



# CALIFORNIA SCIENCE & ENGINEERING FAIR 2019 PROJECT SUMMARY

<b>Name(s)</b>  Neel Redkar	<b>Project Number</b>  <b>J1412</b>
<b>Project Title</b>  Using Machine Learning to Identify and Sort Waste	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives</b> The goal for this project is to design, build, and test a mobile application (app) that is able to sort waste into recycling, compost, and trash. Only 9% of recyclables gets recycled a large percentage, 79%, ends up in landfills. Another goal of the project was to allow the app to further sub-classify into types of recycling - paper, plastic, metal, glass, and cardboard.</p> <p><b>Methods</b> The project required image recognition with machine learning to build my project to allow detection and sorting of the image of the waste. I achieved this by using CoreML machine learning from Apple, and Swift/XCode from Apple to build the application. I built all of the software including the image recognition model and the full application including the user interface. The procurement of 3600 images and training was also done my me. In the testing phase of the product, I procured about 70 pieces of waste, tested the app, calculated and plotted the accuracy rates.</p> <p><b>Results</b> The user interface of the app was intuitive; users were able to understand the intent of the app (RecycleSmart) and how to use the app. The accuracy rate for the ML model was 91.4% for the 70 pieces of waste that were given for a variety of each categories, 10 each.</p> <p><b>Conclusions</b> The app was able to sort the waste with a 91% accuracy rate, which is adequate to use in people s everyday life. It was also easy to use, with the user interface doing well in usability. This means that people would be able to download the app from an Appstore and be able to use it with relative ease.</p>	
<b>Summary Statement</b>  I created a app to sort waste into recyclable, compost, and trash to educate and help people to put waste in the correct bin.	
<b>Help Received</b>  None. I created, tested, and deployed the app myself.	