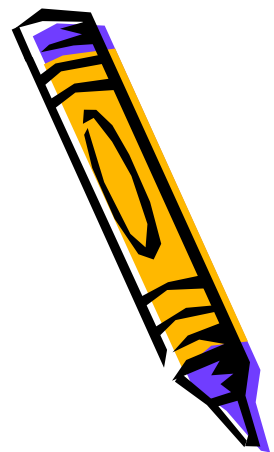
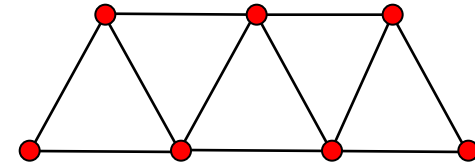
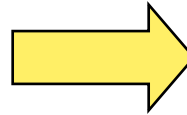
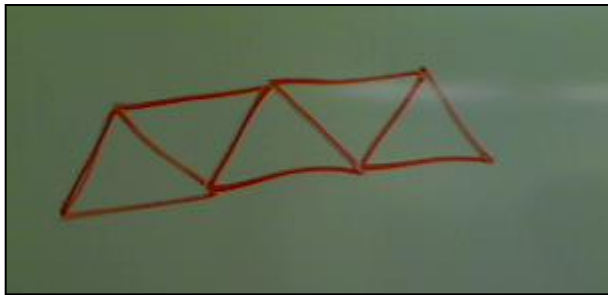
Overview

- Recognition
 - Lines and intersection
- Registration
 - Bridge graph and homography
- Simulation
 - Physics engine
- Visualisation
 - Overlay on live video

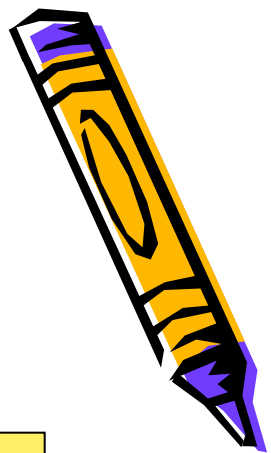
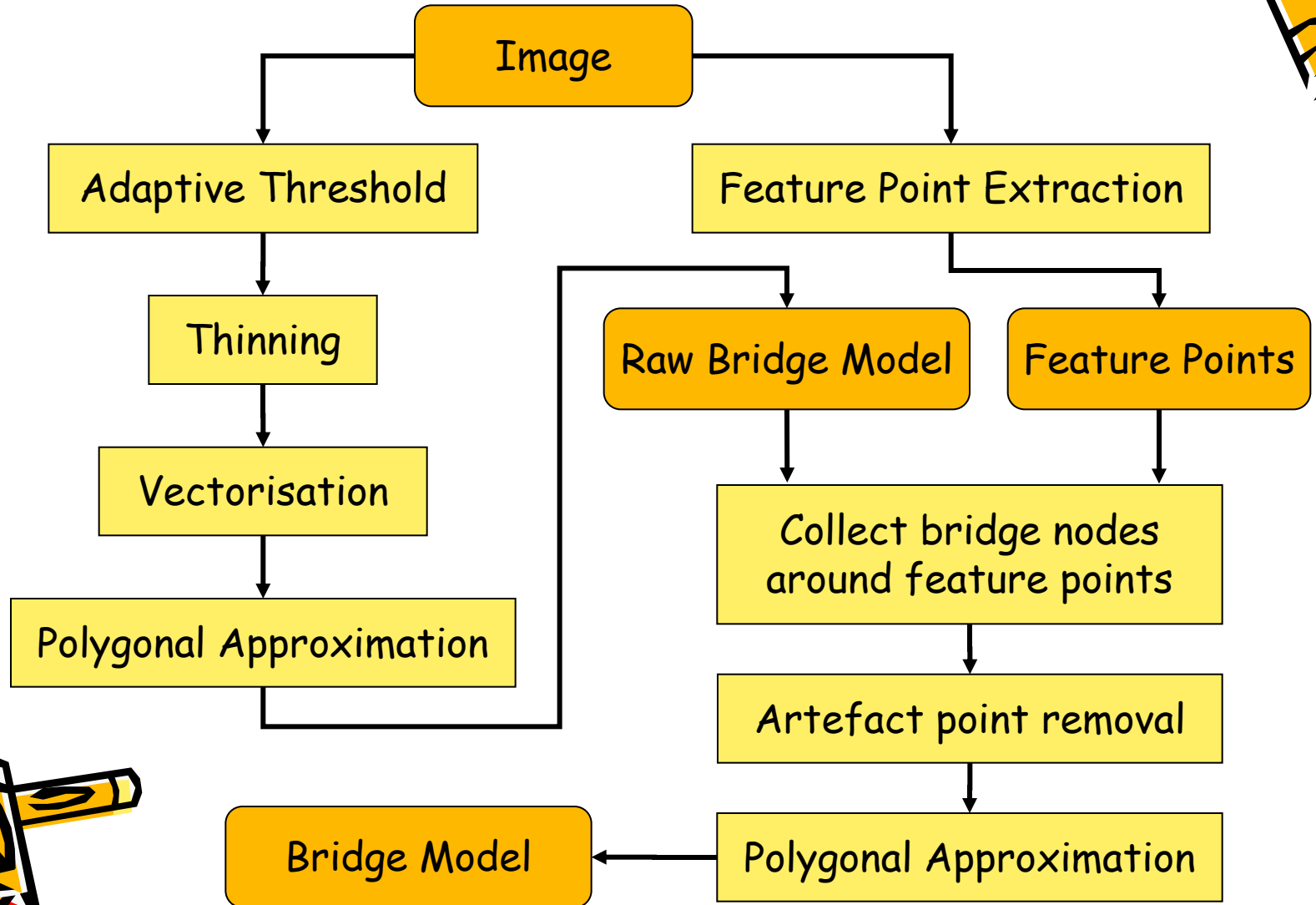


Recognition

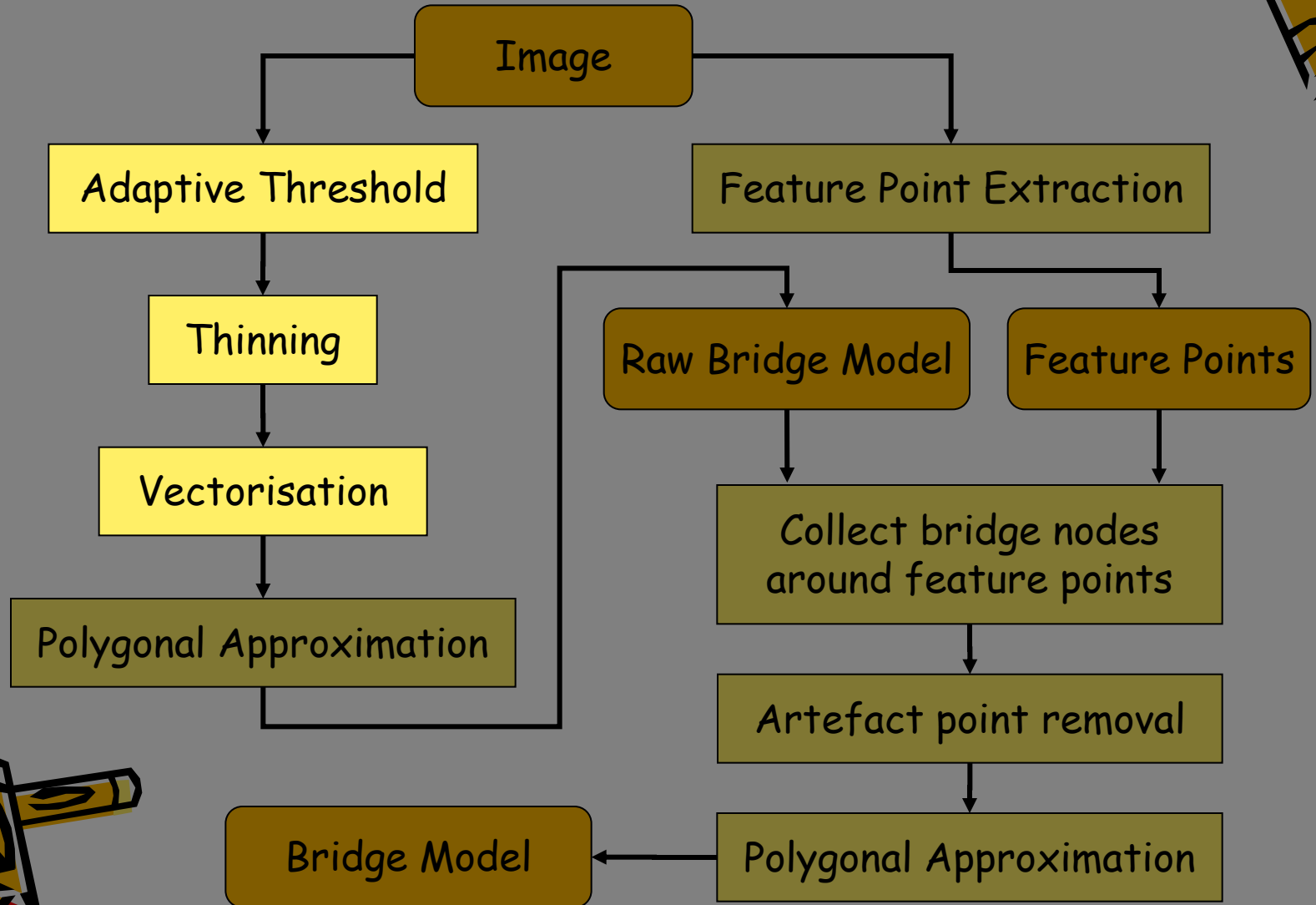
- Recognise trusses and joints
- Represent as bridge graph



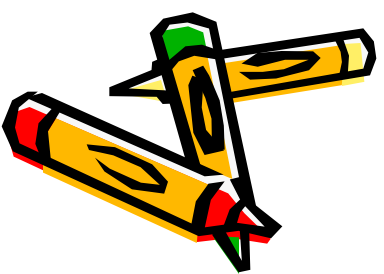
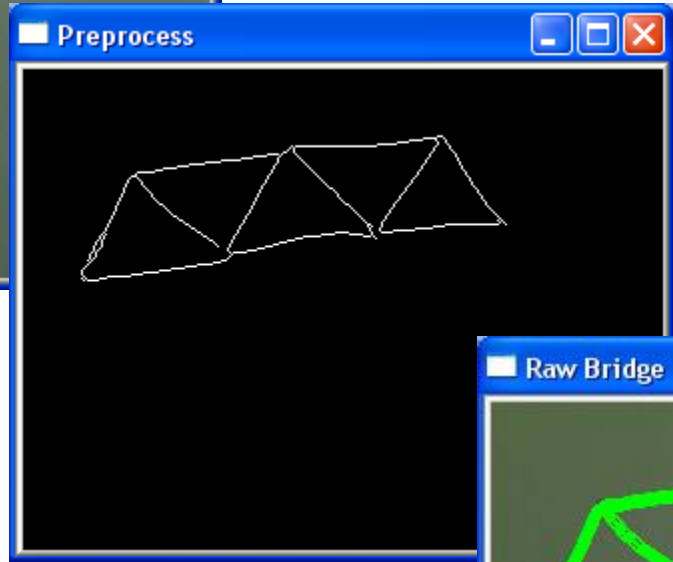
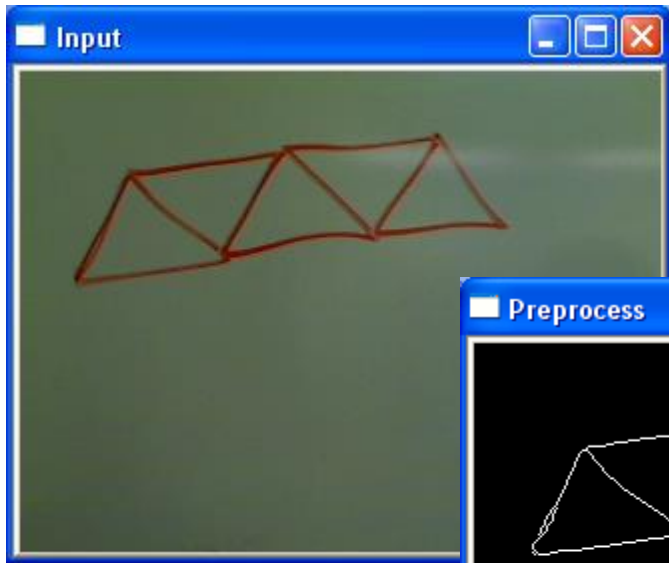
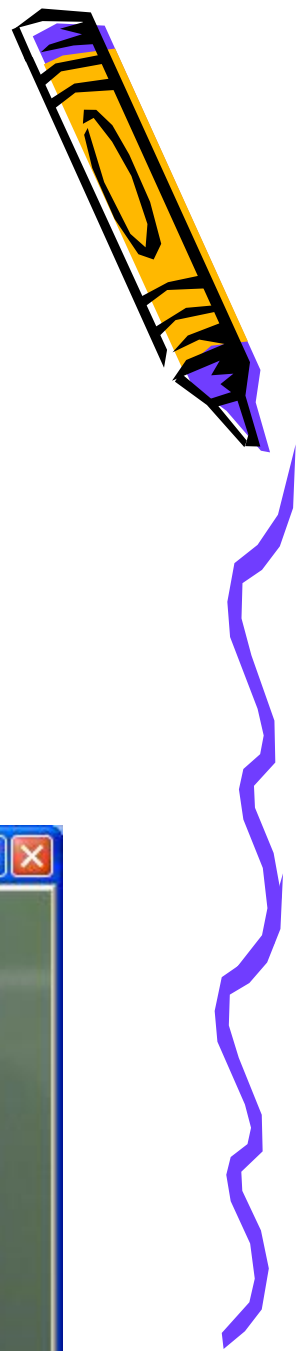
Algorithm



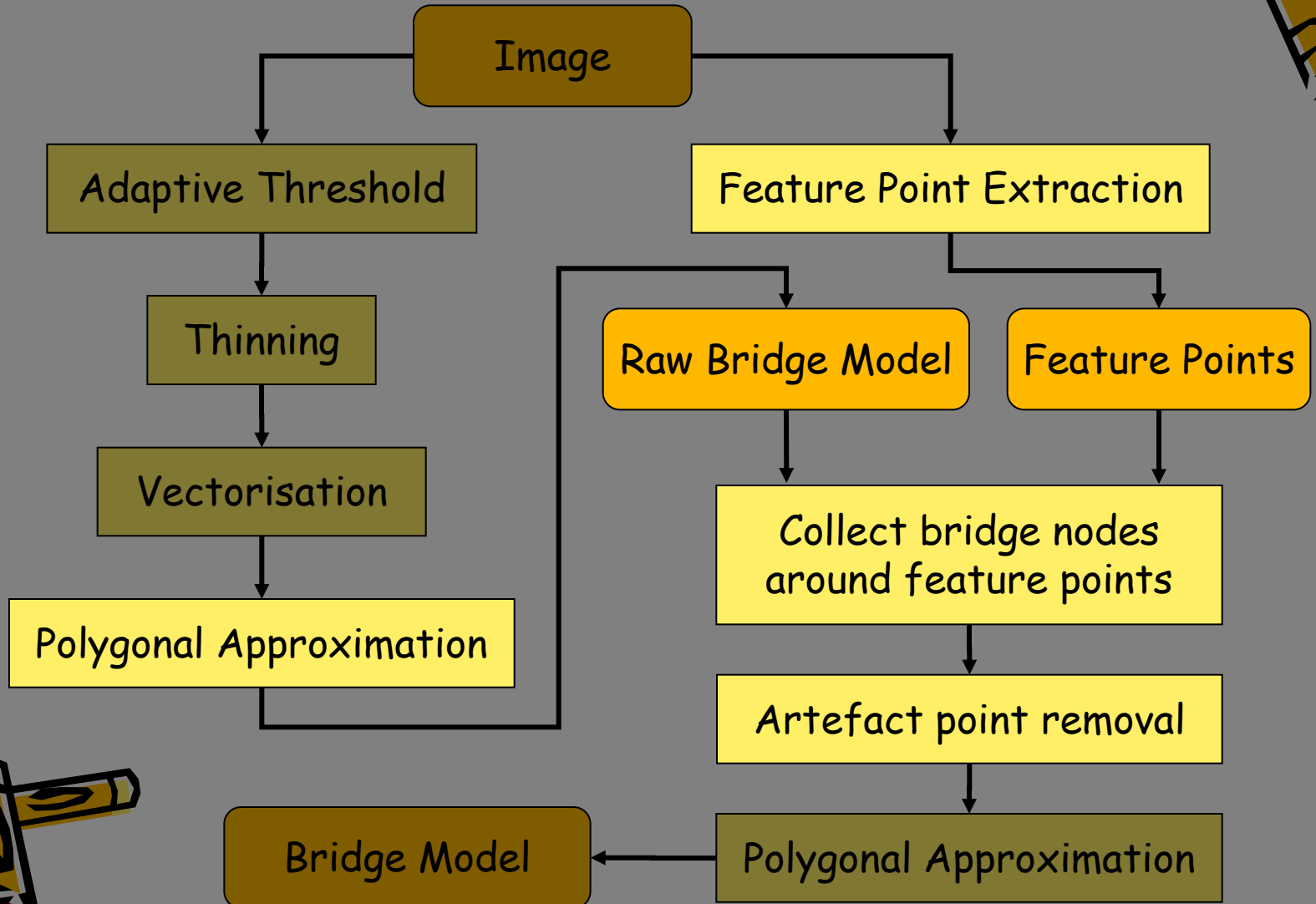
Algorithm



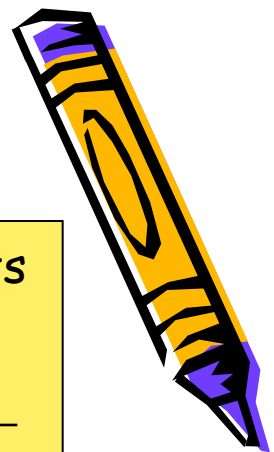
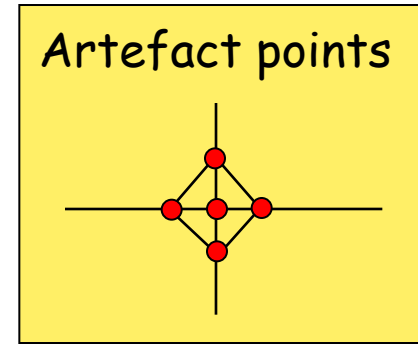
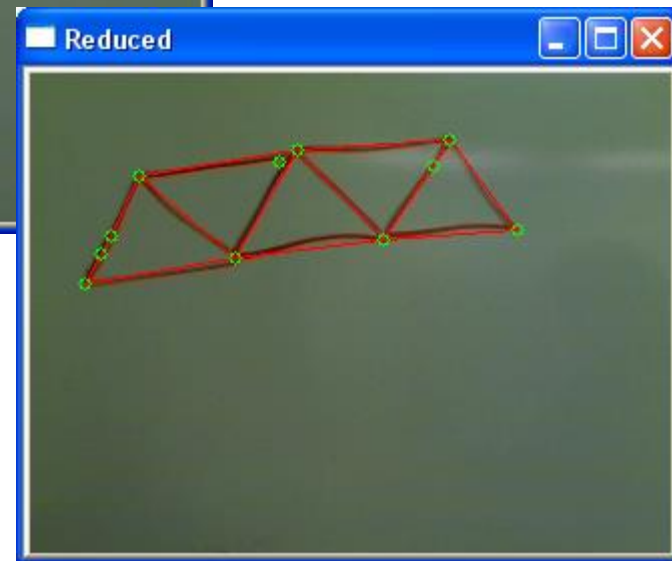
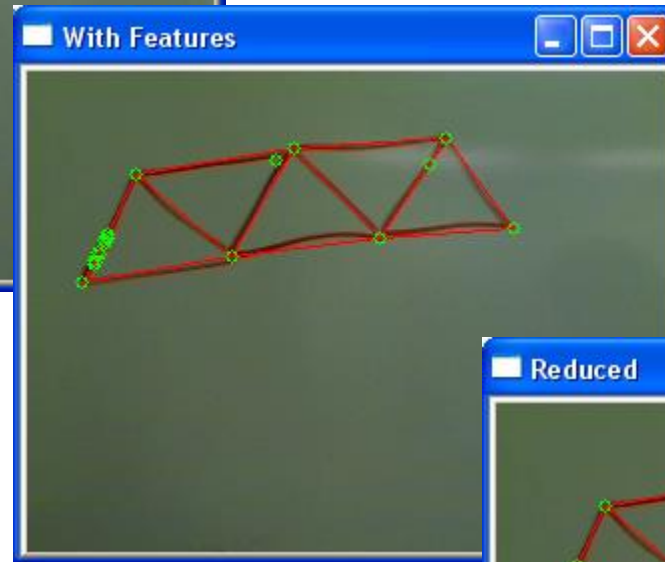
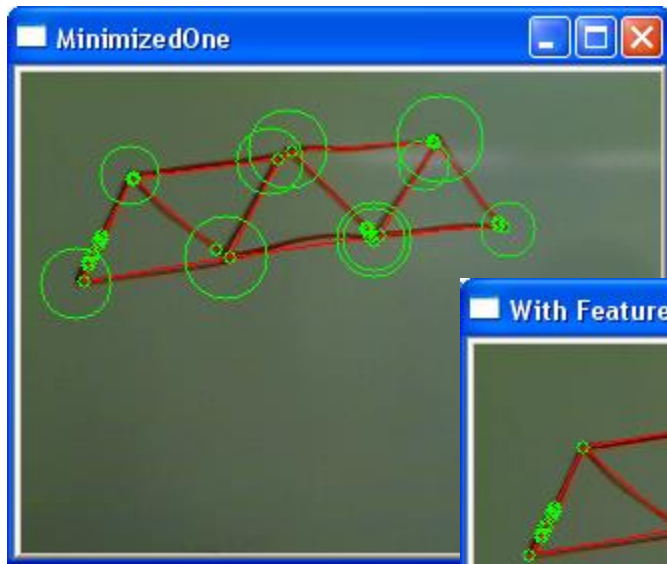
Pre-processing & Vectorisation



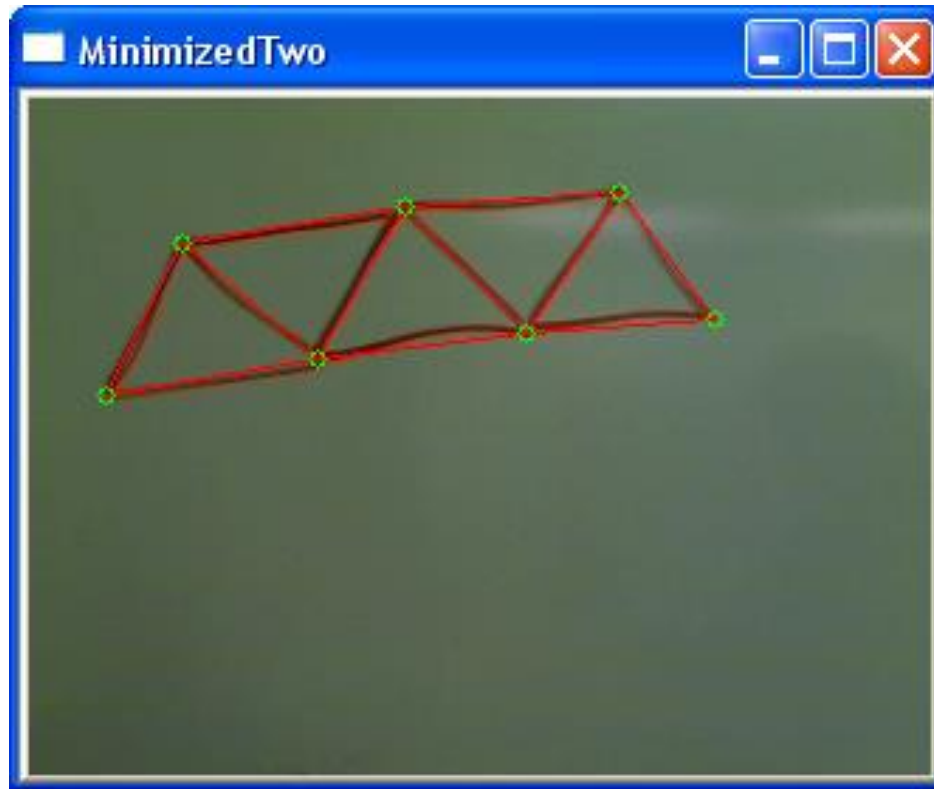
Algorithm



Post-processing

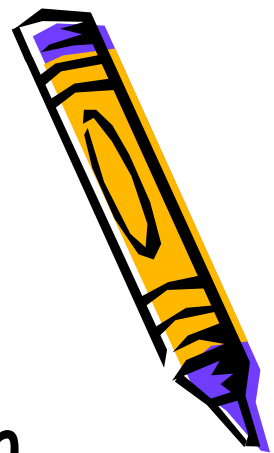
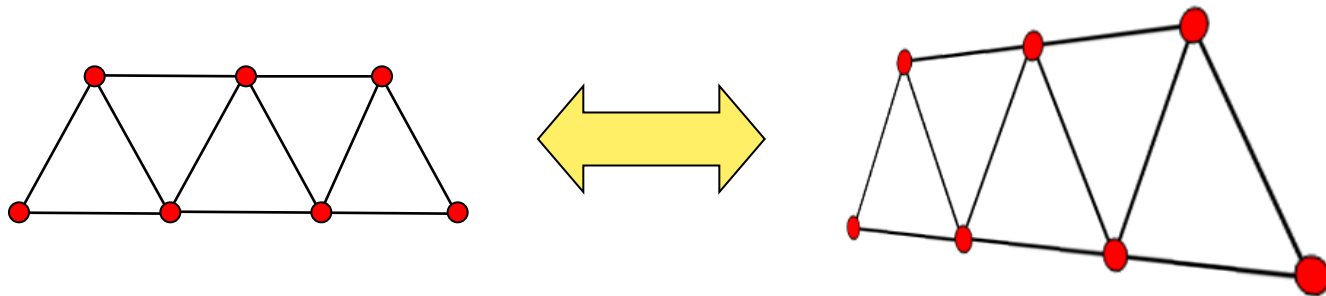


Result



Registration

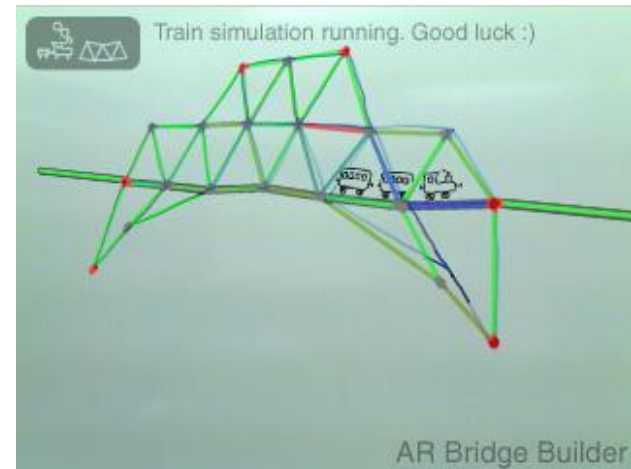
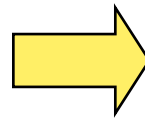
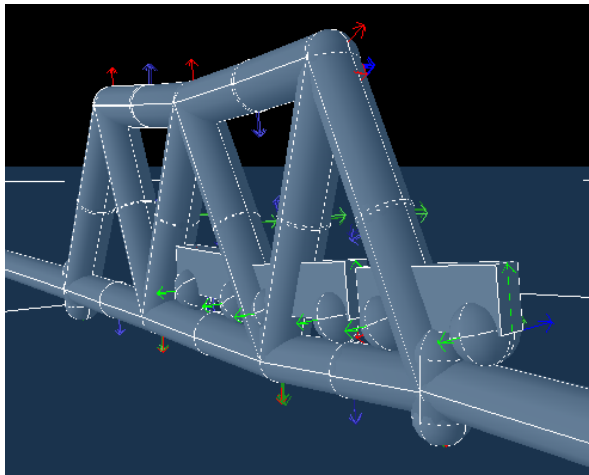
- Track points for physics simulation
- Transform to Reference System
 - Add new joints to reference model
 - Perspectively correct overlays





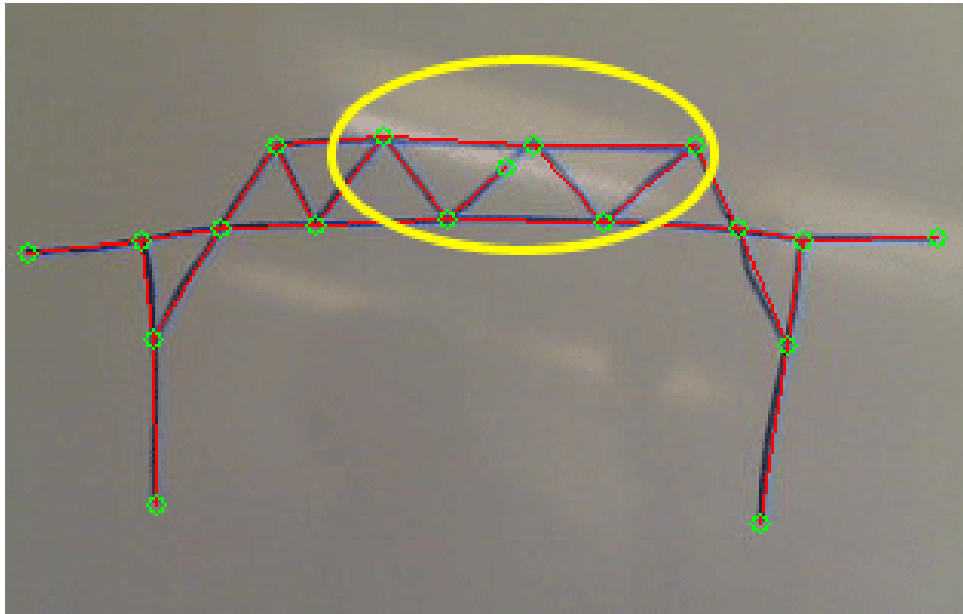
Simulation & Visualisation

- Simulate physics
- Visualise with transparent overlay



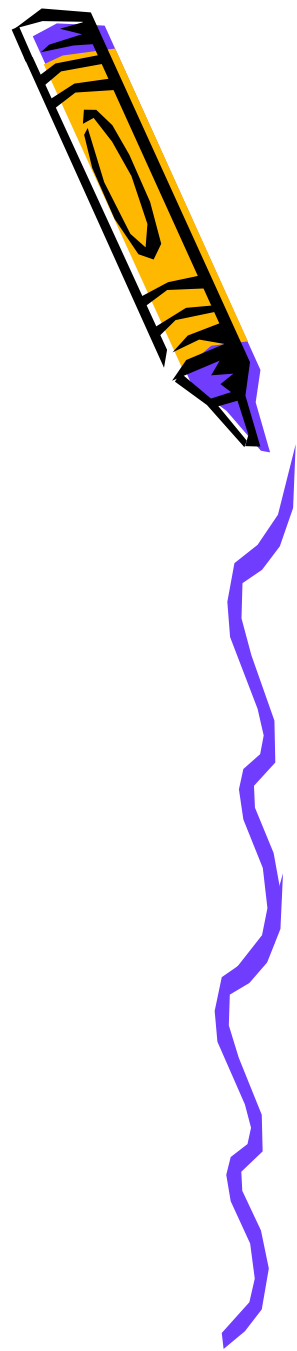
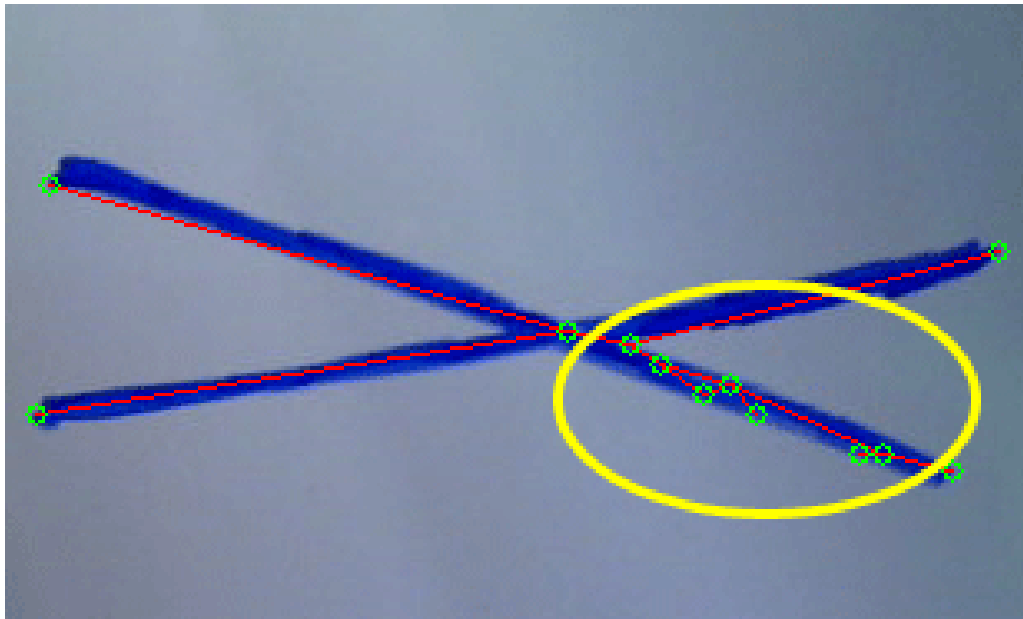
Limitations

- Reflections



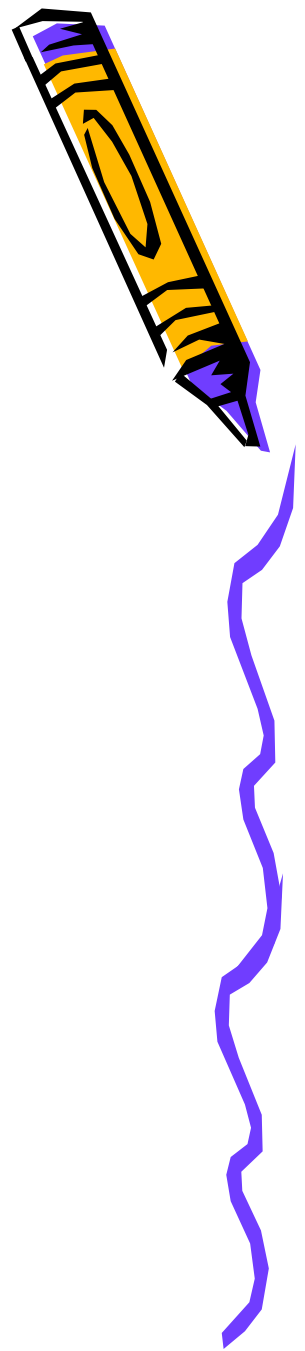
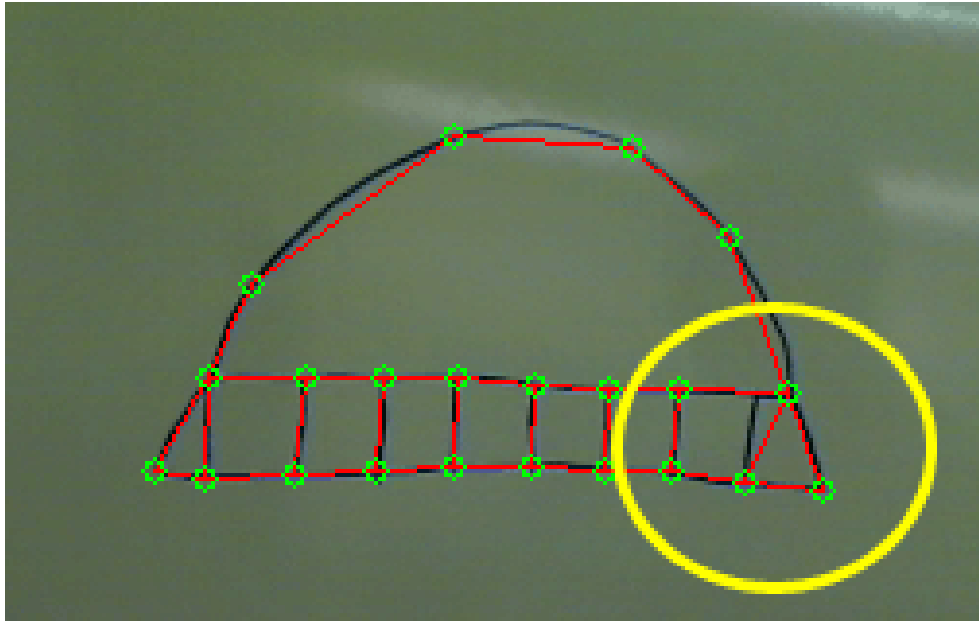
Limitations

- Thick lines



Limitations

- Small structures



Video

- AR Bridge Builder Demo

