



(RESEARCH ARTICLE)



Mobile application for managing common emergencies

Mico Angelo Dela Cruz Del Rosario, April Joy Armienta Macaraig *, Gabriel Odulio, Joana Marie Quila Pizarra, Criselle Jose Centeno and Domingo Valenzuela Tanael

Information Technology Department, Faculty Assistant Professor, College of Computer Studies, Global Reciprocal Colleges, Pamantasan ng Lungsod ng Maynila, Philippines.

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Abstract

First aid skills are highly essential and a must-learn basic ability by everyone. Accidents can happen anytime in anywhere, that's why first aid is needed. The creation of the application was to achieve a way to deliver adequate knowledge to people for handling without professional help on the site of an accident or an emergency. Most people are usually not knowledgeable in what to do in first aid situations, and that is because nobody has had easy access to the necessary information it requires. The aim of the study is to create an application that gives awareness and knowledge to people on the various methods and practices on first aid care. The purpose of this study is to develop the Mobile Application for Managing Common Emergencies by using the prototyping methodology together with the conceptual framework. The application has been designed by considering necessary functions such as location service and first aid treatment information. The result of the development and testing are discussed. The application will educate and instruct the users on how to perform proper first aid. Giving the people ways or the means to help people in need instead of waiting for help to arrive. The researcher was able to develop an application with the first aid registry of all the newer first aid procedures all certified by Philippine Red Cross to give access to everyone on what to do to administer first aid procedures. Using the ISO 25010 The evaluation yielded positive results, with Functional Suitability scoring an overall weighted mean of 4.19, Performance Efficiency at 4.04, Usability at 4.31, Compatibility at 4, and Portability at 4.39. Utilizing a confusion matrix with Weka Software, the application demonstrated an 88.2353% correctly classified instances and 11.7647% incorrectly classified instances, indicating the effectiveness of the algorithm. This study can be possessing significant potential for increasing students learning in term of some accident occurrence and enhancing their learning effectiveness using mobile application-based learning. It can be developed and implementation especially in health-related units or courses.

Keywords: First Aid; Common Emergency; Injuries; Philippine Red Cross

1. Introduction

First aid is defined as immediate medical attention or treatment for anyone who has suffered a sudden illness or injury. Knowing first aid is essential to respond to emergency cases and be able to relieve pain, maintain life, promote recovery and prevent the patient's condition from worsening until professional medical help arrives. Given the fact that many people still do not know how to provide first aid in emergencies, patients often end up in the worst possible condition or even die. People need a credible source of information to learn about first aid and respond to emergencies without having to attend first aid seminars or workshops.

There are many situations which are require first aid and many countries have regulations which it specifies a minimum level of first aid provision in certain circumstances. This can include specific training or equipment to be available in the workplace, the provision of specialist first aid cover at public gatherings and mandatory first aid training within schools.

* Corresponding author: Macaraig April Joy A.

However, first aid does not necessarily require any particular equipment or prior knowledge. It can involve improvisation with materials available at the time and often by untrained persons.

To address the a fore mentioned concerns, the researchers of the study proposed a Mobile Application for Managing Common Emergencies, which aims to provide users with a source of information about how to perform first aid. The application is available for download and use in emergency situations. The user just has to input the injury or illnesses that occur unexpectedly, and the application will provide them the step-by-step process in administering first aid. The software will aid in the response to emergency situations and in saving of lives.

1.1. Statement Of the Problem

- Lack of expertise and information about how to administer first aid and get emergency medical help in the case of any common emergencies.
- Improper medical care and attention given to an incident that happened anywhere and resulted in minor or significant injuries to the patient.
- Lack of access and details about the closest medical facility for urgent situations.
- Effectiveness of the proposed system.

1.2. Objectives of the Study

1.2.1. General Objectives

This study aims to develop mobile application for managing common emergencies, which is essential for everyone to know basic first aid techniques.

1.2.2. Specific Objectives

- To develop a program that instructs users how to deal with common injuries with first aid.
 - Step by steps management for specific injuries.
 - Tips and Trivia's regarding the specific injuries
- To test the user knowledge first aid by provide test for some situation in the application.
 - Includes quiz/test, to determine what you have learned in the application.
 - Scenario based simulation test.
- To provide the fastest and easiest way for users to locate the nearest medical facility
 - Emergency Contact Numbers
 - Incorporate Maps
- To test and evaluate the proposed system using ISO 25010.

1.3. Scope And Delimitation

1.3.1. Scope

This study is limited to the techniques, procedure and management for first aid and it will be based on the current practice and standard of the Philippine Red Cross in dealing with this kind of situations. The scope of the modules will be Cardiac Emergencies, Soft Tissue Injuries, Bone, Joints and Muscle Injuries. The app can give knowledge on the user regarding the specified modules but it will not be equivalent into a formal training where they can receive a license as a first aider. If the user is in distress, it can activate Emergency Medical Services and it will locate the nearest capable hospital to cater the needs of the user.

1.3.2. Delimitation

This study is delimited to the standard of care of a first aider, any other pre hospital care given to a patient like field surgery, intubation, IV injections, airway suctioning, oxygen therapy, drug administration, etc. will no longer be covered by this study. The system will not issue Certificate of Competency or any kind of certification to the user. The system needs to have internet and location service for some of features to work properly. This project is only available on android devices and only the features listed in this document will be included in the system.

2. Methods

2.1. Conceptual Framework of the Study

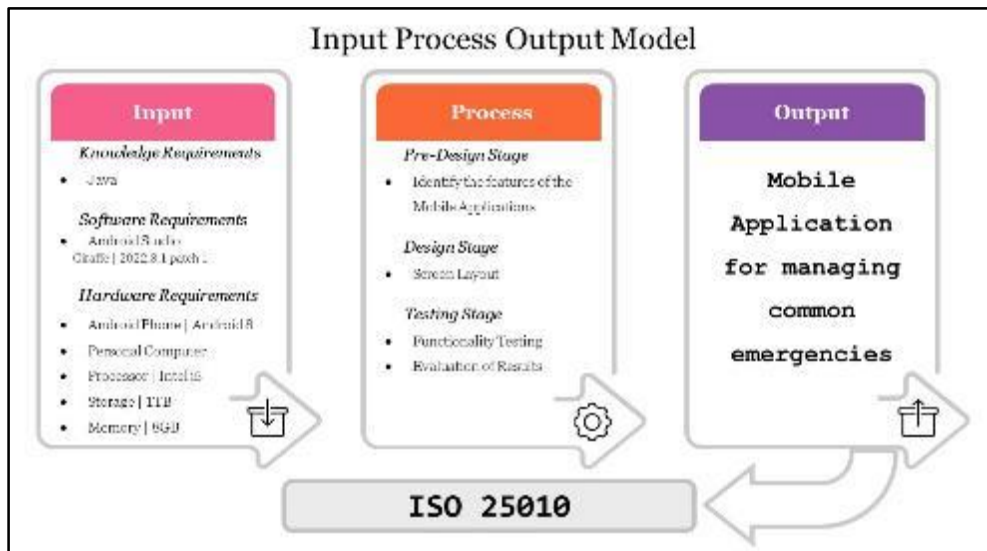


Figure 1 Conceptual Model of the Study

As seen in the provided diagram, the app contained the necessary requirements needed for it to be approved for continued planning and to be moved onto the designing phase.

In the Input Phase, the proponents gathered all necessary information pertaining to the software of the proponent's choice. Websites, Articles and even individual using a First Aid Application are gathered for documentation. The proponents also sorted out all of the programs.

In the Output Phase, the whole application is presented for evaluation to be made by the users. And that concludes the proponent's entire conceptual model of the study.

2.2. System Architecture Diagram

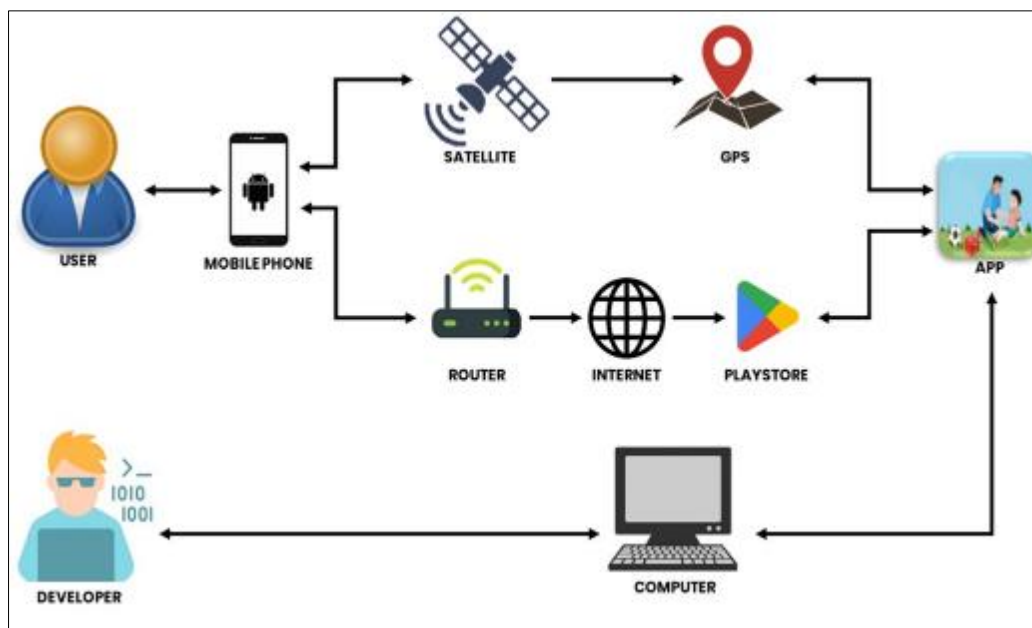


Figure 2 System Architecture Diagram

This figure shows the whole process interact with each other. The user who will be the one in control with the application and the developer will be the one in control in developing the app. The user will be needing mobile phone in order to access the app but before that there some software or tools needed which the satellite for the maps, the router for internet connection in order to download the app in play store. While the developer will be needing computer for developing the application.

2.3. System Flowchart

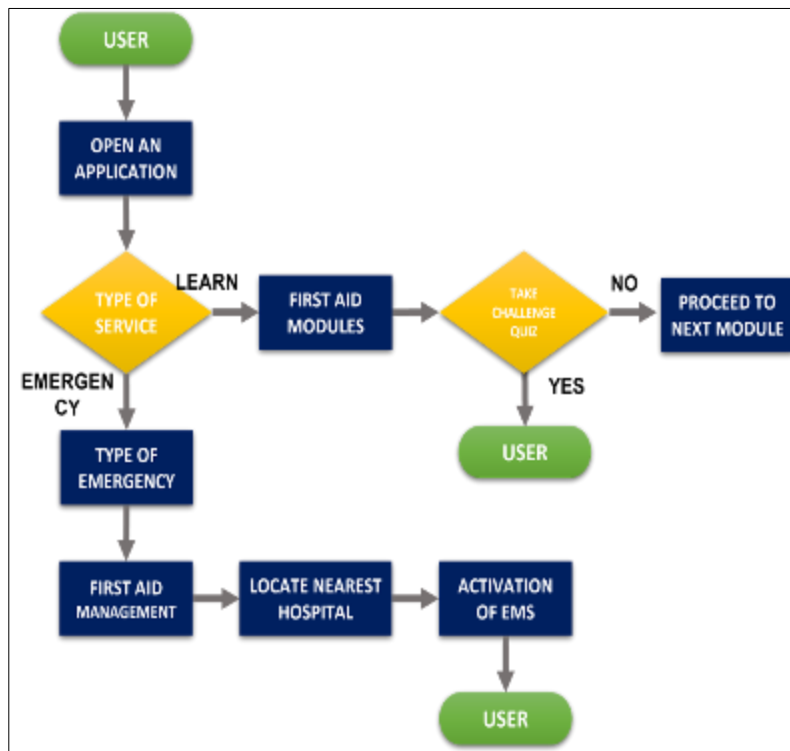


Figure 3 System Flowchart

The process shown in this diagram illustrates how the system operates. Oval shapes are used to denote the flowchart’s beginning and end points. Diamonds denote decision points where decisions are made based on specific conditions or criteria, while rectangles are used to represent specific actions or operations.

2.4. System Development

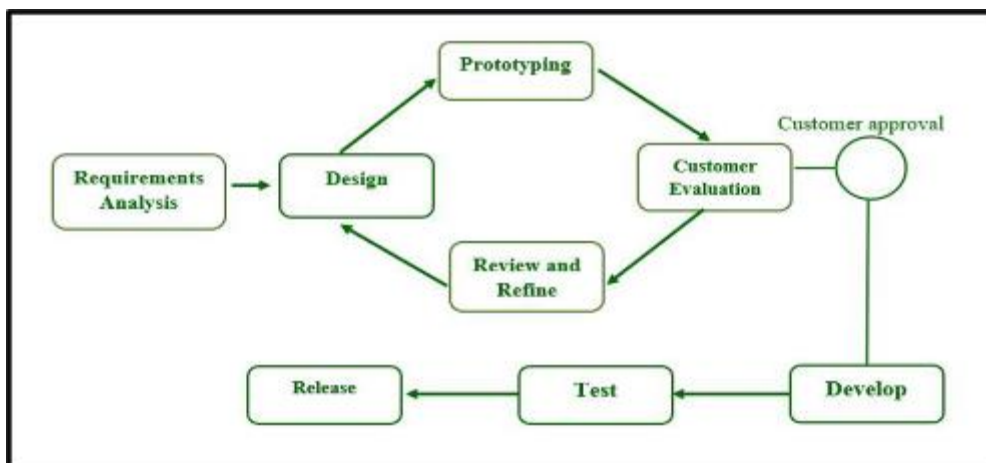


Figure 4 System Development Life Cycle Prototyping

This diagram demonstrates the entire procedure using the Prototype Model methodology. Requirement analysis is the first step in developing a prototyping model. During this phase, the system's desires are precisely defined. During the method, system users are interviewed to determine what they expect from the system. The second phase could consist of a preliminary design or a quick design. During this stage, the system's basic design is formed. However, it is not a complete design. It provides the user with a quick overview of the system. The rapid design aids in the development of the prototype. During this stage, an actual prototype is intended to support the knowledge gained from quick design. It is a small low-level working model of the desired system. The proposed system is presented to the client for preliminary testing at this stage. It is beneficial to investigate the performance model's strengths and weaknesses. Customer feedback and suggestions are gathered and forwarded to the developer. If the user is dissatisfied with the current model, you may want to improve the type that responds to user feedback and suggestions. When the user is satisfied with the upgraded model, a final system based on the approved final type is created. The final system was fully tested and distributed to production after it was developed to support the original version. To reduce downtime and prevent major failures, the programmer is run on a regular basis.

2.5. System Hardware and Software

Table 1 System Hardware Requirements

Hardware components	Minimum Requirements	Hardware Recommendation
RAM	8GB	8GB or above
CPU	Intel i5	I5 or above
Storage Device	1TB	1TB or above
Android Phone	Android 8	Android 8 or above

This are the hardware requirement needed to implement the system. The minimum recommendation for RAM is 8GB or it can be above more so the computer will perform your every need without experiencing big hit in performance. For CPU i5 or above is required because of the capabilities and better option for multi-tasking. Also, the Storage Device needed to be 1TB or above so you can store all the files for the Common Emergencies.

Table 2 System Software Requirements

Software Components	Software Application
Operating System	Windows 10
User Interface Designer	Android Studio
Software Language	Java

This are the software needed to implement the system effectively. With this specification of the computer like Window 10 is needed because most of the software or feature of this program are compatible to this Operating System. Android Studio is the software that needed for the system to create the interface for the mobile users and it uses Java language.

2.6. Instrumental Used

The researchers' primary method for gathering information and participant comments on first aid application for common emergencies was survey interviews. To explore several facts of first aid care procedures for common emergencies, a strategically constructed survey interview with a methodical series of questions was created. With the use of this instrument, the researchers were able to collect insightful information from a wide range of respondents, shining light on their viewpoints, experiences, and first aid methods for common emergencies. The survey interview makes it easier to acquire thorough data, viewpoints, and opinions regarding the difficulties, solutions, and best practices associated with various injury treatments and methods.

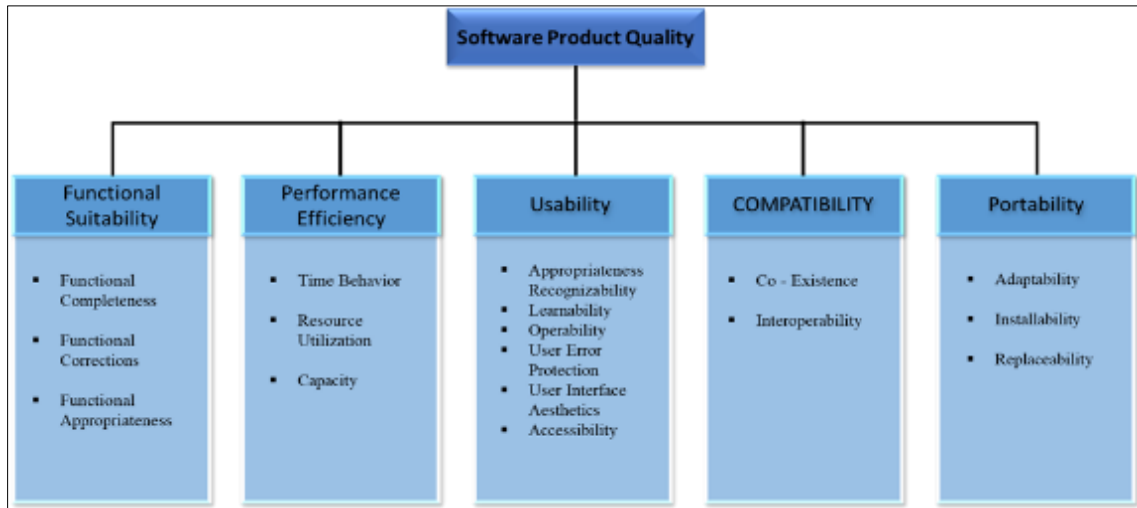


Figure 5 Software Product Quality

From this figure, it illustrates the software product quality wherein the quality is going to use on evaluation of the system. Functional Suitability, how will the system provide suitability to users. Performance Efficiency, to what extent will the system efficient on the users. Usability, what are the pros and cons of the system when it uses and run by the users. Compatibility, it shows how compatible is the system with regards on the needs of the users. And lastly, Portability shows how the system can be accessed by the users.

3. Results

The researchers delve into the findings of their extensive research in this section. and conduct a thorough examination of the data and findings. This section’s primary goal is to not only present the results but also to provide an in-depth interpretation. Data is gathered from a total of fifty (50) respondents, all of whom are residents of Caloocan City. The subjects are chosen at random process.

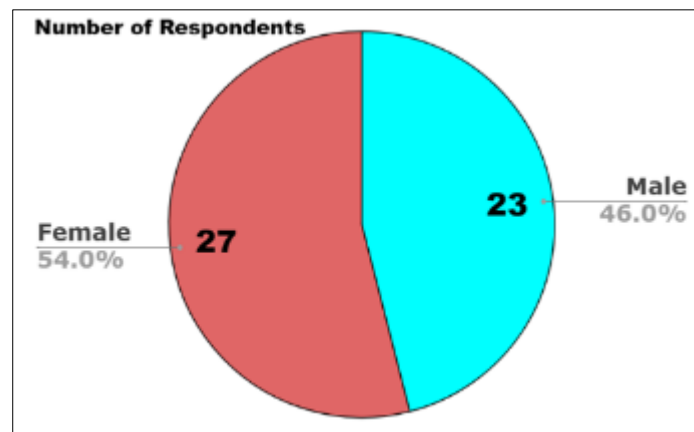


Figure 6 Demographic Profile of the Respondents According to its Gender.

Figure 6 depicts the demographic profile of the respondents by gender. The researchers were able to collect feedback from the chosen individuals in Caloocan City, with a total respondent of 23 or 46.0% male and 27 or 54.0% female.

3.1. Assessing the Mobile Application for Managing Common Emergencies in terms of Functional Suitability, Performance Efficiency, Usability, Compatibility, and Portability.

The ISO25010 evaluation model was used as a framework for the evaluation of the Mobile Application for Managing Common Emergencies. This evaluation considered functional suitability, performance efficiency, usability, compatibility, and other factors. Portability. The survey used a Likert Scale to evaluate the system. Respondents ranked their answers on a five-point scale using the questionnaire.

Table 3 Level of Satisfaction Verbal Interpretation

Scale	Range	Verbal Interpretation
5	4.21 – 5.00	Strongly Agree
4	3.41 – 4.20	Agree
3	2.61 – 3.40	Neutral
2	1.81 – 2.60	Disagree
1	1.00 – 1.80	Strongly Disagree

3.2. Evaluation of the Respondents according to ISO 25010 criteria;

Table 4 Respondents Evaluation According to Functional Suitability

Functional Suitability	1	2	3	4	5	W.M	Verbal Interpretation
Does the system provide knowledge and information about injury management?	0	2	8	15	25	4.26	Strongly Agree
Has the application been tested to ensure its dependability and ease of use?	1	0	11	19	19	4.1	Agree
Is the system’s emergency button appropriate for the environment it serves?	0	0	9	21	20	4.22	Strongly Agree
<i>Weighted Mean</i>						4.19	Agree

Table 4 depicts the respondent’s evaluation according to functional suitability of the Mobile Application for managing Common Emergencies. The average weighted mean for the Functional Suitability is 4.19 having a verbal interpretation of “Agree”.

Table 5 Respondents Evaluation According to Performance Efficiency

Performance Efficiency	1	2	3	4	5	W.M	Verbal Interpretation
When performing its functions, the application’s response and processing time meet requirements.	0	2	6	22	20	4.2	Agree
Application performance validation.	0	3	5	20	22	4.22	Strongly Agree
App performance under low memory conditions.	1	3	16	20	10	3.7	Neutral
<i>Weighted Mean</i>						4.04	Agree

Table 5 depicts the respondent’s evaluation according to performance efficiency of the Mobile Application for managing Common Emergencies. The average weighted mean for the Performance Efficiency is 4.04 having a verbal interpretation of “Agree”.

Table 6 depicts the respondent’s evaluation according to usability of the Mobile Application for managing Common Emergencies. The average weighted mean for the Usability is 4.31 having a verbal interpretation of “Strongly Agree”.

Table 6 Respondents Evaluation According to Usability

Usability	1	2	3	4	5	W.M	Verbal Interpretation
The application meets the needs of the user.	0	2	5	18	25	4.32	Strongly Agree
The application allows users to express themselves and learn more about first aid for various injuries.	0	1	9	8	32	4.42	Strongly Agree
The application is simple to use and control.	0	0	7	9	34	4.54	Strongly Agree
The application guards the user against making mistakes.	0	3	7	22	18	4.1	Agree
The application user interface allows the user to interact in a pleasant and satisfying manner.	0	1	8	23	18	4.16	Agree
Significant users can use the application.	0	1	8	14	27	4.34	Strongly Agree
<i>Weighted Mean</i>						4.31	Strongly Agree

Table 7 Respondents Evaluation According to Compatibility

Compatibility	1	2	3	4	5	W.M	Verbal Interpretation
Issues with resolution, image display, application cache, and performance across multiple devices	0	3	17	16	14	3.82	Agree
Testing the functionality of buttons and links across multiple devices and platforms	0	1	8	22	19	4.18	Agree
<i>Weighted Mean</i>						4	Agree

Table 7 depicts the respondent's evaluation according to compatibility of the Mobile Application for managing Common Emergencies. The average weighted mean for the Compatibility is 4 having a verbal interpretation of "Agree".

Table 8 Respondents Evaluation According to Portability

Portability	1	2	3	4	5	W.M	Verbal Interpretation
The application's functionality is simple to grasp.	0	0	8	19	23	4.3	Agree
The application can be downloaded and installed on an Android device.	0	0	6	16	28	4.44	Strongly Agree
Is the app's user interface consistent, visible, and accessible across different screen sizes?	0	1	6	13	30	4.44	Strongly Agree
<i>Weighted Mean</i>						4.39	Strongly Agree

Table 8 depicts the respondent's evaluation according to portability of the Mobile Application for managing Common Emergencies. The average weighted mean for the Portability is 4.39 having a verbal interpretation of "Strongly Agree".

3.3. Overall Evaluation

Table 9 shows the respondents summary of evaluation according to ISO25010 criteria. The average weighted mean for Function Suitability is 4.19 having a verbal interpretation of "Agree", for Performance Efficiency is 4.04 having a verbal interpretation of "Agree". The rating for Usability is 4.31, indicating a "Strongly Agree" level of satisfaction, Compatibility

has 4 that corresponds to a verbal interpretation of “Agree”, and lastly the Portability that has 4.39 weighted mean having a verbal interpretation of “Agree”.

Table 9 Respondents Evaluation of Distributions to Respondents According to ISO25010 criteria

ISO 25010	Weighted Mean	Verbal Interpretation
Functional Suitability	4.19	Agree
Performance Efficiency	4.04	Agree
Usability	4.31	Strongly Agree
Compatibility	4	Agree
Portability	4.39	Strongly Agree
<i>General Weighted Mean</i>	<i>4.18</i>	<i>Agree</i>

3.4. Confusion Matrix Using WEKA

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Classifier output

=== Classifier model (full training set) ===

J48 pruned tree
-----
Accessibility <= 3: strongly agree (3.0)
Accessibility > 3
| Capacity <= 3: agree (4.0)
| Capacity > 3
| | Appropriateness Recognizability <= 4: strongly agree (6.0/1.0)
| | Appropriateness Recognizability > 4
| | | ID <= 10: strongly agree (2.0/1.0)
| | | ID > 10: agree (2.0)

Number of Leaves :    5
Size of the tree :    9

Time taken to build model: 0 seconds

=== Evaluation on training set ===

Time taken to test model on training data: 0 seconds

=== Summary ===

Correctly Classified Instances      15      88.2353 %
Incorrectly Classified Instances     2      11.7647 %
Kappa statistic                    0.7703
Mean absolute error                 0.1046
Root mean squared error            0.2287
Relative absolute error            27.7778 %
Root relative squared error        53.4332 %
Total Number of Instances          17
Ignored Class Unknown Instances     33

=== Detailed Accuracy By Class ===

          TP Rate  FP Rate  Precision  Recall  F-Measure  MCC   ROC Area  PRC Area  Class
          1.000   0.250   0.818     1.000   0.900     0.783  0.820   0.379   strongly agree
          0.857   0.000   1.000     0.857   0.923     0.883  0.691   0.209   agree
          0.000   0.000   ?         0.000   ?         ?       0.990   0.500   neutral
Weighted Avg.   0.882   0.132   ?         0.882   ?         ?       0.777   0.316

=== Confusion Matrix ===

 a b c  <-- classified as
 9 0 0 | a = strongly agree
 1 6 0 | b = agree
    
```

Figure 7 Confusion Matrix

Table 10 Displays how the application’s effectiveness and dependability to users.

EVALUATION (ISO 25010)							
Functional Stability	SD	D	N	A	SA	Sub - Characters	Overall Weighted Mean
Q1	0	2	8	15	25	Functional Completeness	4.19
Q2	1	0	11	19	19	Functional Correctness	
Q3	0	0	9	21	20	Functional Appropriateness	
Performance Efficiency	SD	D	N	A	SA	Sub - Characters	Overall Weighted Mean
Q4	0	2	6	22	20	Time Behavior	4.04
Q5	0	3	5	20	22	Resource Utilization	
Q6	1	3	16	20	10	Capacity	
Usability	SD	D	N	A	SA	Sub - Characters	Overall Weighted Mean
Q7	0	2	5	18	25	Appropriateness Recognizability	4.31
Q8	0	1	9	8	32	Learnability	
Q9	0	0	7	9	34	Operability	
Q10	0	3	7	22	18	User Error Protection	
Q11	0	1	8	23	18	User Interface Aesthetics	
Q12	0	1	8	14	27	Accessibility	
Compatibility	SD	D	N	A	SA	Sub - Characters	Overall Weighted Mean
Q13	0	3	17	16	14	Co - Existence	4
Q14	0	1	8	22	19	Interoperability	
Portability	SD	D	N	A	SA	Sub - Characters	Overall Weighted Mean
Q15	0	0	8	19	23	Adaptability	4.39
Q16	0	0	6	16	28	Install ability	
Q17	0	1	6	13	30	Replaceability	

4. Conclusion

In summary, the study has successfully demonstrated the efficacy of a mobile application designed for managing common emergencies, offering a streamlined and accessible solution for users. The findings reveal a significant improvement in response times, coordination, and overall effectiveness in handling various emergency scenarios. This innovation holds immense promise for society, presenting a scalable and user-friendly tool that can enhance community resilience and emergency preparedness. As we move forward, widespread adoption of this mobile application, coupled with continuous refinement based on user feedback and technological advancements, promises to redefine the landscape of emergency management, ultimately contributing to safer and more secure communities.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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