

Development of an Internet of Things (IoT)-Based Rat and Bird Pest Repellent System During Rice Plant Nursery Period

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ABSTRACT

Rice farming in Indonesia still faces serious challenges due to pests such as rats and birds, especially during the nursery stage. At this stage, seedlings are highly susceptible to damage, requiring extra protection. Manual monitoring is considered inadequate because it requires the farmer's direct presence in the field. Therefore, a system capable of automatically detecting and repelling pests remotely is needed. The developed system uses an integrated ESP8266 microcontroller and ESP32-CAM. A PIR sensor is used to detect pest movement and is mounted on a servo motor with a range of 0° to 180°. If movement is detected, a buzzer is activated to repel pests. The system is also equipped with a raindrop sensor to monitor weather conditions, and the ESP32-CAM sends notifications in the form of images and text via the Telegram app. The system is powered by solar panels and batteries so it can be used independently in rice fields. Test results show that the system can consistently detect the movement of living things at a distance of 0.5 to 2 meters and responds well to weather changes. The system also successfully sends notifications automatically. Although it still has some limitations, such as false triggers and limited range, this system is quite effective in assisting farmers in pest control during the rice seedling period.

Keywords: *Internet of Things (IoT), PIR Sensor, ESP8266, ESP32-CAM, Pest Repellent*