SPECIALIZED TRAP FOR GROUND TRUTHING AN INSECT RECOGNITION SYSTEM

BACKGROUND

[0001] The present disclosure relates in general to sensors, and in particular to sensors for insect traps.

[0002] Conventional methods for accurately classifying an insect have been very labor intensive and inefficient, for example, by requiring an entomologist to visually inspect each insect as it is trapped by a trap.

BRIEF SUMMARY

[0003] Various examples are described for systems and methods of ground truthing an insect recognition system. According to a first aspect of the present invention, there is provided an apparatus for ground truthing an insect recognition system, the apparatus comprising: a roll of substrate material, the substrate material having upper and lower surfaces and an adhesive applied to at least one of the upper or lower surfaces; a motor coupled to the roll of substrate material and configured to rotate the roll of substrate material to dispense the substrate material into an insect trap; a sensor positioned along a dispensing path of the substrate material and configured to capture information associated with the surface of the dispensed substrate having the adhesive, the sensor further configured to output sensor signals based on the captured information; and a computing device including one or more processors, the computing device configured to receive the sensor signals from the sensor, to transmit at least a portion of the captured information to a remote computing device, to receive classifications of insects based on the captured information from the remote computing device, and to train a machine-learning insect classifier based on the classifications.

[0004] According to a second aspect of the present invention, there is provided an apparatus for ground truthing an insect recognition system, the apparatus comprising: an insect trap enclosure defining a trap volume and having at least one opening to enable insects to enter the trap volume from an environment; a sensor positioned proximate to the insect trap configured to capture information about insects that enter the trap volume from the environment and to transmit sensor signals comprising the captured information; a computing device in communication with the sensor and configured to: receive the sensor signals; recognize, using an object

recognition process, at least one insect based on the captured information; receive an indication of a type of insect based on the displayed captured information; and train the object recognition process based on the recognized insect and the indication of the type of insect.

[0005] According to a third aspect of the present invention, there is provided a method for ground truthing an insect recognition system, comprising: capturing one or more insects; capturing a time associated with a capture of each of the one or more insects; capturing data associated with each of the one or more insects; transmitting the data and the times to a computing device; recognizing, using an object recognition process, one or more of the one or more captured insects; receiving, via user input, indications of insect types for one or more of the one or more captured insects; and training the object recognition process based on the indications of insect types and the recognized captured insects.

[0006] According to a fourth aspect of the present invention, there is provided a method for ground truthing an insect recognition system, comprising: dispensing a substrate into an insect trap, the substrate comprising upper and lower surfaces and an adhesive applied to at least one of the upper or lower surfaces; periodically applying marks to the substrate as it is dispensed, the marks indicating time periods; capturing, using the adhesive, one or more insects on the substrate; capturing data associated with the one or more captured insects and the marks; transmitting the captured data to a computing device; recognizing, using an object recognition process, one or more of the one or more captured insects; receiving, via user input, indications of insect types for one or more of the one or more captured insects; and training the object recognition process based on the indications of insect types and the recognized captured insects.

[0007] These illustrative examples are mentioned not to limit or define the scope of this disclosure, but rather to provide examples to aid understanding thereof. Illustrative examples are described in the Detailed Description, which provides further description. Advantages offered by various examples may be further understood by examining this disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] Fig. 1 depicts a block diagram of an insect classification and training system in accordance with certain embodiments.

[0009] Fig. 2 illustrates a process of ground truthing an insect recognition system in accordance with certain embodiments.