

## **ABSTRACT**

*Pests are one of the problems that humans often face because of their destructive and detrimental nature. The damage caused by these pests varies, ranging from direct plant damage due to being eaten by pests to indirect plant damage due to diseases transmitted by pests to plants. Farmers have tried to deal with this pest problem using traditional methods. Apart from traditional handling by farmers, several parties have also conducted research on methods for dealing with pest problems that use electronics in the application.*

*Based on existing problems, namely pests and reflecting on related research, a grasshopper detection and repellent tool will be designed that implements ultrasonic waves. The detection system consists of a series of sensors. The frequency generator circuit will be used to generate ultrasonic waves and the tweeter as an actuator will emit ultrasonic waves. Apart from that, a feature will be added to this tool which the author observed was not available in previous research, namely Astable Multivibrator frequency data which can be displayed on the LCD for the user to see.*

*The result of this research is a pest detection and repellent tool with dimensions of  $21 \times 14.5 \times 10$  cm. The detection system of the tool works very well, where the HC-SR04 sensor has an accuracy of 99.989% and the MAX4466 sensor has an accuracy of 99.995%. In addition, the Astable Multivibrator readings read by the Arduino Uno and displayed by the LCD have an accuracy of 99.995%. After testing this tool to the research in the form of grasshopper pests, it was discovered that the grasshoppers reacted at ultrasonic frequencies with the most visible reaction at a frequency of 30-40 kHz.*

*Keywords: Grasshopper, Ultrasonic Waves, Astable Multivibrator, HC-SR04, MAX4466, Tweeter, IC 555*