

Original Research Paper

Web Based Expert System in Area & Land Value Calculation and Faraid Distribution

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Abstract: E-FaraidTanah is a web-based expert system that can help Muslims better understand Islamic Inheritance Law and calculates land distribution based on Faraid law. The main goal of this project is to develop the E-FaraidTanah prototype and to evaluate the user satisfaction. The methodology use throughout this project is an iterative and incremental model which offers the advantage of allowing the project improvement in a step-by-step basis. Hence, it is much easier to control risk and track errors at an early stage. E-FaraidTanah has been analyze based on usability testing through an online survey involving Muslim university students that measures percentages. Findings indicate that 82% of 30 respondents agreed that E-FaraidTanah performed well in terms of efficacy and efficiency. Thus, it is beneficial to assist society awareness on how Faraid property is divided and calculated.

Keywords: Expert System, Faraidh, Iterative and Incremental Model.



1. Introduction

Faraid knowledge is the knowledge of the distribution of net inheritance to each heir who is entitled to know the method of calculation and management and understand the concept of correct and perfect distribution [1]. The law of studying the science of Faraid is Fardhu Kifayah, and the rule of carrying out the science of Faraid on the estate of the deceased is Fardhu Ain. It is an absolute decree from Allah SWT and cannot be changed or run away from the law. Allah SWT says in Al-Anfal 8:7,

"And (remember) when Allah promised you one of the two armies, to be for you (facing it), while you wish (the forces of trade) were not the forces (of war) that have the power made for you (face it). But Allah intends to establish the truth by His Words and eradicate the disbelieving folk."

An expert system is a computer program or information system that contains some knowledge from one or more human experts related to a field that tends to be specific. The question expert has expertise in their areas, such as doctors, psychologists, mechanics, etc. [2]. Expert systems can recommend a series of user actions or behaviours to be able to run a correct and accurate method of corrections. Where the system also leverages the ability of the reasoning process to be able to draw conclusions based on existing data and facts.

Property acquired through the division of inheritance can ensure one's future survival. Therefore, Muslims ensure that human rights are passed down from generation to generation. Allah SWT says in Al-Nisa '4: 7:

"For men is a share of what the parents and close relatives leave, and for women is a share of what the parents and close relatives leave, be it little or much - an obligatory share."

This frozen inheritance should not happen because Islam has prescribed the method of division of the estate, which is the law of Faraid. Faraid is a method of division of inheritance in which this division has been determined from the point of view of the heir and his rights. Faraid also gave female heirs and mother's rights, which were denied their rights before the advent of Islam [3].

This study introduces e-FaraidTanah, developing an expert system to calculate Faraid property, especially land value, through the size of land area. This study aims to apply an expert system for Islamic inheritance law based on the rules of the Quran and the four Madhhab, where inheritance is one of the most critical areas in family law [4]. This can facilitate the heritage to examine and understand the concept of division of property and know the value of division among family inheritance.

2. Literature Review

2.1. Expert System

Alaa & Samy [5] stated that expert systems are a life development and massive development of computer technology; humans have become dependent on widely used computer applications in most fields, especially those that rely on accounts and require great speed and data is very complex for the human mind to deal with. One of the essential application-oriented disciplines of artificial intelligence is expert systems. In the beginning, specialist system development is in health and business application [4] [6]. An expert system is a program that advises applying the law in a particular direction for problem users. Expert systems are not programmed to follow procedures, as in the programming tradition. Still, they are designed to solve complex problems through the inference of knowledge, like a human expert. Expert systems are used to solve many issues such as decision-making and financial planning, diagnosing diseases, and matters of Islamic law such as appreciation of Zakat and Faraid, which are all required from human experience.

Faraid is based on the Al-Quran, Al-Sunnah, the consensus of the Prophet's companions and their Ijtihad, making a legal decision by independent interpretation of the Al- Quran legal sources and the Sunnah. The desire to learn and understand Islamic inheritance jurisprudence stems from a desire to identify whether a person is an heir or heirs, identify parts of shares to which each beneficiary is entitled to the estate, and the calculation which may serve to reward any part or beneficiaries through the method of analysis [7] [8].

2.2. Problems Faced By Muslims in Malaysia

Muslims will only learn the knowledge when a person dies, and the deceased person's property must be distributed among the heirs [9]. This should not happen because it will cause a lot of problems. These cases occurred because family members and heirs were unaware of the Faraid law [10]. They were unsure whether they were the rightful owner of the property. They also had no idea how much money they could make from the property. All their confusion grew worse when they didn't know where to turn or who to ask. As a result, they will simply ignore the problems, contributing to the growth of unresolved cases [11].

2.3. Equivalent System Studies

The similarity in behaviour of a component or feature of two different systems is referred to as system equivalence [12]. Equivalent systems can be thought of as working models for one another. This equivalent system analysis aids in understanding the complex operation of systems, lowering the risk factor in implementing newly designed products. Equivalent systems analysis reduces large, complex, and expensive systems to a compact, simple, and less expensive system [13].

2.3.1. Mais e-Faraid

MAIS has created the MAIS e-Faraid System, which represents a paradigm change. This system, which is the first of its sort, was designed by the State Islamic Religious Council to include [14]:

1. Online estate management services.
2. Faraid calculation calculator.
3. File management and reporting for managing officers.

Figure 1. Mais e-Faraid

This system will provide various benefits and benefits to all Muslims and educate the community to divide inheritance according to Islamic law [15].

2.3.2. Sistem Maklumat Faraid

The University of Science Malaysia (USM) has created a website on Islamic inheritance law. The system is a computerized solution to the Faraid management system, which is a method of dividing the deceased's property inheritance among the immediate family and relatives according to Islamic law developed by the department of mathematics at the University Sains Malaysia.

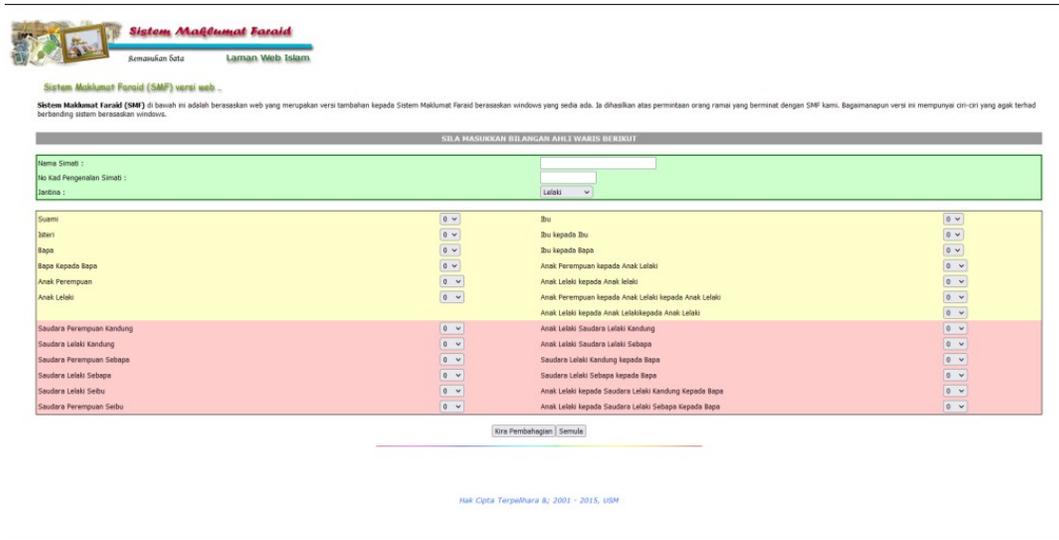


Figure 2. USM – Sistem Maklumat Faraid

The web-based Faraid Information System (SMF) extends the current windows-based Faraid Information System. It was created in response to the public interest in the development system. However, as compared to Windows-based PCs, this version offers fewer functions.

3. Methodology

The Iterative and Incremental Method was chosen for this study. The benefits of iterative and incremental development allow for gradual product improvement [16]. As a result, it is easier to control risk and identify errors early. This avoids the downward flow of the defects. Furthermore, with an iterative model, less effort is spent documenting and more time on design. Because of the regularity in which new increments are developed, the model's flexibility makes the project simple to implement at a low cost. As a result, the iterative and incremental methodology saves time. Figure 3 shows the iterative model. This model follows eight main phases: information gathering (analysis), design, prototype, review, development, implementation, testing, and maintenance.

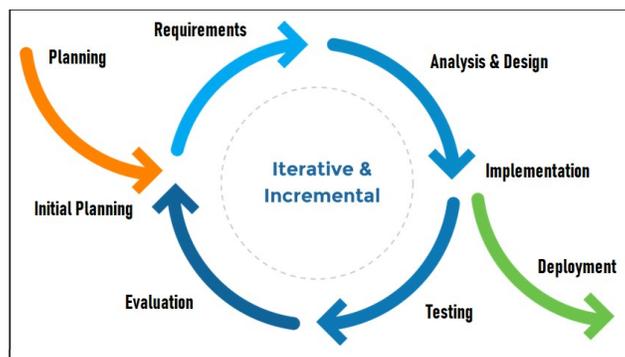


Figure 3. Iterative and Incremental Model

The E-FaraidTanah system is split into three parts. Figure 4 illustrates the E-FaraidTanah system architecture and the E-FaraidTanah system module. To develop and design the system, the E-FaraidTanah system makes use of Sublime Text 3 and Firefox. The language that uses in this system is HTML, JavaScript and CSS.

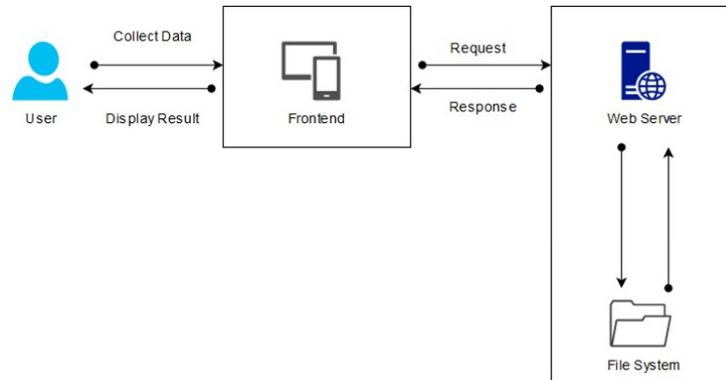


Figure 4. System Architecture for E-FaraidTanah

4. Finding and Discussion

4.1. Interface

This is the system's primary screen. The user can view all Faraid's information. The main screen also has a "Menu" button that users can use to obtain new system information.



Figure 5 Main Page Interface

4.2. Respondents

The gender of the respondents who took part in research questionnaire is 60% male and 40% female. While the responder age group with the largest percentage for this category is 21-29 years old (71%). However, the lowest rate is among those above the age of 30. The ratio of people aged 18 to 20 is 23%.

The quantitative method was applied for evaluation, and this questionnaire was delivered to 50 respondents. The questionnaire has ten questions designed to assess the usefulness of the E-FaraidTanah system. Each question has a scalar value of 1 for completely disagree, 2 for disagree, 3 for neutral, 4 for agree, and 5 for strongly agree. This scalar will result in an imperfect mapping of the response dimension onto the underlying construct of interest, resulting in a more complex cognitive response process. The researcher is utilizing 1 to 5 scalars to prevent respondents from becoming confused while selecting a scalar. Table 1 displays the results of the scalars selected by respondents.

Table 1. Respondent Feedback

No	Question	Totally Disagree	Disagree	Neutral	Agree	Totally Agree
1	I feel comfortable using this system	0	0	1	5	24
2	It was simple to use this system	0	0	0	0	30
3	It was easy to learn use this system	0	0	0	0	30
4	The interface of this system is pleasant	0	4	22	4	0
5	The organization of information on the system interface was clear	0	0	3	21	6
6	Easy to use and straightforward	0	0	0	0	30
7	It was easy to find information	0	0	0	5	25
8	The system has all the functionand capabilities I expect it to have	0	0	7	15	8
9	Overall, I am satisfied with how easy it to use this system	0	0	0	4	26
10	Overall, I am satisfied with this system	0	0	15	12	3

4.3. Evaluation of Acceptability

Based on Table 1, it shows the comfortability of the users using E-FaraidTanah system. They are 80% respondents totally agree and 17% respondents agree and 3% respondents neutral that they are comfortable using the E-FaraidTanah system. The result shows the respondent comfortable when using E-FaraidTanah system. 100% respondents totally agree with the statement of using E-FaraidTanah system is simple to use. They are 13% respondents agree and 74% respondents agree, and 13% respondents disagree with the statement of the interface of this system is pleasant. 87% of respondents totally agree and 13% respondents agree with the statement of E-FaraidTanah System is easy to use. They are 10% respondents totally agree, 35% respondents agree and 55% respondents agree. The result shows the respondent agrees that they are satisfied with the E-FaraidTanah System.

4.3. Evaluation of Usability

Based on Table 1, it shows that 100% of respondents totally agree with the statement of using E-FaraidTanah system is easy to learn using the application. They are 20% respondents totally agree and 70% respondents agree and only 10% respondents neutral with the statement of the organization of information in the E-FaraidTanah system interface was clear. They are 100% respondents totally agree with the statement of E-FaraidTanah system is easy and straightforward. They are 83% respondents totally agree and 17% respondents agree with the statement of E-FaraidTanah system is easy to find information. They are 26% respondents totally agree and 50% respondents agree and only 24% respondents neutral with the statement of the E-FaraidTanah system has all the functions and capabilities the user expects to have.

5. Conclusion

The E-FaraidTanah System is a different system that Muslims can utilise to learn about Islamic Inheritance Law, also known as Faraid Law. Using the proposed system, every Muslim anywhere in the world can simply calculate his or her share of the money left behind by the decedent according to the laws of Faraid in Islam. This online calculation system allows the user to allocate the wealth among all users as well as those who have rights or are entitled to a piece of the wealth. This system encounters some issues during the prototype phase. The application also has search limitations, as it can only handle web browsers with 16:9 device resolution. The UI will alter when we run the system on a smartphone. This application can only be accessed via the web platform.

The expert system for Islamic Inheritance Laws will be able to tackle the previously described challenges because it contains functions that correspond to the system development objectives. As a result, it is hoped that such a system will lead to a greater usage of expert systems in the subject of Islamic Jurisprudence.

Aside from that, the existence of the E-FaraidTanah system will serve as an excellent platform for elevating this technology and expanding its applications throughout the Muslim world. It could serve as the foundation for the development of new Islamic-based technology.

Nonetheless, in order to attain those goals and use this technology in the Muslim world, a study on Muslims' approval of both of these technologies must first be conducted. The research will be conducted in a Muslim-sensitive environment. It is also critical to consult with Muslim scholars and adhere to Islamic regulations.

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