

Computer Vision Project Topics

CSc I6716

Spring2011

Project Reports

1. Introduction (problem –Why, with real-world applications)
2. Related Work (What has been done, with a few references)
3. Your Approach (How you are going to do it, with algorithms, equations, figures)
4. Your Implementation and Analysis (What you do, with images, tables, and numbers)
5. Your Conclusions (Itemized conclusions, observations and discussions)

All Reports in hard copy due May 17, 2011 before class (hard deadline)

Each student has 10 minutes (8 talk +2 QA) x 15 students = 2.5 hours

Rubik cube recognition

- Team
 - Jay Junjie Yao
 - Felix Cen
 - Wahyu Jati Nugroho
- Key Components
 - **Edge detection**: an initial detection of the cube object
 - **Color detection**: scan the color cells for each visible side
 - **Feature extraction**: detect all small squares and cube features (**3D localization and orientation**)
- Implementation
 - Java and OpenCV (JavaCV)
 - You need to specify contributions of each (3x)



Car recognition in images

- Team

- Nikolaos Markou



- Key Components

- object learning and recognition

- Where is 3D and perspective geometry?



- Implementation

- Maybe car distance and orientation estimation?

[A Robust Shape Model for Multi-View Car Alignment](#) [Yan Li](#), [Leon Gu](#), and [Takeo Kanade](#)

The IEEE International Conference on Computer Vision and Pattern Recognition, June, 2009.

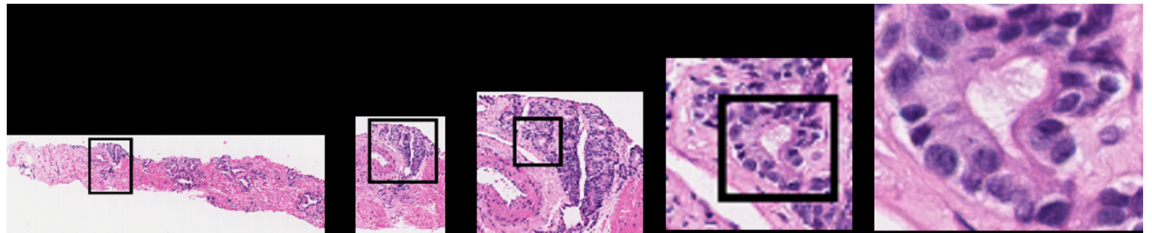
Image searching

- Team
 - Jianfang Li
 - Could you team up with Nikolaos Markou?
- Key Components
 - The project is to find a target image from bunch of images by scale-invariant feature transform (SIFT)
 - This is too broad and vague, lack details
 - How does this have anything to do with 3D vision?
 - Are you dealing with **perspective distortion**?

Detection of possible cancer using computer vision

- Team

- Carlo Garcia
- Razia Sultana



- Key Ideas

- A High Resolution picture of a histology slides and a pathologist uses some staining techniques under a microscope to determine the average intensity by sections of the high resolution image.
- How can computer vision help?
- **Image registration** of images before and after?

Detection of stairs

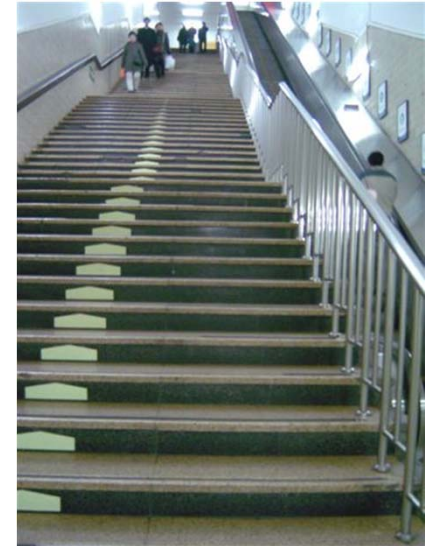
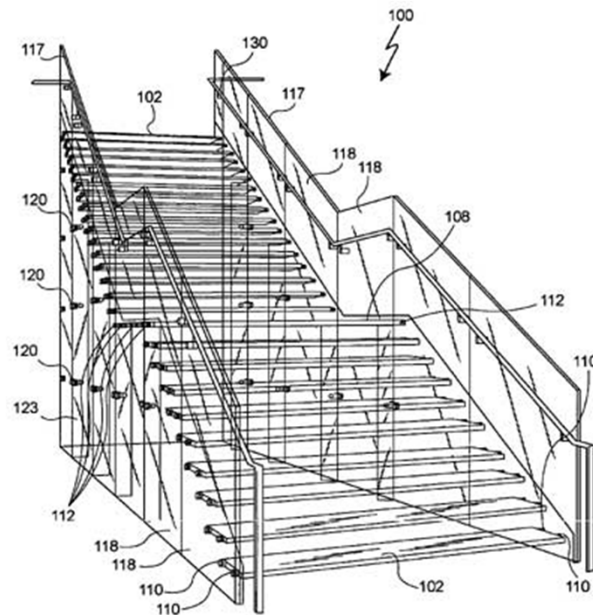
- Team
 - Franqueli Mendez

- Key Ideas

- Line detection
- Parallel lines
- Stair models
- 3D estimation

- Comments

- Obstacle and face detection are too common and hard



Door detection

- Team
 - Hengyu Ji
- Key Ideas
 - Features:
 - Lines, quadrilaterals?
 - Perspective distortion:
 - **Position and orientation?**



Face orientation estimation

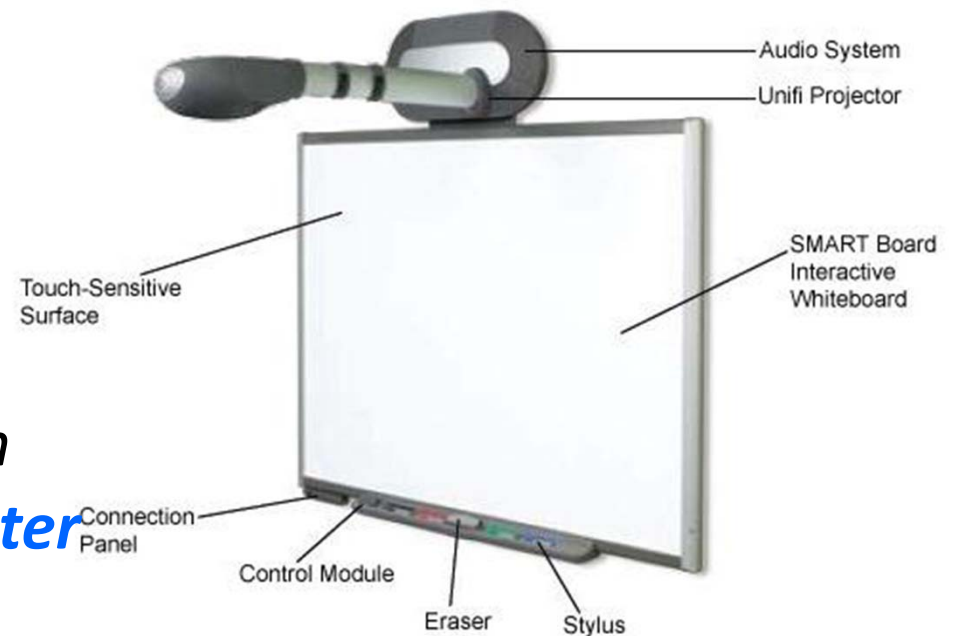
- Team
 - Jose Maldonado
- Project Ideas
 - 1. Face Recognition
 - 2. Bar code reading system
- Implementations
 - Lack details
 - **Detection face orientations ?**



**Many Faces of
Hillary Clinton**

Vision-based smart board

- Team
 - Omar Olivo
- Project Ideas
 - interact with a *projection screen using a **laser pointer** projected on the screen*
 - use **Kinect** to create better interactivity with the screen when teachers are in front of the classrooms



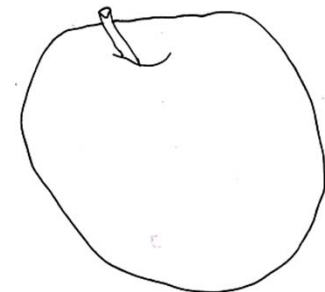
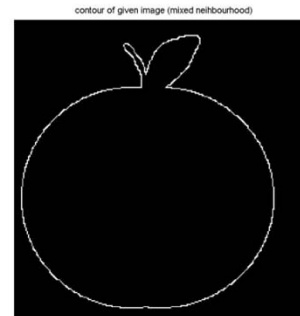
Fast object recognition by standardized edge templates

- Qiang Li

- step1: make a standardized template library (all fruit, 51x51)
- step2: extract individual object from a image and generate a single line edge (**contour???**).
- step3: standardize the image(**normalized**, single line, 51x51).
- step4: use the central point as fix point, clockwise scan the two template images (**contour projection?**).
- step5: choose a tolerance value(3 or 5 pixels) to evaluate the image with each template, and get a score (**contour matching**).
- step6: decide what kind of fruit it is by lowest score.

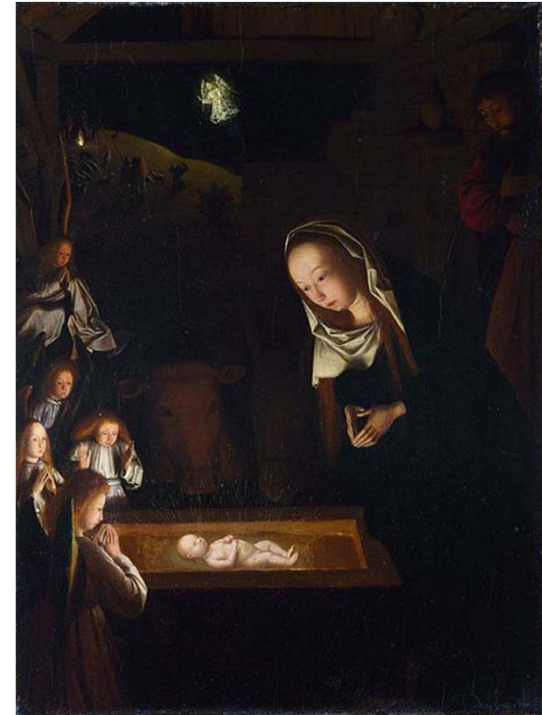
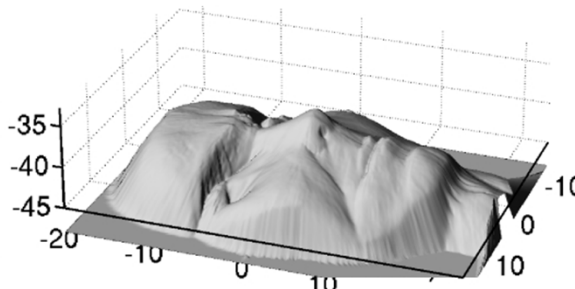
- Next step

- Relational template library



Renaissance Painting & Computer Vision

- **Monica CONCEPCION**
 - chiaroscuro style paintings featuring intense darkness/brightness together
- **Tasks**
 - identify objects in paintings that are done in the chiaroscuro style
 - Shape from shading?



Nativity at Night by [Geertgen tot Sint Jans](#), c. 1490, after a composition by [Hugo van der Goes](#) of c. 1470.

Sources of light are the infant Jesus, the shepherds' fire on the hill behind, and the angel who appears to them.¹²

Estimating Roulette game outcome based on multiple images

- Team

- Lior Baron

- Key Ideas

- Use 3 images of the system in motion, and an image of the roulette wheel to map out the section of the wheel.

- Estimate the ball position speed.
 - Estimate the rotation speed of the roulette wheel
 - Estimate the section of the roulette wheel in which the ball will make contact first.

- Implementation

- use HD videos posted on youtube to get screen captures and test



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