Assessing the Usability of Zakat Finder: A Community-driven Mobile Application for Asnaf Identification and Reporting

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**Abstract.** Traditional zakat management systems in Malaysia often suffer from limited community involvement, inefficiencies, and outdated verification, which can result in eligible asnaf being overlooked. This study aims to develop Zakat Finder, a mobile application designed to facilitate the zakat distribution process by combining community-driven reporting for asnaf identification and machine learning to prioritize asnaf using clearly defined eligibility metrics. The system was developed using agile methodology of the Scrum framework and was tested using System Usability Scale (SUS) questionnaire to evaluate usability. Requirements for the system were gathered and obtained using various elicitation techniques such as document analysis, questionnaire, observation, then organized in a product backlog and user stories. Initial results indicate a high usability score with a mean score of 71.0, which indicates good usability.

# INTRODUCTION

Zakat, the third pillar of Islam is a very important aspect of the Muslim community, serving as a method of redistribution of wealth to those who are in the most need. It improves socioeconomic growth and positively influences the wealth distribution by lessening inequality and expanding economy growth [1]. Zakat management has recently progressively begun adopting digital solutions and tools in recent years to improve productivity, transparency, and accessibility rather than solely using traditional solutions [2]. Digital zakat management has shown a significant and positive change on accountability and zakat growth acceleration [3]. Recently emerging technologies like artificial intelligence (AI) and machine learning (ML) hold great promise for refining the recipient selection process, utilizing advanced algorithms to remove biases that often come with manual methods [4].

Nevertheless, zakat institutions in Malaysia still encounter significant challenges with zakat distribution due to outdated practices [5] and limited community engagement in the identification process. This study aims to address these gaps with the development of Zakat Finder, a mobile application incorporating community-based reports, along with machine learning, into a more effective and transparent platform for zakat distribution.

Therefore, the primary objectives of this paper are: (1) To develop a user-friendly mobile application facilitating community-based reporting of potential asnaf (zakat recipients); (2) To initiate and document early-stage data preprocessing for machine learning integration; and (3) To evaluate the usability and user satisfaction of the developed application. This paper will further detail the background study, methodology of the development process, present key findings from requirements gathering and prototype development, and discuss future machine learning integration to enhance the system.

# background study

Over the years, technological adoption in zakat management has tremendously evolved, increasing efficiency and transparency for processes involved. Rahman et al. emphasized on the importance of trust, security and transparency in digital zakat platforms [2] while Hadi et al. broadened Rahman’s study by looking into the effect of digital zakat management on zakat growth acceleration. Their findings show the implementation of digital platforms for the collection and management of zakat improves accountability in zakat management and accelerates zakat growth [3].

Younas et al. investigated how agent-based modeling, paired with essential Islamic values like Zakat and inheritance, can help create a fairer wealth distribution in Muslim communities. Their simulations revealed that having structured systems, like national Zakat treasury centers, along with raising public awareness, plays a crucial role in narrowing economic gaps [6]. Haryanti et al. developed a decision support system (DSS) using the Analytical Network Process (ANP) method to select the most deserving *mustahik* (recipients) based on health and wealth criteria. The ANP method was found to be more reliable than other multi-criteria decision-making methods in their study due to its flexibility and efficiency [7]. Tarshany proposed a framework using artificial intelligence for distributing zakat that aligned with *Maqasid al-Sharia* goals (fairness, dignity, and social welfare). This ensured that zakat would be distributed to those *mustahik* that had the highest level of need based on these values. The author did not intend to propose a specific AI system but instead gives a conceptual overview of how AI could help decision-makers determine who might be prioritized for receiving zakat based on these values [8].

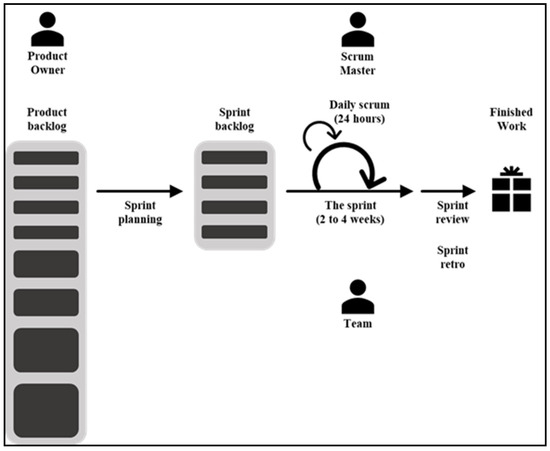
Omar et al. developed an Augmented Reality (AR) mobile application to promote the Asnaf Care fundraising system from the Kedah Zakat Board (LZNK) and increase public engagement. The overall feedback indicated that users found the app useful, visually appealing, and functionally able to support task completion [9]. In addition, Nor et al. explored the potential implementation of digital zakat application within the Zakat on Touch (ZoT) mobile application. Key findings revealed how the application helped in facilitating the online zakat application process, and digital solutions adopted in LZNK’s systems had led to positive improvements in their zakat management system [10]. Furthermore, Omar et al. developed the iZakat mobile application to develop enhanced and improved zakat knowledge and calculation. Experts projected the increasing role of mobile applications for zakat knowledge and practice of zakat in the community [11].

Several studies have shown the potential use of machine learning in zakat systems for decision-making and automation purposes. Kurniawan et al. developed a web-based system to automatically determine the category of asnaf using the Naïve Bayes algorithm The study demonstrated an accuracy of 93.7% and an F-measure of 96.7% in using 80% of training, superior to results by earlier studies using the Bayesian Network [4]. Similarly, Sari et al. (2021) used the K-Nearest Neighbor (KNN) algorithm to classify asnaf on the BAZNAS website. The KNN algorithm also performed well, with a 97% accuracy in classifying zakat recipients. This shows that the KNN algorithm was a practical classification method to classify zakat recipients based on their category [12]. However, both studies noted that the limited scope of the data affected the generalizability of the findings. To tackle the issue of varied data in [12] and [4], Che-Aron et al. developed a mobile application with search, positioning, and navigation features based on asnaf data collected and verified by mosque committees. From the gathered data, a more reliable database of Muslim poverty was created [13]. Meanwhile, Fatima et al. used logistic regression to study how factors like frugality, vocational training, and religious commitment impact poverty alleviation programs. Their model reached a 75% prediction accuracy, showing that even basic machine learning techniques like logistic regression can provide valuable insights, especially when considering the social context [14].

# methodology

## Agile Development

To facilitate the flexible and responsive handling of changing requirements, an agile development approach using the Scrum framework was undertaken. Scrum was especially relevant for the mobile application project because mobile app development requires rapid iteration, continuous user feedback and a high level of focus on usability. Alnanih highlights that adapting Scrum with usability-oriented practices, such as iterative user involvement and grounded theory-based feedback, enhances the overall design and usability of mobile applications [15]. The main phases include: (1) product and sprint backlog creation (2) sprint planning, (3) implementation (4) review, and (5) retrospective conducted in sprints. The iterative nature of agile allows continuous user feedback and system refinement. It ensures that the system is closely aligned with user needs. Figure 1 illustrates the Scrum flowchart of a sprint in the development life cycle for Zakat Finder.



**FIGURE 1.** Flow chart of scrum development [16]

The initial product backlog was created based on the requirements gathered through several fact-finding techniques: (1) document analysis, (2) observation (3) questionnaire, and (4) stakeholder interview. Document analysis involved an in-depth review of regulatory guidelines from official organizations, such as the Zakat Distribution Management Manual (MPAZ), and operational reports from zakat agencies in Malaysia like Official Portal Department of Awqaf, Zakat dan Hajj (JAWHAR) and the Kedah State Zakat Board (LZNK). These documents provided a framework for the identification and classification of asnaf based on predefined socio-economic criteria.

Furthermore, several existing systems related to zakat management and donation systems, including Zakat on Touch (ZOT), Feeling Blessed, and Kitajaga.co were observed and analyzed. The analysis extracted functionalities and evaluated the performance and usability of the existing mobile applications. The comparative analysis of existing applications revealed distinct strengths and weaknesses in their design and target user engagement.

Additionally, a questionnaire was distributed to understand public opinion, preferences and challenges regarding existing zakat applications This consisted of five sections in total, structured according to specific user insights that were aimed at guiding the development of Zakat Finder. Both quantitative and qualitative data were gathered through the structured questionnaire, which helped in the creation of a user-centered system design.

Additionally, an interview was conducted with representatives from Yayasan Universiti Multimedia (YUM), who manage the zakat aspects for the Multimedia University (MMU) community. The purpose of the interview was to understand MMU’s zakat management process, including the identification of asnaf, the eligibility criteria, and challenges in current operations. Following the outcomes of these activities, user stories were drafted and added to the product backlog. Each user story represents a functionality based on three user roles: (1) community member, (2) zakat organization, and (3) administrator.

Sprint planning was held at the very beginning of every sprint cycle. Each sprint was planned based on user stories chosen from the product backlog to be developed during the sprint. The selected user stories were further decomposed into smaller, more manageable tasks. Each sprint was also defined with goals and deliverables to achieve at the end of the cycle.

During the implementation phase, the tasks defined during sprint planning were developed. Development activities used Flutter for cross-platform mobile application development and Firebase for real-time database management and user authentication. Continuous integration practices were implemented to ensure that new code and features could be tested and merged into the prototype regularly while not breaking the other modules.

At the end of each sprint, a sprint review was conducted to review the completed increment to testers and stakeholders. Functional testing was performed to ensure that the essential features were working smoothly within the typical workflows users would follow, like checking database updates after someone registers or submits a report. To assess the system's usability, participants filled out the System Usability Scale (SUS) questionnaire. The SUS is a standardized tool comprising of ten statements that participants rate on a five-point Likert scale [17]. It is widely used in usability studies because it's reliable, straightforward, and works well across different systems. The SUS helps developers make ongoing improvements to the system design based on what users share [18]. The implemented features were demonstrated in a working prototype environment using Xcode and Android Studio simulators, as well as on a physical iPhone connected in development mode. This setup allowed participants to experience the application as it would be used in the real world. Testers were walked through important tasks like registering, submitting reports, and viewing reports and their details.

Following the sprint review, a sprint retrospective was conducted to reflect on the overall sprint performance. Challenges encountered and solutions were discussed, and immediate improvement was applied to optimize processes in future sprints.

# results and discussion

The requirements for the Zakat Finder system were gathered through several elicitation techniques such as document analysis, questionnaires, observation of existing systems, and interview. The document analysis provided a structured framework for identifying and classifying asnaf into eight categories based on predefined criteria. The document also outlines the validation process which consists of: (1) identification, (2) investigation, and (3) verification procedures.

Additionally, an interview with representatives from Yayasan Multimedia University (YUM) revealed that asnaf eligibility is determined based on input from submitted applications. The eligibility is calculated using predetermined calculations and criteria derived from Lembaga Zakat Selangor’s asnaf calculator. Then, they categorize the asnaf into three categories: (1) fakir, (2) miskin, and (3) fisabilillah. Currently, the verification process involves manual cross-checking with multiple departments and relies on data accuracy and phone-based verification, which causes delays in the timeline.

Furthermore, functionalities from existing systems were extracted based on the comparative analysis conducted. The comparative analysis of existing applications revealed distinct strengths and weaknesses in their design and target user engagement. Table 1 summarizes the key features and differences between the mobile applications.

**TABLE 1.** Comparison of existing systems

|  |  |  |  |
| --- | --- | --- | --- |
| **Features** | **Zakat on Touch** | **Feeling Blessed** | **Kitajaga.co** |
| Community-driven Reporting | Yes | No | Yes |
| Real-time data | Yes | Yes | Yes |
| Map Integration | Yes | Yes | Yes |
| Zakat-specific donation | Yes | Yes | No |
| Filtering function | Yes | Yes | Yes |
| Search function | Yes | Yes | Yes |
| Direct Donations | No | Yes | No |
| Performance | Buggy interface, long load time during launch | None reported | Unresponsive User Interface |

By addressing the identified limitations and gaps in existing systems, the proposed system aims to enhance these existing features and introduce new functionalities to improve the overall zakat reporting and distribution process, in accordance with the project's objectives.

Moreover, the questionnaire received a total of 53 responses from a diverse user group. Key findings from the questionnaire displayed that 81.1% of respondents were female, aged between 20 to 49 years. Most respondents hold a bachelor’s degree. Moreover, 53% of respondents reside in suburban areas. Despite a high level of technological familiarity with an average score of 4.43 out of 5, 70% had limited experience with existing zakat or charity apps while the remaining percentage noted issues such as poor navigation and laggy interfaces. Key features prioritized by users included filtering and search functions, educational resources, community-driven reporting and geolocation heatmaps, with 96% expressing strong agreement with real-time mapping features. Furthermore, respondents preferred clear navigation and a grid-style homepage for ease of use.

Based on the findings from the requirements gathering phase, a structured product backlog was created to guide the development activities of Zakat Finder. The backlog consists of user stories categorized by the primary user roles: (1) community members, (2) zakat organizations, and (3) administrators. Table 2 summarizes the key user stories defined during the initial backlog creation.

**TABLE 2.** Initial product backlog for Zakat Finder

|  |  |
| --- | --- |
| **User Role** | **User Story** |
| Community Member | As a community member, I want to register and log in to the application securely. |
| Community Member | As a community member, I want to submit reports of potential asnaf with supporting details and location. |
| Community Member | As a community member, I want to view a map with locations of zakat organizations and navigate to the location. |
| Community Member | As a community member, I want to receive notifications about my report status. |
| Community Member | As a community member, I want to access guidelines related to zakat. |
| Zakat Organization | As a zakat organization, I want to verify reports submitted by community members. |
| Zakat Organization | As a zakat organization, I want to prioritize reports based on priority scoring system. |
| Administrator | As an administrator, I want to manage user accounts and view user history. |

The prototype of Zakat Finder was developed using Flutter for cross-platform compatibility and Firebase for real-time database management and user authentication. Figure 2 illustrates the main screens developed for the prototype, showcasing key functionalities based on user stories and requirements gathered during the requirements gathering phase.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |
| (a) | (b) | (c) | (d) | (e) |

**Figure 2.** Main screens developed for the Zakat Finder prototype: (a) Registration, (b) User dashboard, (c) Report zakat recipient, (d) View submitted reports, and (e) View report details

During the sprint review phase, a usability test was conducted using the System Usability Scale (SUS). Three participants were asked to complete tasks such as user registration, submitting report, and viewing report details. After task completion, participants filled the SUS questionnaire, which consists of ten items scored on a five-point Likert scale. Table 3 displays the responses for each participant.

Based on the results of the SUS scores, the prototype achieved a mean SUS score of 71.0in which, according to the SUS general guideline, corresponds to grade B (good). Users found the app intuitive and easy to navigate, though a few noted slight delays during report submission to pin the location of the user, and to view the integrated map. This indicates that while the system is generally easy to use, there remains room for improvement, particularly in the areas of system responsiveness and minor UI refinements. Building on these findings, Zakat Finder shows potential for scalability beyond the university context, as its community-driven reporting and prioritization mechanisms can be adapted to other institutions and zakat bodies. Integration with state zakat organizations may enhance data sharing and verification, promoting transparency and efficiency. Furthermore, this approach could inform future digital zakat policies by highlighting how technology supports inclusivity and optimizes zakat distribution.

**TABLE 3.** SUS questionnaire responses for Zakat Finder

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **User Task** | **T1** | **T2** | **T3** | **T4** | **T5** | **T6** | **T7** | **T8** | **T9** | **T10** | **X** | **Y** | **SUS Score** |
| P1 | 4 | 2 | 4 | 3 | 4 | 2 | 4 | 3 | 4 | 2 | 15 | 13 | 70.0 |
| P2 | 5 | 2 | 4 | 2 | 4 | 2 | 4 | 3 | 4 | 2 | 16 | 14 | 75.0 |
| P3 | 4 | 2 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 2 | 15 | 12 | 67.5 |
| P4 | 4 | 2 | 4 | 3 | 4 | 2 | 4 | 3 | 4 | 2 | 15 | 13 | 70.0 |
| P5 | 5 | 2 | 4 | 2 | 4 | 2 | 4 | 2 | 4 | 2 | 16 | 15 | 77.5 |
| P6 | 4 | 3 | 4 | 3 | 3 | 3 | 4 | 3 | 4 | 2 | 14 | 11 | 62.5 |
| P7 | 4 | 2 | 4 | 3 | 4 | 2 | 4 | 3 | 4 | 2 | 15 | 13 | 70.0 |
| P8 | 5 | 2 | 4 | 3 | 4 | 2 | 4 | 2 | 4 | 2 | 16 | 14 | 75.0 |
| Mean | | | | | | | | | | | | | **71.0** |

*Note: T1–T10 represent the 10 items in the System Usability Scale (SUS) questionnaire. Each item is rated on a 5-point Likert scale. SUS scores are computed using the standard method [17]:*

*X = (Sum of points for all the odd-numbered questions) – 5*

*Y = 25 – (Sum of points for even-numbered questions)*

*User’s SUS Score = (X+Y) \*2.5*

## Ongoing Work: Machine Learning Integration

To support the prioritization of asnaf reports, integration of machine learning into Zakat Finder has commenced. A dataset comprising over 1000 applicant records from 2023 to 2024 was provided by Yayasan Universiti Multimedia (YUM). This dataset contains detailed demographic, academic, and socioeconomic attributes including gender, race, religion, nationality, program of study, academic performance, income-related documentation, individual income of the father, mother, and siblings, as well as the number of dependents in the household. Classification labels for asnaf eligibility were derived using YUM’s official *Asnaf Calculator*, a structured decision model that computes financial need based on household income, number of dependents, and other socioeconomic criteria. This calculator served as the basis for supervised learning. Once labels are finalized using the official *Asnaf Calculator* and feature selection is completed, model training and evaluation will proceed. Several machine learning algorithms will be trained on the cleaned dataset and compared using standard metrics to select the best performing model. Metrics such as classification accuracy, confusion matrix, and F1-score will be reported in subsequent phases.

# CONCLUSION

This paper introduced Zakat Finder, a mobile application aimed at enhancing the identification and prioritization of zakat beneficiaries through community-driven reporting and the future use of machine learning. The system addresses limitations found in traditional zakat management processes. The system was developed using an agile methodology with the Scrum framework, ensuring iterative feedback and alignment with stakeholder needs and evolving requirements. A product backlog and user stories were created based on information gathered from several elicitation techniques, such as document analysis, questionnaire, observation, and interviews with stakeholders. The prototype of the system was developed using Flutter, with Firebase as the backend service. Usability testing using the System Usability Scale (SUS) was conducted during sprint reviews, revealing a mean score of 71.0. This suggests a good usability score and general positive user experience with the system.

As part of the ongoing phase of the project, work on the machine learning component has begun. Data collection and preprocessing are actively being conducted to construct a reliable training dataset, which includes data cleaning and feature extraction to ensure the quality and relevance of the inputs. The next phase will involve training and evaluating various models to determine the most effective approach for prioritizing reported cases based on predefined scoring criteria. Upon validation, the selected model will be deployed within the system to support automated prioritization of asnaf applications. The outcomes of this extended functionality will be reported as part of the final stage of the research.

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