SIoT-Bee Care: A Self-Powered Beehive Monitoring System to Promote the Well-Being of Honeybees

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Around the world there has been a vast decline in the population of honeybees, the greatest pollinizer; climate change, and parasites are playing a part in the fall (Vercelli, 2021). Along these, bees have been affected by negligent use of pesticides that destroy honeybees' sensory skills and heighten beehive diseases (Ullah, 2021). Recognizing the surfeit of literature addressing the decline in bee populations and the consequences for agriculture, the researchers contended that studies for comprehending the quality parameters of beehives remain relatively less explored. In this context, research efforts aimed at designing, assembling, and testing the effectiveness of a solar-powered beehive monitoring system called SioT-Bee Care to promote the well-being of honeybees. The prototype, which served as a complementary modification to a beehive, consisted of an Arduino UNO hardware to monitor the sensors, a wireless communication system and a solar panel with battery charger. SioT-Bee Care sensed the temperature, humidity, and frequency inside the beehive, along with real-time dispatched outputs in a system of LED lights, serial terminal readings and graphical visuals through a telecommunication port adaptable to mobile devices (computer and phone). To check the system's efficacy, inputs, and outputs were tested and evaluated with a wild beehive that invaded a house. The beehive was rescued and relocated into SioT-Bee Care. The data obtained supported the effectiveness of SioT-Bee Care in providing real-time information to monitor parameters needed to sustain the wellbeing of honeybees. A camera with an infrared sensor will be eventually integrated to increase the monitoring efforts.

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