Technology Tips For Beekeepers

Malcolm T. Sanford

RF DOPPLER SENSOR FOR ASSESSING BEEHIVE HEALTH

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This sensor should be of interest to commercial beekeepers as well as the armchair beekeepers who want to unobtrusively monitor the health and productivity of remote beehives with a smartphone. The sensor is small and requires no disassembly or modifications of a hive. The sensor is based on a low-cost, low-power 24 GHz Doppler radar module that is commonly used in automobile collision avoidance systems. With some modifications, it is capable of detecting honeybees in flight at a short distance. The output of the Doppler sensor is an electronic signal the 0 to 800 Hz frequency range. Beehive health and productivity are assessed by monitoring the flying activity of bees arriving at and departing from the hive entrance and comparing it with the activity in front of other hives. To reduce the large volume of data to a single meaningful index, the activity level is quantified by the average root-mean-square (RMS) power in the Doppler spectrum. This index is collected every 2 minutes during daylight hours and transmitted to a central node by a wireless network. Data from three instrumented beehives collected during the summers of 2018 and 2019 are presented. The activity indices were found to be highly correlated with environmental effects, such as temperature and solar radiation. They were also indicators alerting the beekeeper to immediate intervention, such as hive failure, absconding, swarming, and robbing. The technique was validated by comparison with visual hive inspections.
14 minutes https://tinyurl.com/hujz3s

OPEN-SOURCE MONITORING PLATFORM BEEP DEVELOPMENT IN B-GOOD PROJECT

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BEEP is based in The Netherlands and provides open source tools to beekeepers to help them keep honey bee colonies healthy. The BEEP platform consists of a responsive web application and a digital hive monitoring system. The BEEP app is a digital colony management logbook in which one can register inspections and access sensor data from the BEEP base or another (hive monitoring) device via API interfacing. Its main strength is the standardized data categorization with over 600 items that the beekeeper or bee researcher can select from to organize their data collection. The BEEP base measures weight, temperature, and sound of the bee colony. More sensors can be added, and the app code and base designs and firmware are open source available. The custom PCB is designed to be as energy efficient as possible and uses LoRa data connectivity. The BEEP platform is further developed into a decision-making support tool for honeybee health in the B-GOOD research project. 8 minutes https://tinyurl.com/k2syvkmz

TECHNOLOGIES FOR POLLINATOR SURVEILLANCE IN FIELD STUDIES AND INTELLIGENT IMAGE RECOGNITION: RFID, RANA, AND DAISY-II

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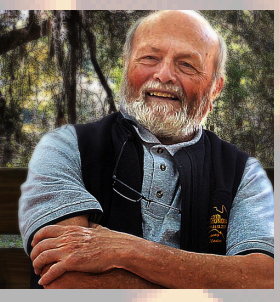

https://beekeep.info/vita_details/

Ecologists and beekeepers need technology-based solutions, or e-ecology tools, for acquiring, sharing, and understanding data on pollinators to address urgent knowledge gaps. We will present our work on developing and applying three novel technologies for studying pollinators: these are 1) prototype long-range RFID tags for tracking bumblebees in the field; 2) an automated video monitoring system based on active motion vision, called Rana; and 3) a deep learning intelligent image recognition system based on plastic self-organizing maps, called DAISY-II. We envisage an integrated e-ecology platform that leverages these, and other, tools. Developing the next generation of e-ecology tools will require cross-disciplinary collaborations between ecologists, engineers, informaticians and beekeepers, and significant investment from academia and industry. 14 minutes https://tinyurl.com/4yjdes75