ABSTRACT

Soil is an important factor in the growth and production of vegetable crops. Poor soil quality can inhibit plant growth and reduce yields. Determining the level of soil suitability for vegetable crops is usually done by analyzing soil physical properties such as structure, texture, and density can affect the availability of water and air in the soil. Soil chemical properties, such as pH and nutrient content (NPK), can affect the availability of nutrients for plants. While soil biological properties, such as microorganisms, can affect the decomposition process and nutrient cycling in the soil. Knowing the physical, chemical and biological elements in the soil aims to determine the optimal soil conditions for the growth and production of vegetable crops. by knowing the nutrients in the soil farmers can increase vegetable crop production.

This research introduces a tool to detect soil fertility using sensors that have been connected using the GRU (Gate Recurrent Unit) method. The sensor will be inserted into the soil and will measure the level of soil fertility and will validate the data so as to produce a dataset in the form of CSV. The dataset will be used as a training and test sample in GRU. The results of GRU data processing will be used as a classification of vegetable crops. to make it easier for farmers to know the nutrient content.

In this final project research, using 5 classes of vegetable plants with each class there are 600 datasets. Classification using GRU architecture by testing the best parameters by changing parameters such as epoch, learning rate, batch size, and optimizer. From the results of changing the parameters, the best parameter results were obtained at epoch 40, learning rate 0.001, batch size 32 and optimizer adam obtained the best accuracy validation with a value of 98.80% with a validation loss value of 0.0477

Kata Kunci**:** *Soil, vegetable crop, GRU, parameters*