Monitoring Honeybee Hive Health With Computer Vision

Chambers, Victoria (School: Woodhaven Academy)

Honeybees are an essential part of both natural ecology and human agriculture. Monitoring beehive health is an essential component of beekeeping. Proper monitoring is needed to prevent Colony Collapse Disorder (CCD), where entire bee colonies disappear without warning. Current monitoring practices are time-consuming, costly, labor-intensive, and disruptive to the hive. This project modifies the open-source VLC multimedia player into a computer vision tool for convenient beehive inspection. Active beehives were recorded over several weeks, and the resulting videos were analyzed for movement using the debugging feature of the VLC software. This algorithm was shown to detect and report movement quantitatively, corresponding to hive health. This data demonstrates that a healthy hive has an activity range, even when external conditions such as weather and time are constant. This data is the beginning of defining the “range” of a healthy hive’s movement, both for the average amount of movement and the standard deviation of the dataset. The innovation of software and the camera apparatus will make the collection of quantitative data for beekeepers a transformative solution for monitoring hives, hive husbandry, and discovering the causes of CCD.

Awards Won:

Central Intelligence Agency: First Award: $1000 award