The Mantis System

"Creating a Healthier & Safer Driving Environment"

-The Mantis System

The Mantis System is a group of five UCR undergraduate Bioengineering students (Zach Carrier, Vamsi Choday, Jaclyn Hirbawi, Kyle LaRue, and Raymond Wan) who share a passion for creating a healthier and safer driving environment. At the beginning of the school year, the group set out to create an innovative product that aids in reducing accidents attributed to intoxicated, drowsy, distracted, and aggressive driving for their senior design project.

The final prototype, as seen below, was first designed using the 3-D modeling software *SolidWorks*. The steering wheel, stand, and touchscreen mounts were then strategically 3-D printed in either ABS or PLA plastic at on-campus facilities operated by the Department of Bioengineering and the Orbach Science Library. Finally, the wooden dashboard and fiberglass back-cover was constructed by the group.

The final Mantis System prototype iteration, showcasing the 3-D printed plastic and hand-built components.

Housed within the steering wheel and dashboard is a combination of 13 sensors, a web-cam, notification LED's, vibration motors, two Arduino microcontrollers, and two Raspberry Pi computers. The system interfaces these components using both Python and Arduino coding languages. Through the coupling of various sensor readings, the system can detect the events of distracted driving, drowsy driving, and aggressive driving. In the case of a detect event the driver is alerted by various visual, tactical, and auditory feedback mechanisms (Link #1).

On June 30th, 2017, the Mantis System received the *Undergraduate Senior Capstone Design Award*, along with $750 in prize money at the 18th Annual UC Systemwide Bioengineering Symposium held at UCLA's Luskin Conference Center. This competition was open to all undergraduate senior design groups from the 10 UC campuses with a Bioengineering or Biomedical Engineering program. The participating groups had to first submit a 2-minute long elevator-pitch style video (Link #2). From these submissions, the Mantis System and three other groups were selected as finalists. At the symposium, the Mantis System gave a 15-minute long presentation in front students, professors, and judges from various Bio-Tech companies (Link#3). Numerous professionals praised the group on their presentation which eventually lead to them placing first in the competition.

Currently, the group members are applying for graduate school or to jobs in industry. In their spare-time, they are working on making improvements to their prototype and filing for a design patent.

The Mantis System members would like to thank the numerous graduate students and faculty of UCR's Bourns College of Engineering; notably their advisors Dr. Ahmed Eldawy, Dr. Walid Najjar, and Dr. William Grover for their support and guidance throughout the creation of their prototype.

Mantis System team members at the Systemwide Bioengineering Symposium. From left to right: Raymond Wan, Vamsi Choday, Zach Carrier, Jaclyn Hirbawi, and Kyle LaRue.

For more information on The Mantis System visit:

1. www.tinyurl.com/Mantis-System-Functionality
2. www.tinyurl.com/Mantis-Competition-Submission
3. www.tinyurl.com/Mantis-System-Presentation
4. www.facebook.com/TheMantisSystem