Development of a Mobile Application that Facilitates Temperature Monitoring of the Honeybee (Apis mellifera) for Beekeeping in Rural Areas

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Precision Apiculture is a subbranch of agriculture that isn't commonly known. One of the major factors that it monitors is the temperature of the beehive, which can bring drastic consequences, depending if it's hotter or colder than normal. Apiculture has been a field where the integration of technology has not been seen as deeply as in other fields. A prototype was created in order to detect temperature anomalies and alert the beekeeper through a mobile application if an anomaly was detected. If it is successful, Precision Apiculture will be able to expand to different beekeepers' workplaces. The prototype development was divided into three phases, which it needs to pass in order to proceed to the experimentation process. The prototype consists of an Arduino Uno, a Wi-Fi module and a temperature sensor, which will send temperature data from the beehive to the cloud server: CloudMQTT. After the prototype was created, it went through a field test to see if it was efficient. This test allowed us to visualize how the experimentation process was going to be and the expected results. During the field test, there was little connection loss from the prototype to the cloud server and it was able to detect the temperature consistently between the beehives. The data received by the prototype showed consistency in the temperature with minor fluctuations from each beehive. Considering the conditions that each beehive faced during the test, the prototype was considered efficient in detecting temperature data and sending it to the cloud server.

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