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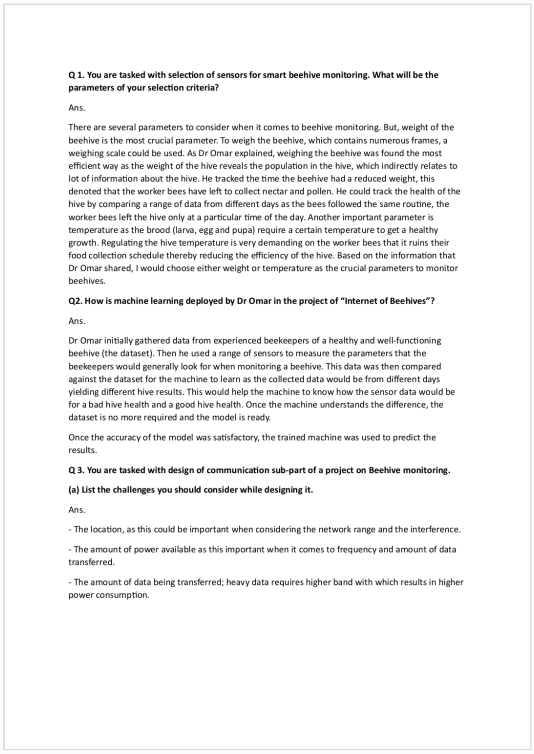
Assignment title:	Assessment - Answers to Guest Lecture 1 (BeeHives)
Submission title:	AdharshSundaramSoudakar_23796349_AnsBeehiveMonitori...
File name:	AdharshSundaramSoudakar_23796349_AnsBeehiveMonitori...
File size:	16.36K
Page count:	2
Word count:	867
Character count:	4,326
Submission date:	29-Aug-2023 06:30PM (UTC+0800)
Submission ID:	2153381047



Q 1. You are tasked with selection of sensors for smart beehive monitoring. What will be the parameters of your selection criteria?

Ans.

There are several parameters to consider when it comes to beehive monitoring. But, weight of the beehive is the most crucial parameter. To weigh the beehive, which contains numerous frames, a weighing scale could be used. As Dr Omar explained, weighing the beehive was found the most efficient way as the weight of the hive reveals the population in the hive, which indirectly relates to lot of information about the hive. He tracked the time the beehive had a reduced weight, this denoted that the worker bees have left to collect nectar and pollen. He could track the health of the hive by comparing a range of data from different days as the bees followed the same routine, the worker bees left the hive only at a particular time of the day. Another important parameter is temperature as the brood (larva, egg and pupa) require a certain temperature to get a healthy growth. Regulating the hive temperature is very demanding on the worker bees that it ruins their food collection schedule thereby reducing the efficiency of the hive. Based on the information that Dr Omar shared, I would choose either weight or temperature as the crucial parameters to monitor beehives.

Q2. How is machine learning deployed by Dr Omar in the project of "Internet of Beehives"?

Ans.

Dr Omar initially gathered data from experienced beekeepers of a healthy and well-functioning beehive (the dataset). Then he used a range of sensors to measure the parameters that the beekeepers would generally look for when monitoring a beehive. This data was then compared against the dataset for the machine to learn as the collected data would be from different days yielding different hive results. This would help the machine to know how the sensor data would be for a bad hive health and a good hive health. Once the machine understands the difference, the dataset is no more required and the model is ready.

Once the accuracy of the model was satisfactory, the trained machine was used to predict the results.

Q 3. You are tasked with design of communication sub-part of a project on Beehive monitoring.

(a) List the challenges you should consider while designing it.

Ans.

- The location, as this could be important when considering the network range and the interference.

- The amount of power available as this important when it comes to frequency and amount of data transferred.

- The amount of data being transferred; heavy data requires higher band with which results in higher power consumption.