



CALIFORNIA SCIENCE & ENGINEERING FAIR 2019 PROJECT SUMMARY

Name(s) Eitan Feldman	Project Number J1405
Project Title Spot That Dot: Autonomous Classification of Benign and Malignant Moles	
<p style="text-align: center;">Abstract</p> <p>Objectives The objective is to create software to identify malignant moles by evaluating size, shape, and variation in color. This software attempts to compensate for changes in distance and camera orientation.</p> <p>Methods Computer, camera, circular sticker Tested mole classification software algorithm on internet images of benign and malignant moles as well as images taken at home of moles with adjacent sticker</p> <p>Results Statistics on the accuracy of the mole classification software revealed that positive and negative predictive values, sensitivity, specificity, and accuracy were 0.8. After correcting distortion in images, the average deviation from the mean of mole to sticker ratio was 45.2%, 46.8% and 52.5% for each of three moles.</p> <p>One aspect of the hypothesis was found to be untrue: camera orientation must be controlled so that the circular sticker has an aspect ratio of less than 1.2. Otherwise the software was unable to produce consistent estimates of the mole size (relative to sticker size). The other aspect of the hypothesis, that software can evaluate characteristics of a mole to determine whether it is cancerous, was largely proven.</p> <p>Conclusions The 80% percent diagnostic accuracy achieved with this software compares favorably with trained professionals having five or fewer years of experience. The software also provided evidence that shape irregularity and variation in color are important indicators of melanoma.</p>	
Summary Statement This project identifies moles and classifies them as benign or malignant based on size, color variation, and shape, but was not able to correct for large variation in camera distances and angles.	
Help Received Mother helped design poster. Father provided coding advice.	