A Mobile Application to Identify Cancerous Moles
Abhishek Gadiraju, Sneha Keshwani, Elise Minkin
Advisor: Zachary Ives

Motivation
• Early detection of melanoma crucial for patient survival

<table>
<thead>
<tr>
<th>Melanoma caught in...</th>
<th>Five-year survival</th>
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<tbody>
<tr>
<td>Localized Stage</td>
<td>98%</td>
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<tr>
<td>Distant Stage</td>
<td>15%</td>
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• People with suspicious moles often do not visit their doctor, leading to late diagnoses

Goal
• Build mobile application that allows users to determine the likelihood that a mole is melanoma via image analysis

Results/Evaluation
• Machine learning model 79.8% accurate at classifying images from test set
• Additional inputs of medical history and mole details create more accurate mimic of doctor’s examination
• Application easy to use

Execution: Application
• Allows user to take a picture of a mole
• Gathers medical history through a questionnaire, which contributes to estimate
• Outputs the percent likelihood that the mole in question is melanoma

Execution: ML Model
• Computer vision algorithm
• Evaluation of symmetry, border and color of mole

Methodology
1. Upload or take picture
2. Display error message
3. Check for image validity
4a. Break down into features
4b. Classify images
5. Display confidence
6. Gather medical history
7. Calculate confidence

Step 0: Pre-screen mole

Step 1: Visual Examination and Medical History

Step 2: Dermatoscopy, MelaFind or SIAscopy (Optional)

Step 3: Skin Biopsy

• Incentivize at-risk users to seek medical attention

Step: Senior Project Poster Day 2015 – Department of Computer Science and Engineering – University of Pennsylvania