

## **ABSTRACT**

The increased use of electricity indirectly increases the amount of electronic equipment used. Electronic equipment, such as fans, chargers, lamps, and the like, are non-linear loads that can generate harmonic sources. Harmonics are important to consider because they can affect power quality, increase cable temperature, which can cause measurement errors on KWH-meters, and reduce equipment life which has an impact on additional costs for electricity use.

This study designed an identification electrical loads/devices system using 3 machine learning models which are Support Vector Machine, Random Forest, and Decision Tree algorithms. The system was applied for monitoring the use of electrical devices that are operating in order to find out the indications of waste. Data collection and testing of electrical devices was carried out using 7 electronic devices, namely rice cookers, laptops, lamps, hair dryers, fans, dispensers, and phone chargers. This study integrated EMG25, Current Transformer MSQ-30, electrical devices, USB Module RS-485 and Raspberry Pi3 for data processing, forming system models by algorithms and testing system identification. This research produced a system model of three algorithm Support Vector Machine, Random Forest, and Decision Tree with an accuracy of 93.5%, 95,5% and 92.5% respectively and wall time 0.489, 0.337, and 0.0278 second it was proven to be able to identify electrical devices that were operating correctly based on data characteristics.

**Keywords— Non-Intrusive Load Monitoring (NILM), Support Vector Machine (SVM), Random Forest (RF), Decision Tree (DT), and Harmonics.**