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RECOGNITION OF FLY SPECIES-LOCUST BASED ON IMPROVED RESNET

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ABSTRACT

A dozen species of locusts (Orthoptera: Acrididae) are a major threat to food security worldwide. Their outbreaks occur on every continent except Antarctica, threatening the livelihood of 10% of the world's population. The locusts are infamous for their voracity, polyphagy, and capacity for long-distance migrations. For effective control, the insects need to be detected on the ground before they start to develop air borne swarms. Detection systems need to determine pest density and location with high speed and accuracy. Location of the swarms on the ground then enables their control by the application of pesticides and bio-pesticides. This work proposes a locust species recognition method based on Resnet50 - convolutional neural network (CNN). We experimentally compared the proposed method with other the state-of-the-art methods on the established dataset. Experimental results showed that accuracy of this method reached higher than the state-of-the-art methods. This method has a good detection effect on the fly species recognition.

***Key Words*: Orthoptera: Acrididae , CNN-Convolution neutral network, good detection.**

1.INTRODUCTION

Crop pest identification and classification represent one of the major challenges in the agriculture field. Insects cause damage to crops and mainly affect the productivity of crop yield. Classification of insects is a difficult task due to the complex structure and having a high degree of similarity of the appearance between distinct species. It is necessary to recognize and classify insects in the crops at an early stage, especially to prevent the spread of insects, which cause crop diseases by selecting effective pesticides and biological control methods. Traditional manual identification of insects is typically labour-intensive, time-consuming and inefficient. The vision-based computerized system of image processing using machine learning was developed for accurate classification and identification of insects to overcome these problems in agriculture research field.

1.1 Feature extraction

Feature extraction transforms the raw data into meaningful representations for a given classification task. Images are typically composed of millions of pixels with associated colour information each. The high dimensionality of these images is reduced by computing abstract features, i.e. a quantified representation of the image retaining relevant information for the classification problem (e.g. shape, texture or colour information) and omitting irrelevant. Traditionally, features to be extracted were designed by domain experts in a typically long term and rather subjective manual process. For instance, it was observed that humans are sensitive to edges in images. Many well-known computer vision algorithms follow this pattern and use edge or gradient based features, e.g. the scale invariant feature transform (SIFT). SIFT is a widely adopted approach for object detection and image comparison that efficiently detects and describes characteristic and scale invariant keypoints within images that provided a huge improvement over earlier approaches

1.2 Classification

Depending on the application, the score is either compared to a threshold solely deciding whether an object is present or not (e.g. presence of a plant or animal in the image), or it is compared to other scores to distinguish object classes (e.g. species name). Prominent classification methods are machine learning algorithms such as support vector machines, Random Forest and artificial neuronal network (ANN).