

ABSTRAK

SitiDayanti, Shakila Rahmadita. 2026. *Smart Charity Box* Sebagai Media Monitoring dan Otomatisasi Perhitungan Amal Berbasis *Internet of Things* (IoT) Menggunakan ESP32. Skripsi. Program Studi Teknik Informatika, FT, Universitas PGRI Madiun. Pembimbing (I) Slamet Riyanto, ST., MM. (II) Pratiwi Susanti, S.Kom., M.MT.

Perkembangan teknologi *Internet of Things* (IoT) memberikan peluang untuk meningkatkan transparansi dan efisiensi pengelolaan dana amal di masjid. Namun, pengelolaan kotak amal masih dilakukan secara konvensional sehingga proses perhitungan donasi memerlukan waktu, kurang transparan serta belum didukung sistem keamanan yang memadai. Penelitian ini bertujuan merancang dan membangun *Smart Charity Box* berbasis *Internet of Things* (IoT) menggunakan ESP32 yang mampu mengidentifikasi nominal uang kertas secara otomatis, memantau data donasi secara *real-time* dan meningkatkan keamanan kotak amal. Penelitian menggunakan metode *Prototype* yang meliputi tahapan komunikasi, perancangan cepat, pembangunan prototipe, evaluasi pengguna dan penyempurnaan sistem. Pengumpulan data dilakukan melalui observasi dan wawancara, sedangkan pengujian sistem menggunakan *Black Box Testing* dan *User Acceptance Testing* (UAT). Sistem *Smart Charity Box* yang terintegrasi dengan sensor warna TCS34725, sensor *fingerprint*, sensor getaran SW-420, *Firestore Realtime Database* dan aplikasi SahabatAmal untuk monitoring donasi. Hasil *Black Box Testing* menunjukkan seluruh fitur sistem berjalan sesuai dengan kebutuhan fungsional. Sementara itu, hasil UAT memperoleh nilai 96% pada aspek kemudahan penggunaan, 89% pada aspek kinerja sistem, 89% pada aspek tampilan informasi dan 93% pada aspek kepuasan pengguna, yang seluruhnya termasuk kategori Sangat Baik. Sistem yang dikembangkan telah berjalan sesuai kebutuhan dan diharapkan dapat meningkatkan efisiensi, transparansi dan keamanan pengelolaan dana amal di masjid serta menjadi referensi bagi pengembangan sistem berbasis *Internet of Things* pada penelitian selanjutnya.

Kata Kunci : *Smart Charity Box*, ESP32, *Internet of Things* (IoT), Monitoring Donasi, *Prototype*.

ABSTRACT

SitiDayanti, Shakila Rahmadita. 2026. Smart Charity Box for Monitoring and Automated Donation Counting Based on the Internet of Things (IoT) Using ESP32. Undergraduate Thesis. Informatics Engineering Study Program, Faculty of Engineering, Universitas PGRI Madiun. Advisor (I) Slamet Riyanto, S.T., M.M. Advisor (II) Pratiwi Susanti, S.Kom., M.MT.

The development of Internet of Things (IoT) technology provides opportunities to improve the transparency and efficiency of charitable donation management in mosques. However, charity boxes are still managed conventionally, making the donation counting process time-consuming, less transparent, and lacking adequate security mechanisms. This study aims to design and develop an IoT-based Smart Charity Box using the ESP32 microcontroller to automatically identify paper currency denominations, monitor donation data in real time, and enhance the security of charity boxes. The research employed the Prototype development method, consisting of communication, quick design, prototype construction, user evaluation, and system refinement. Data were collected through observation and interviews, while system evaluation was conducted using Black Box Testing and User Acceptance Testing (UAT). The proposed Smart Charity Box integrates the TCS34725 color sensor, fingerprint sensor, SW-420 vibration sensor, Firebase Realtime Database, and the SahabatAmal mobile application for real-time donation monitoring. The results of Black Box Testing indicate that all system features functioned according to the specified functional requirements. Meanwhile, the UAT results achieved scores of 96% for ease of use, 89% for system performance, 89% for information display, and 93% for user satisfaction, all of which fall into the Excellent category. The developed system successfully meets the intended requirements and is expected to improve the efficiency, transparency, and security of mosque donation management while serving as a reference for future research on Internet of Things based systems.

Keywords : Internet of Things (IoT), ESP32, Smart Charity Box, Donation Monitoring, Prototype.