Novel Methods of Augmenting Plant Pollination

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The objective of this experiment is to provide mechanical mechanisms by which one can augment plant pollination. This was done by creating mechanical systems that mimic specific bee behaviors that cause pollen to be released. More specifically this experiment is a vital step towards a mechanical system that can autonomously pollination all types of plants. The first part of this experiment is the pollination through vibration. I developed a bee like device that while clipped to the stalk of a plant, mimics the vibration created by bees, causing the flowers to release pollen, which in return, self-pollinates the flower. The Second part, was the use of autonomous drones to cross pollinate plants. This was carried out by transferring pods from one plant to another. The enclosed vibrating motor causes the flower to release pollen, which is then picked up by the attached filaments and transferred from one plant to another. The third part is the novel manipulation of motor rotational speed to produce thrust that modulates at 200hz. This was completed by rewriting the motor control functions of an open source flight controller to change the speed of a motor 400 times a second, resulting in a downwards thrust that vibrates at the same frequency of bees. More specifically this is intended to augment pollination by causing higher amounts of pollen to be released. In conclusion, using beelike devices, autonomous drones, and thrust modulated at 200hz, I can augment the pollination process. Compared to a control(absent from bees) the bee like device increase pollination on average by almost 2,000%, the automated drone provides a mechanism to cross pollinate plants, and the modulated thrust allows for a large scale implementation and automation of the pollination through vibration.

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