Integrating Engineering into the Classroom

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Introduction

Dr. Rosen is working in two areas:

1) Develop new programs to compare genes and genomes.

2) To develop activities and labs to get high school students interested in the field of engineering.

Collaboration

• Graduate and undergraduate students came in CAPA to administer the labs.

• The Drexel Students brought the materials they needed (lap tops, iRobots, lab reports, etc).

•Students will complete the labs and answer pre and post surveys about them.

Labs from 2008-2009

Drexel Graduate and Undergraduate students performed four labs last year.

1. Forensics Lab
2. Random Walk Lab
3. iRobot Lab
4. Image Processing Lab.

Results from 2008 – 2009

• Students had an increase engagement in the lesson
• Students became familiar with concepts of bio-informatics.
• Students learned about robotics and programming.

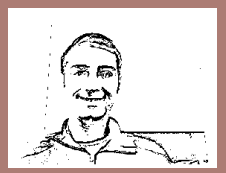
Future Work

• Labs will continue to be conducted for 2009 - 2010 school year
• We will present the labs at the annual American Engineer Educator Society conference in June 2010.
• I will co-author papers on integrating engineering concepts in the classroom.

Image Processing Lab

The lab that I helped develop this year is an image processing lab. The lab is divided into two parts. Part one is a lab where student will try to detect the edges of an image uploaded to Matlab.

Non-average value



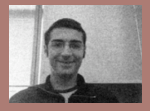
Average Values

Students will see how using averages is a better way to detect the edges of an

Part two of the lab students will have to clean an image that has become 'noisy'. They will exam two different types of noise, and compare two different ways of cleaning the image (using mean and median.

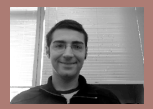
Noisy Image

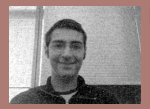
Median Values



Mean Values

In our first group of pictures, we have an example Gaussian Noise (Snowy). There is liltte difference between using the median and the mean to 'denoise' the image.





In our second example, we have an example of Salt & Pepper noise. Here using the median produces a much cleaner image than the means.

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