CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
Varsha Manjunath, IV

Project Number
J0623

Project Title
Detecting Image Forgeries

Abstract

Objectives/Goals
My project is about digital image forensics. I created a set of digitally manipulated images using Adobe Photoshop, a photo-editing software. The primary goal is to explore what factors influence human ability to detect such image forgeries. The four factors I tested were: (1) the order in which the pictures were presented (whether the original was shown first or the altered picture shown first), (2) the type of alteration (whether the original was altered by deleting some object or adding an object), (3) age of the subject, and (4) gender of the subject tested.

Methods/Materials
A total of 48 respondents were tested - 24 of which were children and 24 were adults. Adobe Photoshop was used to create six sets of pictures, each set containing one original picture and one altered picture. A stopwatch was used to time people to see how long they took to detect the forgeries and a notebook was used to record the data. The data was then entered into a spreadsheet. The spreadsheet was also used for data analysis

Results
The most surprising result I found was that female children are better at detecting forgeries compared to their male counterparts as well as the adults. My results also showed that the order in which the pictures were presented is not a statistically significant factor. As for the second factor I concluded that the respondents would do better in detecting forgeries only if a deletion was shown first. Overall, children were able to detect forgeries better than adults.

Conclusions/Discussion
Children on the average did better in detecting the forgeries, and did so in a shorter amount of time. Another surprise was that the detection rate did not improve significantly when the respondents were shown both original and altered pictures side by side. These observations are not supported by current research in image forensics and are good topics for further research. In real life scenarios we do not have two pictures to compare, which makes it even harder to detect the forgeries. Given the limited ability of the humans to detect image forgeries, it is important to develop robust computer methods to solve problems in image forensics.

Summary Statement
My project tests to see what factors influence our ability to detect image forgeries.

Help Received
Mother helped paste slides; Family friend taught me the significance of Paired T-tests; Science teachers helped with many useful discussions.