

## **ABSTRACT**

*Name : Bayu Satria Permana  
Major : Electrical Engineering  
Title : Piezoelectric Punching Force Measuring Device for Boxing Athlete*

*Sport is an activity to train the body, both physically and mentally. Sports have many types, one of which is boxing. In boxing, punches play a very important role. From the punch, a force is obtained, then the force is applied to the sensor. In general, the sensor used to measure punches is a load cell sensor. But the price of load cell sensors on the market today is quite expensive, so a measuring device using piezoelectric sensors is made as an alternative. When force is applied to piezoelectric material, it will produce voltage. The voltage generated by this material can be used to create visual or sound effects. Research on piezoelectricity against voltage output is an important aspect in piezoelectric development. The purpose of this research is to analyze the effect of striking force, diameter variation and also the effect of series and parallel circuit on piezoelectric module on the voltage output generated from piezoelectric. The main components used in this research are piezoelectrics with diameters of 27 mm and 35 mm each as a sensor, ESP32 as a microcontroller, and LCD which is used as an interface to the system. This research method uses the design and implementation method of the force formula. The results obtained from this research are to create a prototype of a punching force measurement tool to help boxing athletes in their training program.*

*Keywords : Piezoelectric, Force, Boxing*