

Analisis Sistem Tertanam dan Desain Mekanik pada Pengembangan Tongkat Cerdas untuk Tunanetra (*Analysis of Embedded Systems and Mechanical Design in the Development of a Smart Cane for the Visually Impaired*).
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ABSTRACT

Visually impaired individuals face challenges in daily activities, particularly with mobility and safety. In 2018, Sidoarjo Regency reported 1,737 visually impaired persons. This research develops a smart cane with an emergency button to send location coordinates and a pickup message to family members during emergencies. The embedded system analysis showed the emergency button works optimally. Ten open-area tests resulted in an 80% message delivery success rate, with an average response time of 7.4 seconds and an average location accuracy of 5.25 meters. Additionally, the mechanical design analysis using Autodesk Inventor and stress analysis proved the cane's structural durability. The ABS Plastic design withstood a 100 N static load, indicated by a maximum von mises stress of 2.839 MPa, displacement of 0.1419 mm, and a minimum safety factor of 7.04. Overall, this research demonstrates that the smart cane performs well, both in its emergency system functionality and mechanical durability, making it a suitable tool for assisting visually impaired individuals.

Keywords: *Visually Impaired, Smart Stick, Embedded System, Mechanical Design, Functional Testing, Stress Analysis*