Deep Learning Based Student Emotion Monitoring System Using Internet of Things

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Abstract

During the covid lockdown and intermediate new normal situations, classes were conducted in online and hybrid. In hybrid mode students attended the classes with masks on. The students attended the classes from their homes without masks by online mode. So, the footages of online classes were recorded. All the classes were conducted using Google Meet and the footage was recorded with a Filmora video recorder which gave a holistic view of the whole class. The inbuilt recording of Google Meet recorded only those who speak. The videos recorded were subjected to a three-tier architecture to localize the students from different parts of the frame. This was done to calculate multiple students in the frame as instances. These instances are fed to the face detection module. The detected faces are then tested against the Lite version of VGG-16 model trained using FER dataset. The bounding boxes on the detected faces are given unique color codes according to the emotions. The change in color code will help the instructor to know whether the students are able to follow the lecture effectively and identify those students who are slow learners and concentrate them with a different teaching methodology. The product is deployable in a Tensorflow enabled NVIDIA Jetson Nano which can be placed in a classroom within the space occupied by a standard surveillance camera.

1. Student Localization

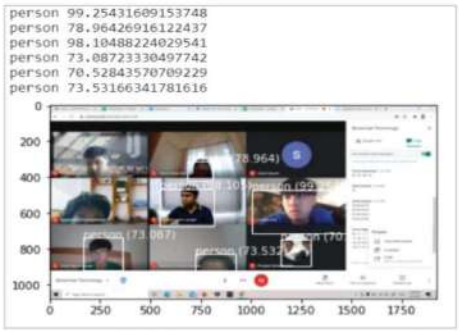

Figure 1: YOLO v3 result to extract person from the frame

2. Face Detection

Figure 2: Haar Cascade output

3. Emotion Recognition

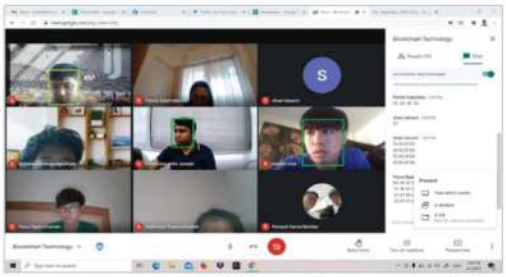

Figure 3: Emotions detected. Dark green bounding boxes for normal faces and light green bounding box for sad face. Remaining faces are not identified with any emotion

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SUSTAINABLE MANUFACTURING

Prototype of Air Conditioners Control Systems via Line Chatbot using Raspberry Pi

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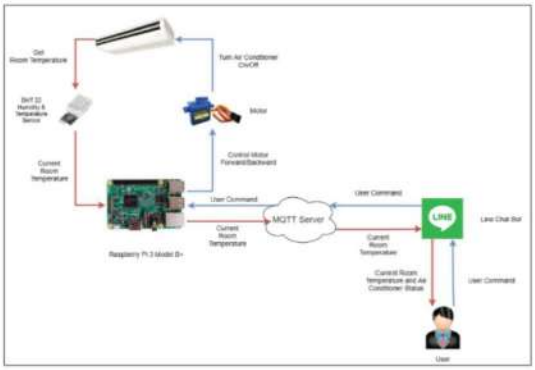
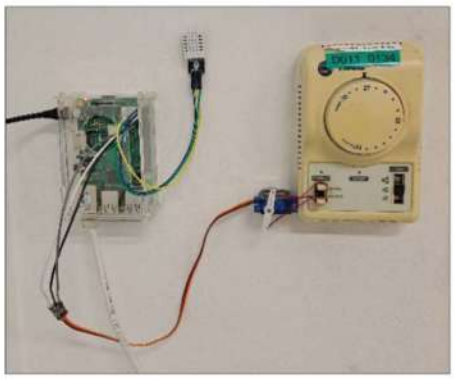
Abstract

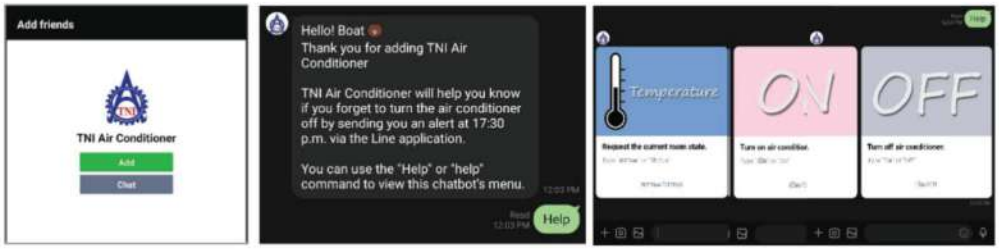
The concept of this research is development of control of air conditioner through a chatbot, with Raspberry Pi. The study starts from learning how to program Raspberry Pi to work with the air conditioner that has on-off power switch, and write a program to control the air conditioner through a LINE chatbot. This study aims to allow the user to turn the air conditioner on and off through the LINE chatbot anytime and anywhere as long as Internet connection is available, solving wasteful power consumption problem. This study experiments on an air conditioner in the computer lab room B404 of Faculty of Information Technology, Thai-Nichi Institute of Technology. Evaluation of the prototype system is done in two forms: evaluation by three experts, and 20 users. Evaluation shows that the experts' rating is "very satisfy" (average =4.63), and users' rating is "satisfy" (average =4.13).

Methodology



System development





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SUSTAINABLE MANUFACTURING

A Smart Farming of Red Claw Crayfish for Small and Medium Enterprise (SMEs)

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1. Abstract

This paper is a newly developed smart farming system of red claw crayfish was considered worth investment and represents the application of novel Information Technologies (IT) into agriculture.

2. Introduction

Currently, Farmers in Thailand prefer large numbers of red claw crayfish for consumption. The red claw crayfish has attracted the interest of many farmers. According to a survey by the Department of Fisheries, there are about 62 provinces where there are about 4,000 feeders. The reason is that it is a new economic animal that has made a lot of money for farmers.

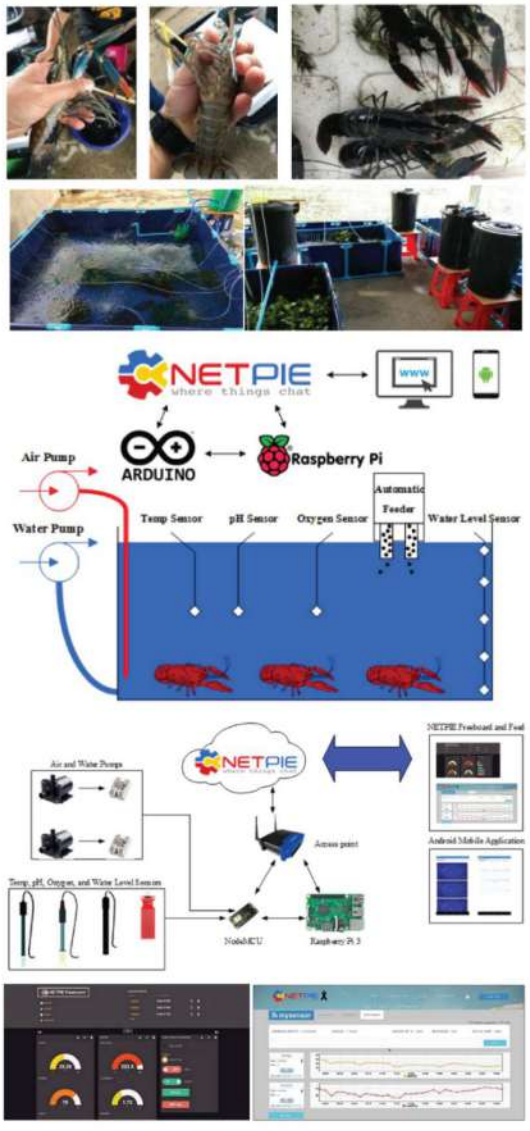
3. Research Methodology

The requirement for prototype a smart farm of red claw crayfish. The water quality was the most important environmental aspect that needed to be controlled in this farm. Automatically pumping, on/off the water pump and the air pump was required. Moreover, the smart farm system should be simple maintenance with NETPIE service and control on computer (web app. and mobile app.)

In this paper, consider the environmental aspect of the red claw crayfish used are shown in the table.

4. Conclusion

The implemented system consists of the NETPIE service, Embedded System, Micro-controller and Sensors. Users are able to control devices on the farming through smartphones from anywhere that the Internet is available. The internet of things was applied for the smart fanning of red claw crayfish. Smart Farming represents the application of novel Information Technologies (IT) into agriculture. Smart farming solution to help farmers monitor the growing conditions within their red claw crayfish.



Criterion Aspect	*Value*
Temperature (°C)	25 - 35
pH (potential of hydrogen)	7.5 - 8.5
Oxygen (ppm, mg/L)	7.5 - 8.0