

CS 5600/6600

Lecture 4: Project 1: Part 1

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Electronic Beehive Monitoring

Experienced beekeepers can tell which audio and video patterns are produced by stressed colonies, they may not always be physically present to observe them in time to administer appropriate treatment due to fatigue or problems with logistics.

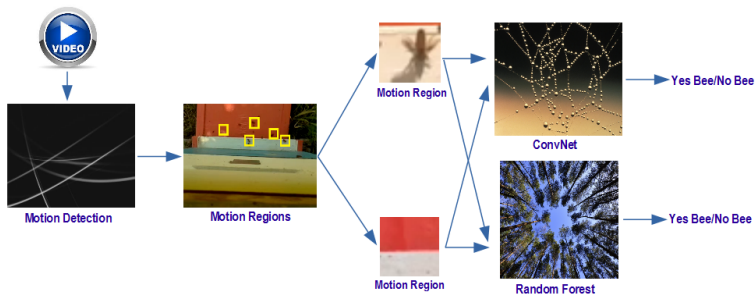
The cost of transportation is also a factor, as many beekeepers drive longer distances to their far flung apiaries due to ever increasing urban and suburban sprawl.

Insomuch as beekeepers cannot monitor their hives continuously, electronic beehive monitoring (EBM) can help extract valuable information on honeybee colonies without invasive hive inspections or transportation costs.

BeePi Monitor: A Beehive as an Immobile Robot



Video Processing in BeePi

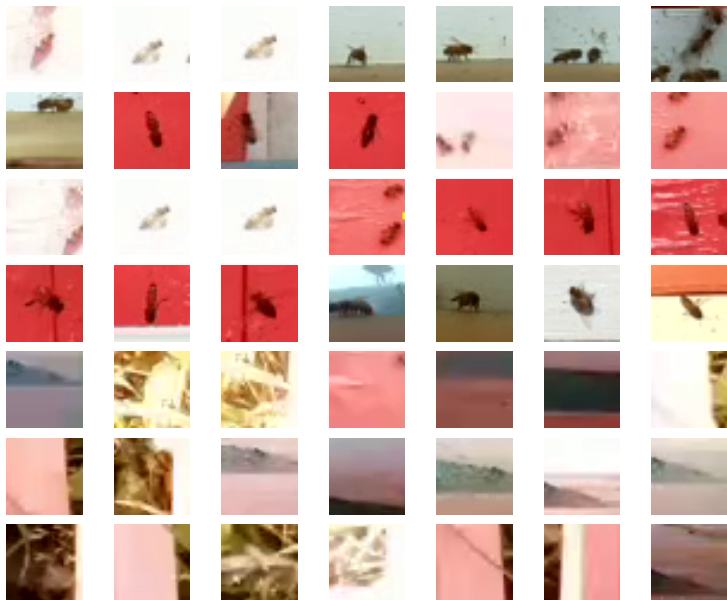


BEE1 Dataset

BEE1 contains 54,382 32×32 images with two categories — BEE (if an image contains at least one bee) or NO-BEE (if it contains no bees or only a small part of a bee).

All images were obtained from BeePi monitors deployed on beehives with Italian honeybees in Logan and North Logan, UT in 2017.

BEE1 Dataset

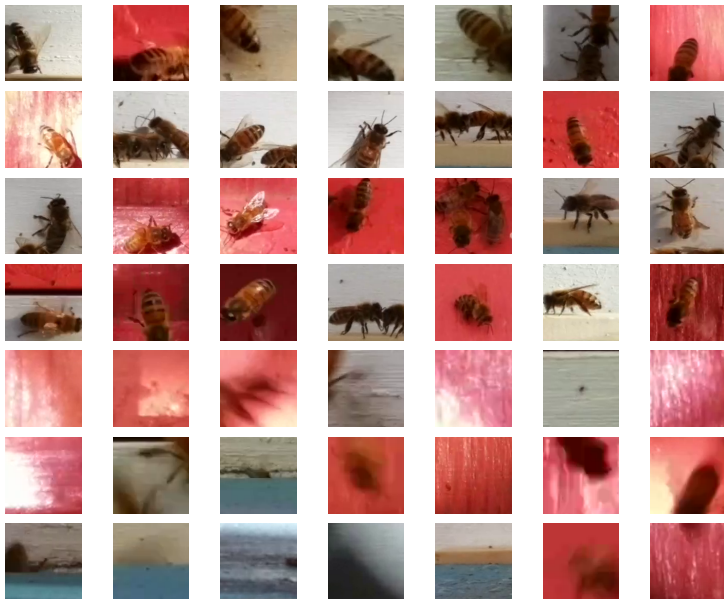


BEE2 Dataset

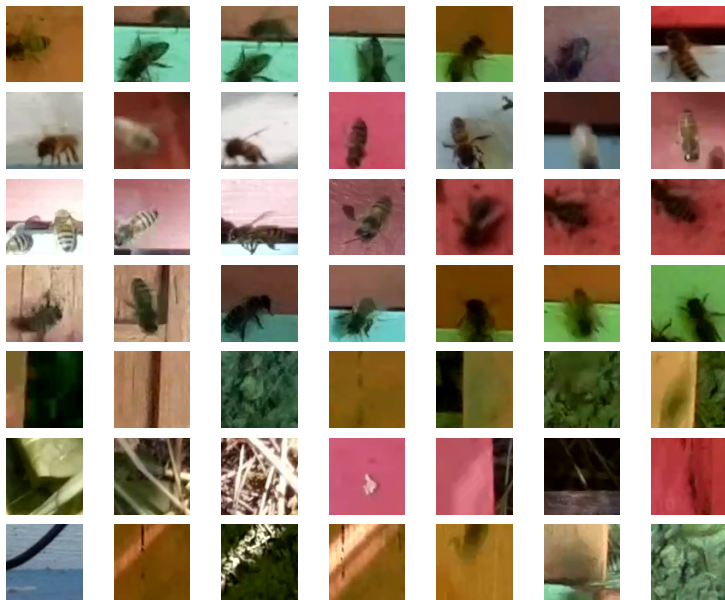
BEE2 is a dataset of 112,879 labeled images obtained from the videos captured by four BeePi monitors on four Langstroth beehives with Carniolan honeybee colonies in Logan, UT, in 2018.

	Train/Test (BEE)	Train/Test (NO-BEE)	Validate (BEE)	Validate (NO-BEE)	Total
BEE2_1S	11,094	36,143	8298	2666	58,201
BEE2_2S	17,176	21,310	6823	9369	54,678
Total	28,270	57,453	15,121	12,035	112,879

BEE2 Dataset: 1 Super



BEE2 Dataset: 2 Super



Project 1: Part 1: Objective 1

Design, train, evaluate, and persist one ANN for BEE1 and one ANN for BEE2.

BUZZ1 and BUZZ2 Datasets

BUZZ1 (10,260 samples) and BUZZ2 (12,914 samples), of manually labeled audio samples (bee buzzing, cricket chirping, and ambient noise).

BUZZ1 consists of audio samples captured from beehives with Italian honeybees in Logan and North Logan, UT in 2017.

BUZZ2 consists of audio samples captured from beehives with Italian and Carniolan honeybee colonies in Logan and North Logan, UT in 2018.

Project 1: Part 1: Objective 2

Design, train, evaluate, and persist one ANN for BUZZ1 and one ANN for BUZZ2.