Extracting Vital Features for Emotion Recognition

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Abstract

Increasing the demand for pork consumption is inevitable as the world population is growing. Although the amount of pork production is increased, expanding the labor cost is limited. Utilizing artificial intelligence in pork farming industries can balance the demand for meat productivity. The pig emotion recognition (PER) dataset is not accessible in public, and the PER dataset is not generally preprocessed after the collection of the pig images. In this paper, we demonstrate how we were able to extract the vital features from the whole image input.

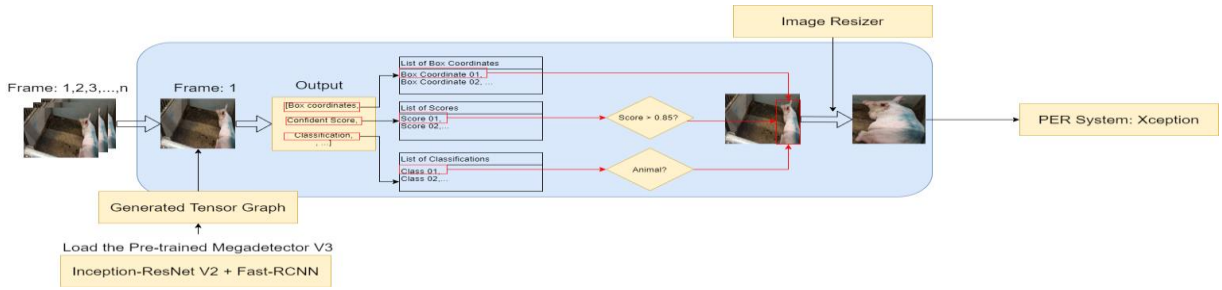

Fig. 1 The pig extractor after utilizing the Megadetector V3.

I. Introduction

The number of pig farming workers could face a shortage since labor costs are the main factor in the farming industry's expenditures. To reduce labor costs drastically, the farming industries could replace the useless labor expenditure with low-cost automated machines. [1] However, obtaining the pig emotion recognition (PER) dataset is not accessible to the public and is generally obtained from collaborating animal research institutes. Even after we obtained from the animal research institutes, most images were collected without refining the PER dataset. Refining the PER dataset is to utilize the pretrained Megadetector model. We can modify the pretrained model to extract the relevant features of pigs, though the model shows only bounding boxes.

II. The Semi-Shuffled PER Dataset

The PER dataset was created by the Department of Animal Science, Wageningen University and Research. The PER dataset consists of video clips and several captured images. Each image has many irrelevant pictures of a pig, and some images do not include any pig.

The pretrained Megadetector is based on combined neural networks of the Inception-ResNet V2 and Fast-RCNN and generates the tensor graph. The generated tensor graph contains the box coordinate, score, and class. The box coordinate has the x-y coordinates of the pig's location in the image. The score contains the percentage of confidence by the model's recognition. The class means if the detected pictures are either animal or not. The rest of the model's attributes have been omitted since they are not significant for extracting the vital features of the pig image. This modified prototype can locate all pig features and remove irrelevant features within a short time.

III. Test Results

From Table I, the accuracy is 59.56% without utilizing the pretrained megadetector model, while 21.61% after applying the pretrained megadetector model. The recall percentages from without and with the megadetector model are 55.91 % and 23.61% respectively. F1-scores from both applications are 59.56% and 15.02%.

Table I. THE EXPERIMENTAL RESULTS OF THE PRE-TRAINED XCEPTION WITH THE TESTING DATASET.

PER Dataset	Accuracy	Recall	F1 Score
Without Megadetector	59.56 %	55.91 %	59.56 %
With Megadetector	**21.61 %**	**23.61 %**	**15.02 %**

IV. Conclusion

In this paper, we demonstrated how we utilized the pretrained megadetector model and modified it to make the vital feature extractor. Later, we can generate objective experimental results.

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References

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