Smart Nest for Birds

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The hatching behavior of birds is an important part of animal ethology, but how to observe hatching in nests has always been a challenge. Traditional observation methods require observers to wait around the nest, sometimes even need to install cameras to realize it. However, the traditional methods might cause disturbance to birds, and even cause parents to abandon their nests in serious cases. In order to better observe hatching behavior of birds in the nest, a smart bird nest box was designed as non-intrusive tool for long-term monitoring. A camera was installed in the nest for live video. A relay module was designed as an on-off switch for remote control of camera. DS18B20 and DHT11 sensors were used for monitoring temperature and humidity. SEN0239 and RD623 infrared sensors were designed to monitor the movement of hatched birds. ESP8266 Wi-Fi module and 4G wireless router were used for communication among related devices. Energy-efficient optimization of solar panels, lithium batteries and electronic devices ensured that the nest can last for at least five months. A mobile APP was designed to help observers monitor and observe the live video and data of sensors anytime, anywhere. The smart nest had been applied to two mother Mandarin Ducks and their sixteen babies in the wild during a 4-month experiment in 2018. It recorded a complete hatching cycle data, including some typical behaviors such as hatching eggs, turning eggs, and feather covering, which provided an important basis for the behavior analysis of birds.

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