

## ***ABSTRACT***

*Sugarcane plantations play a vital role in national sugar production; however, the dry and easily combustible characteristics of the land, particularly during the dry season, significantly increase the risk of fire. Fire incidents in the Cirebon region indicate that conventional monitoring systems are not yet capable of providing effective detection. This study aims to design and implement a fire detection system for sugarcane plantations based on a temperature sensor (DHT11) and a smoke sensor (Smoke Detector Module) integrated with the Internet of Things (IoT) technology. The developed prototype consists of a temperature sensor, smoke detector, camera/CCTV, solar panel, and Wi-Fi-based communication module connected to the Deon Smart Living application for real-time monitoring.*

*The testing results show that the system is capable of detecting temperature increases above the 40–50°C threshold and smoke concentrations exceeding 300 ppm with a rapid response of less than 5 seconds. The smoke detector proved more responsive to dense smoke from burning dry leaves compared to cigarette smoke, while the temperature sensor activated the buzzer and provided real-time notifications when the threshold was exceeded. The IoT integration enables instant notification delivery to user devices, although internet stability remains a determining factor. Overall, the system is proven effective in providing early fire warnings and has the potential to assist plantation managers in preventing the spread of fires, thereby minimizing economic losses and environmental impacts.*

***Keywords:*** *Fire, Sugarcane Plantation, DHT11, Smoke Detector, IoT*