

## ABSTRACT

Indonesia is a country with the largest soybean market in Asia with an average consumption of tempeh reaching 6.59 kg and consumption of tofu reaching 7.06 kg per person. At present, with population growth, the demand for soybean producers is increasing which makes there a considerable difference between the production and consumption of soybeans. In soybean production, we must monitor especially the storage temperature of soybean seeds. So far, the process of monitoring the temperature of soybean seeds is still done manually by officials. Therefore, to monitor the temperature of stored soybean seeds, a special system is needed so that the temperature of soybean seeds can be monitored automatically easily.

In this Final Project the author will design a system to monitor and monitor the temperature of soybean seeds and send images of soybean seeds to a website based on the Internet of Things. In the designed system, there are several things that are needed, such as the DHT-11 sensor which is used as a temperature sensor, ESP 32 CAM is used as a seed monitor inside the germinator, heater as a temperature controller, Arduino ESP 32 as a microcontroller that is connected to Bluetooth and Wi-Fi networks. Fi, Firebase is a database for storing data from sensors and cameras, and also here QoS measurements and tests will be carried out using Wireshark on websites.

The test results on the temperature sensor with an average temperature of 28.74°C, with the lowest temperature being 27.10°C and the highest temperature being 30.00°C. The comparison tool used for the temperature sensor, namely a thermometer, obtains a sensor accuracy of 95.32%. The results of sensor data and images can be sent to firebase and match the monitor on Arduino. Network quality when data is sent and received on Firebase also results in an average delay of 14.23 ms and an average throughput of 2388.26 bps. Soybean seeds when initially placed in the germinator within 8 days can develop and grow tall quickly with success in 84 out of 100 seeds planted. And also the results of camera testing, the pictures can be taken quite clearly, although there are still deficiencies.

Keywords: Soybean Seed, Microcontroller, IoT, Firebase