

# Searching and Displaying Al-Quran Verses from All Derivative Isim Makrifat Words to Support the Quranpedia Project

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**Abstract**—Quranpedia is a website built to facilitate its users in searching for root words and verses containing the exact root words by following the structure of Wikipedia. This research employs the black box testing method to assess the functionality of the Quranpedia website. The results of the black box testing indicate that the website achieves a success rate of 94%, with an intuitive interface that aligns with the presentation of the Al-Quran. Additionally, this study involves root word testing to evaluate the accuracy of the search results for Quranic verses that share the exact root words. From these tests, an accuracy level of 85% is obtained. The findings of this research demonstrate that Quranpedia successfully fulfills its primary goal by providing a reliable and comprehensive reference source for the Muslim community. With an engaging interface and an ongoing commitment to improving accuracy, Quranpedia is expected to assist the Muslim community in deepening their understanding and appreciation of the sacred book, the Al-Quran.

**Keywords:** Root Words; Quranpedia; Al-Quran; Codeigniter 4; Black Box Testing

## 1. INTRODUCTION

The Quran is a holy book for Muslims containing Allah SWT revelations[1]. A critical aspect of studying the Quran is understanding each word's meaning in the holy book[2]. In Arabic, there is a concept called "derivatif isim makrifat," which refers to words that have the same root and are interconnected in meaning[3]. Understanding the relationship between words with the same root can help comprehend the concepts and contexts of the verses in the Quran[4].

A crucial aspect of understanding and extracting wisdom from the Quran is the comprehension of the meanings of each word in the holy book[5]. In the Arabic language, which is the original language of the Quran, there is a concept called "derivatif isim makrifat," referring to words that have the same root and are interconnected in meaning[6]. Understanding the relationship between words with the same root can lead to a deeper and more accurate understanding of the concepts and contexts of the Quranic verses.

In the Arabic language, there is also a field of study called "ilmu tasrif," which deals with the transformation of words into other words[7][8]. Similar to the use of affixes in the Indonesian language to change the forms of words, in Arabic, finding a word's meaning involves understanding its root before searching for its definition in a dictionary[9]. For example, when searching for the meaning of a word in Arabic, not all words can be directly found in a dictionary; instead, one must first know the root of that word. This process is similar to searching for words in the Indonesian language, where the word "menerangkan" must be recognized as the base word "terang" before looking for its meaning. While this may be easy for Indonesian speakers, it can be more challenging for foreigners to learn the language[10][11].

Regarding root words, Arabic words generally have a three-consonant base[1]. Six forms of words can be derived from these three consonants, and all of them have meanings[12]. Differences in pronunciation will lead to differences in meaning[13]. The uniqueness of the Arabic language is also evident in numbers (mufrad, muthanna, and jama<sup>‘</sup>), gender (mudhakkar and mu<sup>‘</sup>annath), and other aspects[10][14].

Based on this understanding, there is a need for the Quranpedia website, which not only displays complete Quranic verses but also provides ease in finding words based on their root (derivative isim makrifat). Through Quranpedia, users, especially Muslims, will have a holistic and integrated learning experience. They can understand the meanings of words in the Quran more deeply, explore the concepts and contexts of the verses, and obtain relevant explanations from the Quranic verses in line with the hadiths of Kutubus Sittah.

Quranpedia is a website project built using the CodeIgniter 4 framework. The website aims to provide easy access for users to learn the Quran interactively. One of the features to be developed in Quranpedia is the ability to search and display Quranic verses based on words with the same root (derivative isim makrifat). Users can click on words in the Quran and get their roots and display every verse containing the exact root words.

This study applies the Extreme Programming (XP) method to provide solutions for overcoming current issues by developing a website-based system[15]. XP is a user-oriented method and falls under the Agile method category[16]. In the system design, XP adopts four stages: Planning, Design, Coding, and Testing[17]. Previous studies have shown that XP is suitable for designing Information Systems that are simple and recognized as a fast and efficient method in designing Information Systems[18][19]. Through the application of XP, this study aims to provide practical and valuable solutions to address current challenges and build a website system that functions optimally and meets user needs.

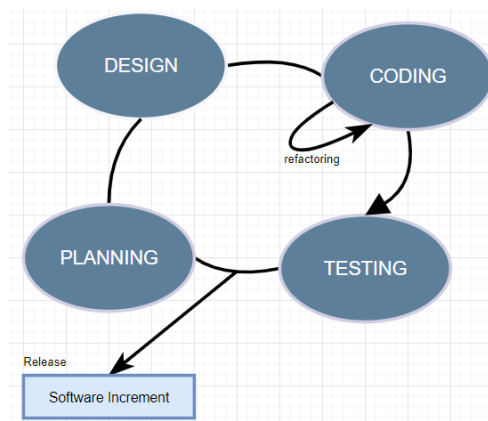
Testing and validating the system are essential steps in Quranpedia development. Black box testing will be conducted to ensure that the search feature and the display of Quranic verses function well as expected. This testing process will identify and address potential issues or bugs in the system[20], ensuring that Quranpedia operates optimally and provides a good user experience.

Through this research, it is expected to build the Quranpedia website that aligns with the appearance of the Quran and displays all Quranic verses containing the exact root words. Thus, Quranpedia will become a comprehensive, interactive, and easily accessible source of knowledge for Muslims to understand and explore the wisdom of the holy book, the Quran.

## 2. RESEARCH METHODOLOGY

### 2.1 Software Development Methods

In designing the Quranpedia system based on a website, the researchers implemented the Extreme Programming (XP) method. The stages of the Extreme Programming method are shown in the following Figure 1.



**Figure 1.** Extreme Programming

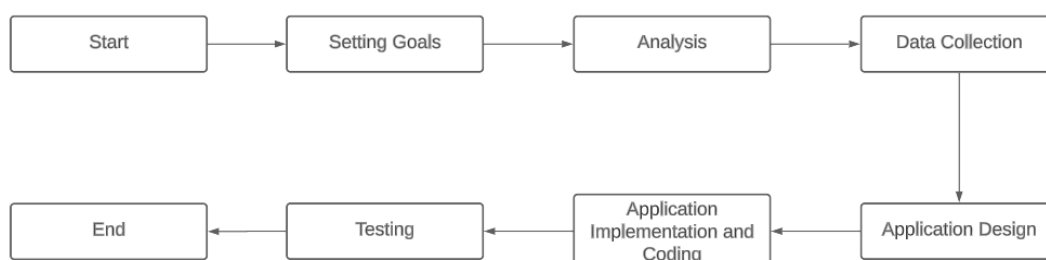
There are 4 stages that must be passed in the software development process using the Extreme Programming (XP) method, namely:

- a. **Planning**  
The planning phase involves setting key objectives, analysis, data collection, application design, application implementation coding and testing.
- b. **Design**  
In the design phase, an interface similar to the Quran will be designed, the content organization will be done, and a responsive layout will be designed to access the website from various devices. The researchers will use the Unified Modeling Language (UML) approach, specifically the activity diagram.
- c. **Coding**  
In the coding phase, the front-end and back-end development of the website will be carried out using web programming languages such as PHP, HTML, CSS, JavaScript and integrating Quranic data from the source <https://tanzil.net/>.
- d. **Testing**  
In the testing phase, functional testing will be conducted to ensure all features work correctly using black box testing method, root word testing to assess the accuracy of search results, and responsive testing to ensure proper display on various devices.

## 3. RESULT AND DISCUSSION

### 3.1 Planning

The research planning in this study consists of several stages or steps outlined in a structured manner. The research planning is illustrated in Figure 2.



**Figure 2.** Planning

**a. Setting Goals**

The design process begins by setting clear goals for the Quranpedia project. These goals will guide the application development, ensuring the project's focus and direction align with user needs. In this context, the goal is to create a feature for searching and displaying Quranic verses based on derivational morphemes, to support understanding of the Quran.

**b. Analysis**

In the analysis phase, the project team will identify the needs and requirements of the application from stakeholders. This analysis includes understanding the problems to be addressed, functional and non-functional requirements, and the application's environment and context. The results of this analysis will help design relevant and user-oriented features.

**c. Data Collection**

Relevant data related to derivational morphemes in the Quranic verses will be collected in this phase. This data may include lists of root words, relationships between words, and related references. Data collection is essential to ensure that Quranpedia provides accurate information in line with the context of the Quran.

**d. Applications Design**

The application design is carried out after the data collection. The project team will design the structure and architecture of the application, including user interface design, database design, and system logic. This design includes how the features for searching and displaying verses based on derivational morphemes will be implemented in the application.

**e. Implementation and Application Coding**

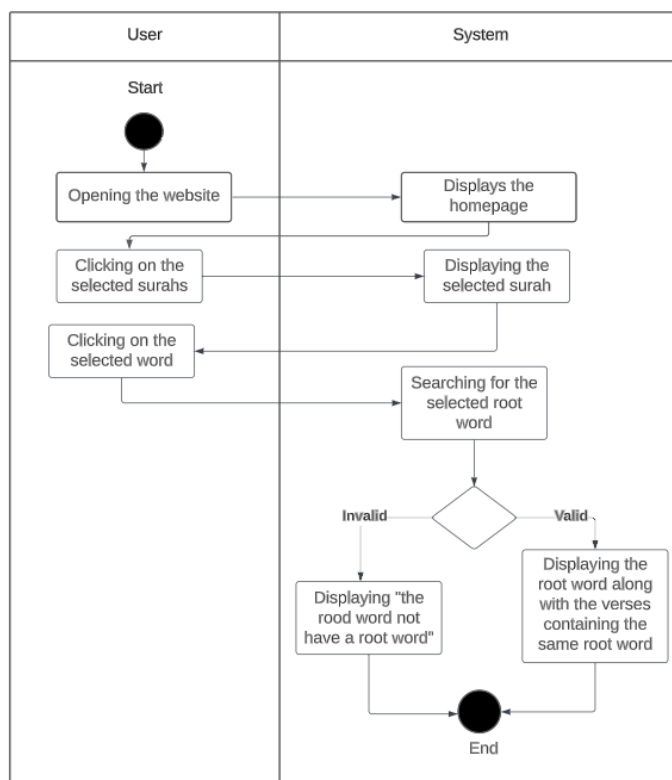
After the design is completed, the implementation phase begins. The development team will transform the design into working code. This coding process involves developing application features, integrating with the database, and arranging the application workflow based on the previously made design.

**f. Testing**

Once the application is implemented, testing is conducted to ensure the performance and accuracy of the search and verse display features. Functional testing is then done to verify that the application functions according to the set goals and is safe for users.

**3.2 Design**

**a. Activity Diagram**



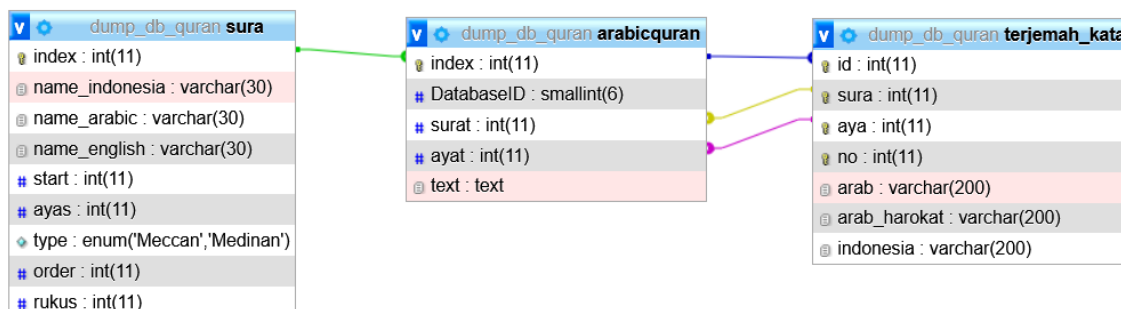
**Figure 3.** Activity Diagram

The design shown in Figure 3 provides an overall overview of the steps to be followed in searching for root words in Quranpedia. Starting from identifying the word whose root word is to be searched, through an intuitive user interface,

to data processing and presenting the search results with a layout in accordance with the Quran. The design also includes validation and testing processes to ensure the accuracy and reliability of the displayed root word results to users.

**b. Entity Relationship Diagram**

Before designing the database, the researcher created an Entity Relationship Diagram (ERD) consisting of entities and necessary attributes and connected them with other entities.



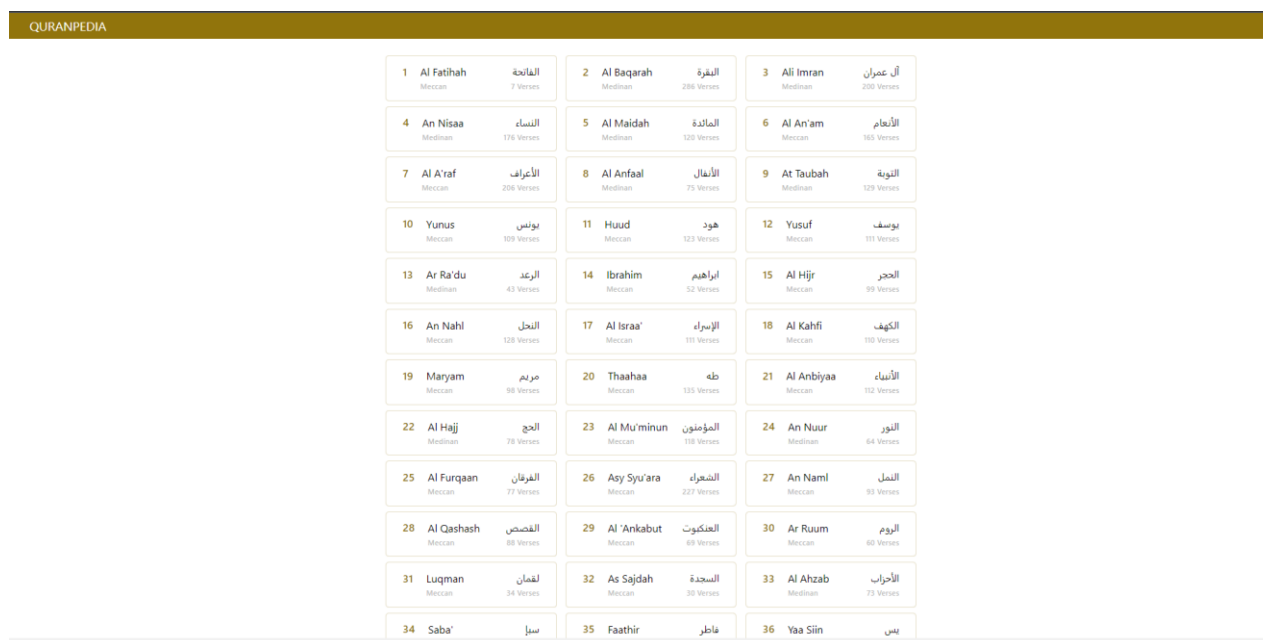
**Figure 4.** Entity Relationship Diagram

**3.3 Coding**

The coding stage involves implementing the design into programming code. The following is the result of the coding stage.

**a. Homepage Display**

This page plays a central role as the starting point for users to navigate and select the list of Quranic surahs they want to study and explore. With an attractive and intuitive design, Quranpedia's homepage provides users with an overview of the contents of the Quran and easy access to each surah available. Users can easily choose specific surahs that interest them or want to study further. Thus, this homepage functions as the main gateway for users to explore the Quran through Quranpedia and plays a crucial role in providing users with an optimal experience and a better understanding of the sacred messages within the Quran.



**Figure 5.** Homepage Display

**b. Surah Display**

The page displaying the surahs in Quranpedia is a crucial part of the interactive experience provided to users. This page offers users a unique ability to explore and delve deeper into each Quranic surah. On this page, users are granted easy access to click on the root words of every Quranic verse.

With a clear and intuitive interface, users can select their interested surah and directly click on words within the Quranic verses to obtain information about their root words. This enables users to track and understand the relationships between words that share the same root in the Quran, thereby deepening their understanding of the Arabic language and the meanings contained within this sacred scripture.

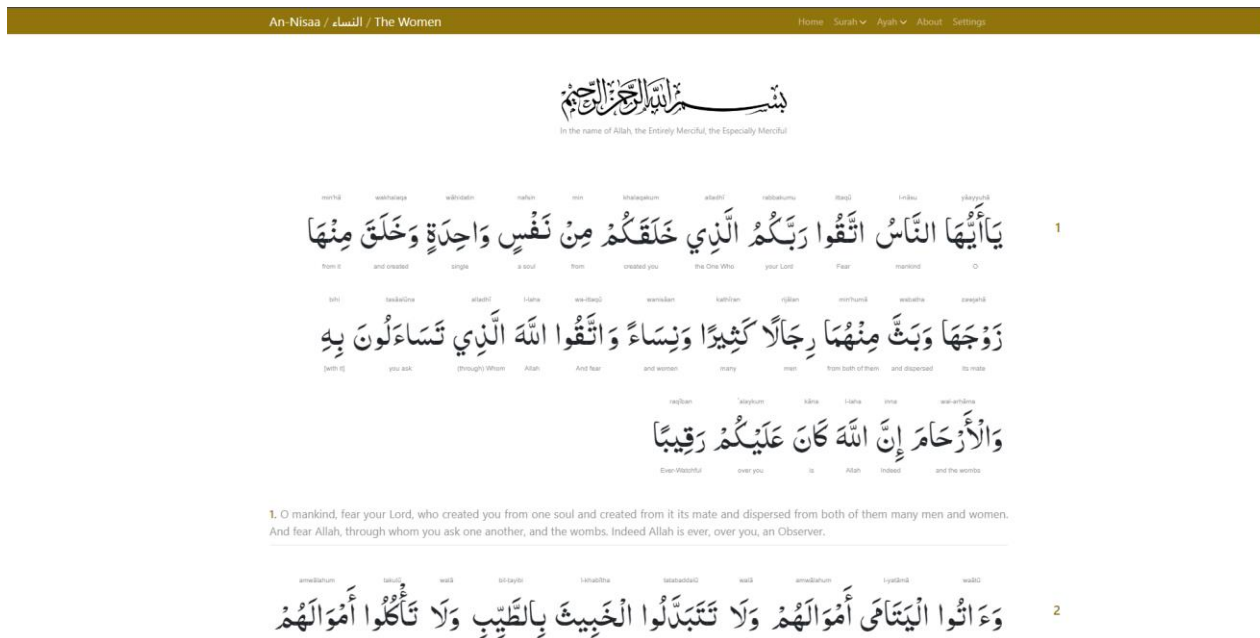


Figure 6. Surah Display

c. Root Word Display

The root words page in Quranpedia plays a crucial role in facilitating users to gain a more comprehensive understanding of the root word they have clicked on the previous page.

This root words page is specially designed to provide users with in-depth information about the selected root word. On this page, users can explore all the words that share the same root as the word they clicked on earlier. Each word that shares the same root is presented completely, allowing users to delve into the intricacies and nuances of these related words.

Through this page, users can enhance their knowledge and grasp of the Arabic language and its structure by exploring the various words derived from the same root. This feature empowers users to study the connections and meanings of these words, contributing to a deeper and more insightful comprehension of the Quranic text.

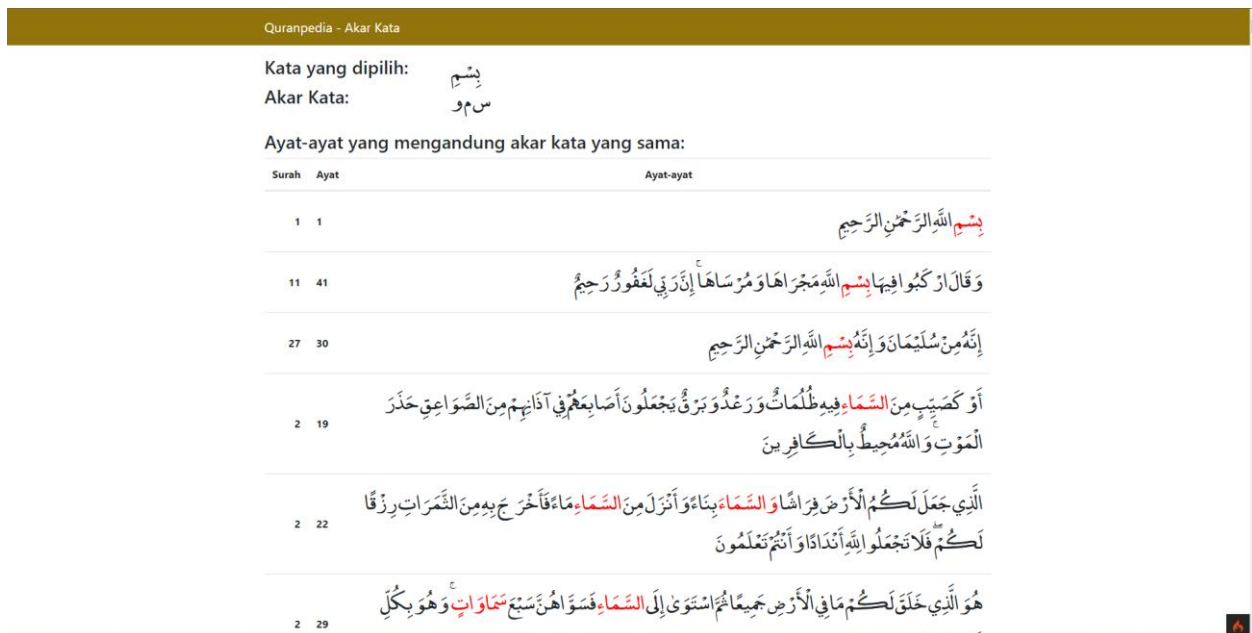


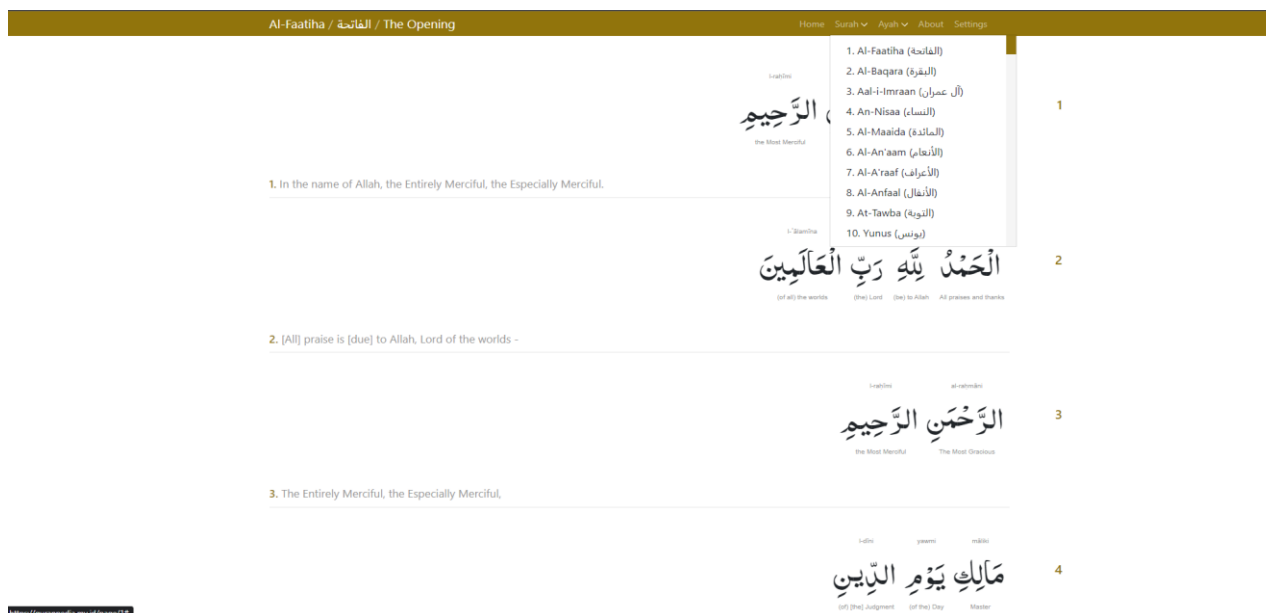
Figure 7. Root Word Display

d. Surah Search Naviganiton Display

The search navigation interface in Quranpedia provides users with ease and speed in finding the specific surahs of the Quran they wish to view.

This navigation page is designed to be intuitive and efficient, enabling users to switch between different surahs quickly. On this page, users can utilize the search function based on surah names and sequential numbers, allowing them to scroll through the list of surahs swiftly.

This search navigation feature allows users to quickly access the desired surah, saving time and enhancing their browsing experience on Quranpedia. The intuitive design and efficient search capabilities contribute to a seamless and user-friendly exploration of the Quranic surahs within the website.



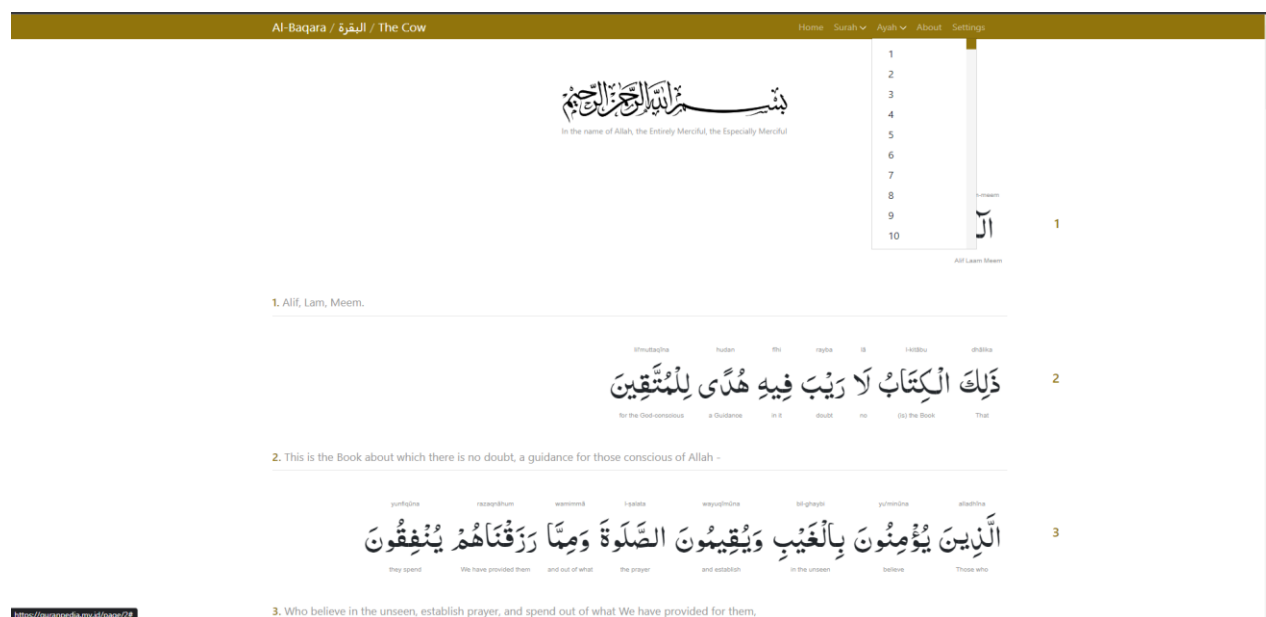
**Figure 8.** Surah Search Naviganiton Display

e. Ayah Search Navigation Display

The search navigation interface in Quranpedia provides users with ease and speed in finding the specific verses of the Quran they wish to view.

This navigation page is designed with an intuitive and efficient interface, enabling users to switch between different verses quickly. Users can utilize various search options and features on this page to easily find the desired verses. They can perform searches based on sequential verse numbers, allowing them to scroll through the list of verses swiftly.

This search navigation feature lets users quickly access the desired verses, enhancing their browsing experience on Quranpedia. The intuitive design and efficient search capabilities contribute to a seamless and user-friendly exploration of the Quranic verses within the website.



**Figure 9.** Ayah Search Navigation Display

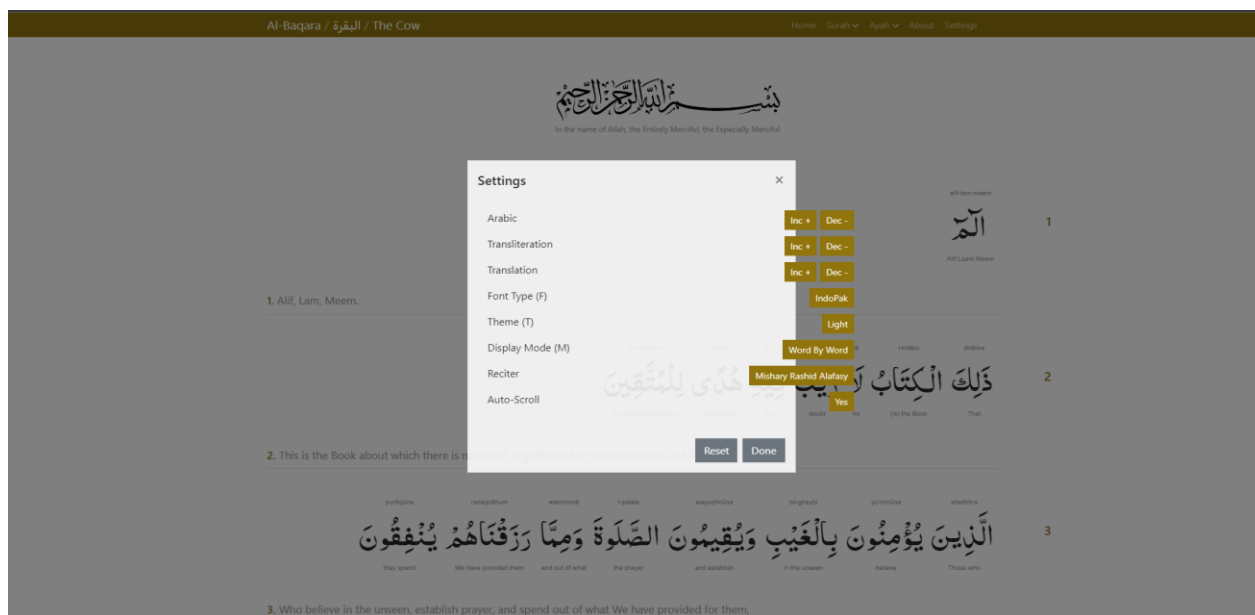
f. Settings Display

The settings page in Quranpedia allows users to customize various preferences and settings that affect the display and reading of the Quranic text.

This settings page offers flexibility for users to adjust and tailor the display of the Quranic text according to their personal preferences. On this page, users are given full control to enlarge or shrink the size of the Arabic script, choose

between word-by-word translation or translation by surah, change the Arabic font style, switch to Dark Mode for a darker color scheme, and select between word-by-word view or normal view.

By offering these customization options, Quranpedia ensures that users can have a personalized and comfortable reading experience when exploring the Quran. The user-friendly design of the settings page empowers users to adapt the display and settings according to their individual preferences, enhancing their interaction with the sacred text and making their Quranic journey more enjoyable and meaningful.



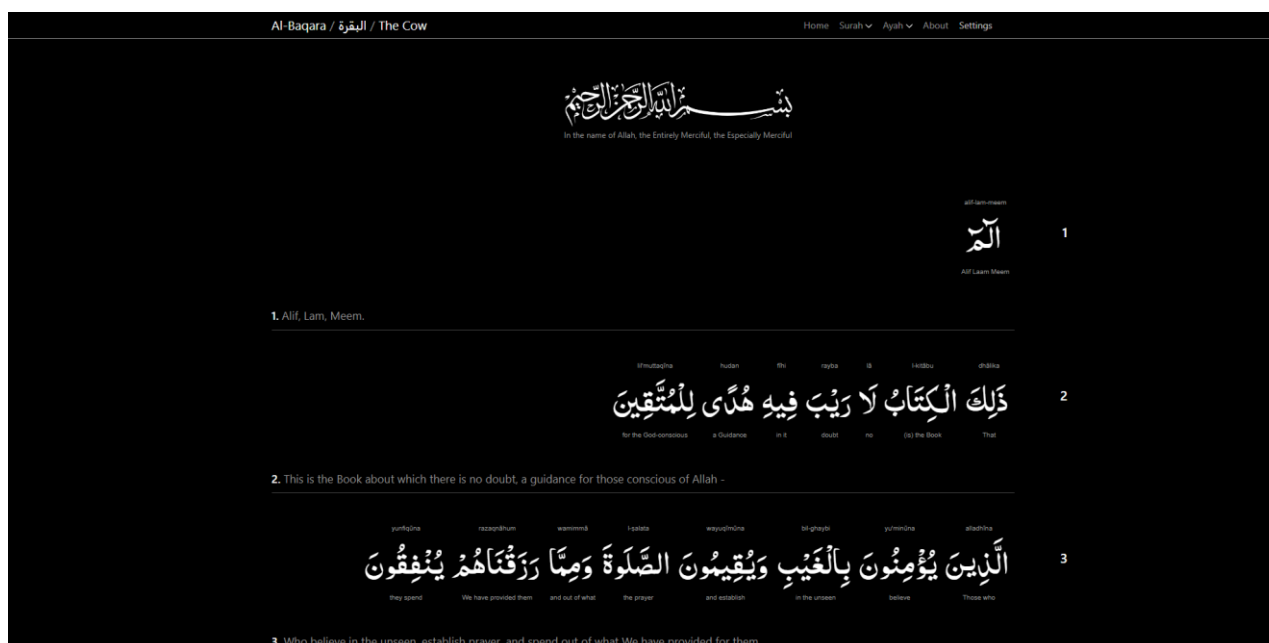
**Figure 10. Settings Display**

**g. Dark Mode Display**

The Dark Mode feature in Quranpedia allows users to switch the interface from a light theme to a dark theme, creating a more comfortable visual experience for the eyes.

This Dark Mode page is designed to offer a more enjoyable experience and reduce eye strain for users when using Quranpedia in low-light conditions or during nighttime. Users can easily toggle the Dark Mode on or off this page according to their preferences.

By implementing the Dark Mode feature, Quranpedia caters to its users' diverse needs and preferences, allowing them to choose the interface that suits their comfort and viewing preferences. This feature enhances the usability and accessibility of Quranpedia, ensuring that users can interact with the platform with ease and convenience, regardless of the lighting conditions.



**Figure 11. Dark Mode Display**

### 3.4 Testing

After the features were coded, the researchers conducted testing to evaluate the extent of Quranpedia website's performance in achieving the set goals. In order to test its reliability and functionality, the testing was carried out using black box testing method and root word comparison testing.

#### 3.4.1 Root Comparison Test

Root Word Comparison Testing takes samples from each hijaiyah letter with the most derivatives. This testing aims to obtain a representative overview of the consistency and accuracy of root word searches in Quranpedia and the corpus used as a reference.

The sample selection process involves choosing specific hijaiyah letters and identifying the most associated derivatives with each letter. Then, root word searches are performed on Quranpedia and the corpus to obtain the results of root word searches from each source.

Through this testing, the author aims to ensure that Quranpedia provides root word search results equivalent to the corpus as a reliable reference source. By sampling from each hijaiyah letter with the most derivatives, this testing provides a more comprehensive understanding of the consistency and accuracy in searching for root words from both sources.

Thus, this root word comparison testing provides a broader insight into Quranpedia's ability to provide accurate and reliable root word search results. In this context, users of Quranpedia can confidently obtain root word information of comparable quality to other reference sources.

**Table 1.** Root Word Comparison Table

Root Words	Corpus Quran	Quranpedia	Percentage
أ م ن	883	663	75%
ب ي ن	523	445	85%
ت ب ع	172	158	91%
ث ق ل	28	26	93%
ج م ع	129	123	95%
ح ي ي	184	144	78%
خ ل ف	261	214	81%
د ب ر	44	44	100%
ذ ك ر	292	244	83%
ر ض و	73	52	71%
ز ك و	59	37	62%
س ل م	142	142	100%
ش ق ق	28	23	82%
ص د ق	155	144	92%
ض ر ر	74	70	94%
ط ه ر	31	26	83%
ظ ل م	315	287	91%
ع ل م	854	722	84%
غ ف ر	234	201	85%
ف ر ق	72	65	90%
ق و م	661	594	89%
ك ب ر	162	148	91%
ل ق ي	146	118	80%
م ل ك	206	186	90%
ن ز ل	293	249	84%
ه د ي	316	231	73%
و ل ي	232	170	73%
ي س ر	45	40	88%
Total			85%

#### 3.4.2 Analysis of Comparative Testing of Word Roots

Based on the results of the root word comparison testing, an average score of 85% was obtained. From this score, it can be concluded that the search results for root words from the Quran corpus do not significantly differ from those of Quranpedia.

The root word comparison testing aims to compare the accuracy and reliability of root word search results between Quranpedia and the Quran corpus used as the reference source. With an average score of 85%, this testing indicates that both sources provide similar results in searching for root words in the Quran.

Although there is a small difference in the average score, the testing results show that Quranpedia and the Quran corpus consistently provide information about root words in the Quran. This suggests that users can obtain consistent and reliable root word search results through Quranpedia and the Quran corpus.

Therefore, users can choose according to their preferences when seeking information about root words in the Quran. Both Quranpedia and the Quran corpus provide reliable and effective sources for understanding the root words found in the sacred text of the Quran.

### 3.4.3 Black Box Testing

The testing is conducted to evaluate and measure the performance and effectiveness of the Quranpedia website in achieving its established goals. This testing is designed using the black box testing method, which allows the testing to focus on the external functionality of the system without considering the internal implementation details.

In this testing, various aspects and features of Quranpedia will be examined to ensure that the website functions well according to the defined needs and expectations. This testing will provide valuable insights into the system's reliability, performance, and capabilities in delivering an optimal user experience.

The testing results will be presented in Table 2, which will provide an overview of the overall outcomes of the conducted testing. This table will include detailed information about each testing, the methods used, expected outputs, and assessments from the respondents involved.

Through comprehensive black box testing, Quranpedia can be thoroughly evaluated to ensure the website operates according to the established standards. This testing provides a deeper understanding of the quality and performance of Quranpedia and valuable feedback to identify areas that may need improvement or correction.

**Table 2.** Testing

No.	Description	Testing Procedure	Expected Output	Respondent Assessment
1	Selecting Quranic Surah	The testing is conducted by opening the Quranic Surah page and observing how the system responds to the user's selection of Surah.	The Quranpedia system directly and responsively redirects users to the selected Surah page.	97%
2	Searching for root words from Quranic verses	The testing is conducted by clicking on words within the Quranic verses and observing the system's response.	The Quranpedia system quickly and accurately directs users to the related root word page, displaying comprehensive information about that root word.	92%
3	Navigation from one Surah to another Surah	The testing is conducted by clicking on the Surah menu in the navigation (navbar) and observing how the system handles the transitions between Surahs.	The Quranpedia system smoothly and seamlessly directs users to the selected Surah page from the navigation menu without any hindrance.	95%
4	Searching for verses	The testing is conducted by clicking the verse menu in the navigation (navbar) and examining the system's response.	The Quranpedia system accurately and swiftly directs users to the selected verse page, allowing easy access to the desired verse.	92%
5	Switching to Dark Mode	The testing is conducted by clicking on the settings menu in the navigation (navbar), selecting the "Theme" option, and changing the display from "Light" to "Dark."	The Quranpedia system promptly responds to the user's request by changing the display in real-time from "Light" mode to "Dark" mode, providing a more comfortable visual experience.	94%
Total				94%

### 3.4.4 Analysis of Test Results Black box Testing

Based on the data from the conducted black box testing, which included testing of 5 main features: selecting Quranic Surahs, searching for root words from Quranic verses, navigating from one Surah to another, searching for verses, and switching to Dark Mode, respondents gave an average rating of 94%. From this score, it can be concluded that each feature in Quranpedia functions according to the expected output.

The black box testing has proven that each feature tested in Quranpedia successfully meets user expectations. The feature to select Quranic Surahs allows users to easily and accurately navigate to the desired Surah. The feature to search for root words from Quranic verses provides a responsive experience and comprehensive information about the selected root word. The navigation feature between Surahs facilitates smooth and seamless transitions from one Surah to another. The verse search feature enables users to access the desired verse promptly and accurately. Lastly, the Dark Mode feature offers a comfortable visual experience and adjusts to users' preferences.

With an average rating of 94%, it can be concluded that Quranpedia meets the expected standards and provides a satisfactory user experience. This testing confirms that each feature in Quranpedia functions well and delivers outputs

that align with users' expectations. This reinforces that Quranpedia is a reliable and effective platform that facilitates users in learning and exploring the Quran with ease and enjoyment.

## 4. CONCLUSION

This research has successfully achieved the main goal of creating the Quranpedia website designed with a structure similar to Wikipedia and a presentation per the Al-Quran. By utilizing the black box testing method, the website has been tested and provided satisfactory results with a success rate of 94%. Additionally, through root word testing, the website achieved an accuracy level of 85% in displaying Quranic verses that share the same root words. However, the root word testing results also indicate that there is room for further improvement in enhancing the accuracy of the search results for Quranic verses that share the same root words. This can be taken as feedback for future development to enhance the functionality of Quranpedia, making it more consistent and accurate in providing information about root words. Overall, this research contributes to the development of Quranpedia as a comprehensive and useful website for users who seek to deepen their understanding of the Al-Quran and derivational forms of words (isim makrifat). With an attractive interface and continuous improvement in accuracy, Quranpedia becomes a reliable and valuable reference source for the Muslim community in their study and understanding of the Al-Quran.

## REFERENCES

- [1] F. E. Zamani, K. Umam, W. D. I. Azis, and W. S. Abdillah, "Analysis and implementation of computer-based system development of stemming algorithm for finding Arabic root word," *J Phys Conf Ser*, vol. 1402, no. 6, p. 066030, Dec. 2019, doi: 10.1088/1742-6596/1402/6/066030.
- [2] Z. Rajab, M. R. Ismail, and A. A. K. S. Mohammed, "RASM UTHMANI: PERBANDINGAN PRINSIP AL-HAZF DALAM AL-QURAN AL-KARIM DAN QURAN MAJID," *Malaysian Journal Of Islamic Studies (MJIS)*, vol. 5, no. 1, pp. 119–128, Jun. 2021, doi: 10.37231/mjis.2021.5.1.150.
- [3] A. Z. Adillah Zahra, "TAFSIR IBN KATSIR : METODOLOGI PENAFSIRAN AL-QURAN BI SUNNAH MENURUT IMAM IBNU KATSIR," *AT-TAISIR: Journal of Indonesian Tafsir Studies*, vol. 3, no. 2, pp. 29–36, Dec. 2022, doi: 10.51875/attaisir.v3i2.137.
- [4] M. D. Kurniasih, D. A. Lestari, and A. Fauzi, "HIKMAH PENURUNAN AL-QUR'AN SECARA BERANGSUR," *Mimbar Agama Budaya*, vol. 38, no. 2, pp. 11–20, Dec. 2020, doi: 10.15408/mimbar.v37i2.18914.
- [5] N. Himawan, G. W. Wicaksono, and I. Nuryasin, "Ekstraksi Fi'il dan Isim Pada Kaidah Nahwu Shorof Berbasis Android," *Jurnal Repositor*, vol. 2, no. 5, pp. 619–626, Mar. 2020, doi: 10.22219/repositor.v2i5.110.
- [6] A. Al Qifari, "Shaut Al-'Arabiyah Nakirah dan Ma' Rifah Fii Al-Qur'an," vol. 10, no. 1, 2022, doi: 10.24252/saa.v10i1.29432.
- [7] R. Ruslan, N. Abd Safa, M. F. Khalik, and M. A. Burga, "Derivasi dalam Bahasa Arab dan Bahasa Indonesia: Hubungan Bentuk dan Maknanya," *Syntax Literate; Jurnal Ilmiah Indonesia*, vol. 8, no. 3, pp. 1783–1793, Mar. 2023, doi: 10.36418/syntax-literate.v8i3.11482.
- [8] A. Zare Zardini and M. Ansari Moghaddam, "A Comparative Study of the 'Tasrif' Verses in the Holy Quran in Al-Mizan and Majma Al-Bayan Commentaries," *International Journal of Multicultural and Multireligious Understanding*, vol. 7, no. 2, p. 56, Mar. 2020, doi: 10.18415/ijmmu.v7i2.1419.
- [9] L. Zuhriyah, A. Sholihuddin, and M. Thohir, "PROSES AFIKSASI MORFOLOGI ISM (NOMINA) DALAM BAHASA ARAB," *Jurnal Pendidikan Bahasa Arab dan KebahasaAraban*, vol. 5, no. 2, pp. 292–313, 2018, doi: 10.15408/a.v5i2.7794.
- [10] T. I. Ramadhan, M. A. Bijaksana, and A. F. Huda, "Neural-based Arabic Morphological Analyzer," in *2021 International Conference on Data Science and Its Applications (ICoDSA)*, IEEE, Oct. 2021, pp. 16–21. doi: 10.1109/ICoDSA53588.2021.9617211.
- [11] M. A. Radhi Billah, A. Muta'ali, and F. Asisi Datang, "REDUPLIKASI DALAM BAHASA ARAB DAN BAHASA INDONESIA: STUDI KONTRASTIF," *LINGUISTIK: Jurnal Bahasa dan Sastra*, vol. 8, no. 1, p. 24, May 2023, doi: 10.31604/linguistik.v8i1.24-33.
- [12] A. Mujahid, Z. Z. Rasyidi, S. Fajeri, H. Hamli, and S. Nur, "Isti'mal Isim al-Ma'rifah bi Alif wa Lam fi Surah al-Muzzammil," *Al Qalam: Jurnal Ilmiah Keagamaan dan Kemasyarakatan*, vol. 17, no. 1, p. 728, Mar. 2023, doi: 10.35931/aq.v17i1.1560.
- [13] A. Latief and D. Darmawati, "Objek Penelitian Bahasa Arab," *Matriks Jurnal Sosial dan Sains*, vol. 4, no. 2, pp. 97–106, Jan. 2023, doi: 10.59784/matriks.v4i2.478.
- [14] A. Salida and Z. Zulpina, "Keistimewaan Bahasa Arab sebagai Bahasa Al-Quran dan Ijtihadiyyah," *Jurnal Sathar*, vol. 1, no. 1, pp. 23–33, Jun. 2023, doi: 10.59548/js.v1i1.40.
- [15] A. Supriyatna, "METODE EXTREME PROGRAMMING PADA PEMBANGUNAN WEB APLIKASI SELEKSI PESERTA PELATIHAN KERJA," *JURNAL TEKNIK INFORMATIKA*, vol. 11, no. 1, pp. 1–18, May 2018, doi: 10.15408/jti.v11i1.6628.
- [16] L. Ariyanti, M. N. D. Satria, and D. Alita, "SISTEM INFORMASI AKADEMIK DAN ADMINISTRASI DENGAN METODE EXTREME PROGRAMMING PADA LEMBAGA KURSUS DAN PELATIHAN," *Jurnal Teknologi dan Sistem Informasi*, vol. 1, no. 1, pp. 90–96, Jun. 2020, doi: 10.33365/jtsi.v1i1.214.
- [17] Setiawansyah, H. Sulistiani, A. Yuliani, and F. Hamidy, "Perancangan Sistem Informasi Akuntansi Upah Lembur Karyawan Menggunakan Extreme Programming," *Technomedia Journal*, vol. 6, no. 1, Jun. 2021, doi: 10.33050/tmj.v6i1.1421.
- [18] L. P. Wanti, F. Fadillah, G. N. Ikhtiangung, and I. A. Pangestu, "Implementasi Extreme programming Pada Website Marketplace Lapak Petani Online," *Infotekmesin*, vol. 12, no. 1, pp. 50–58, Mar. 2021, doi: 10.35970/infotekmesin.v12i1.427.
- [19] A. E. Maulana, "Implementasi Extreme Programming pada Website Sekolah Tinggi Ilmu Tarbiyah (STIT) Daarul Fatah Tangerang," *Explorer (Hayward)*, vol. 2, no. 2, pp. 61–70, Jul. 2022, doi: 10.47065/explorer.v2i2.306.
- [20] B. A. Priyangga, D. B. Aji, M. Syahroni, N. T. S. Aji, and A. Saifudin, "Pengujian Black Box pada Aplikasi Perpustakaan Menggunakan Teknik Equivalence Partitions," *Jurnal Teknologi Sistem Informasi dan Aplikasi*, vol. 3, no. 3, p. 150, Aug. 2020, doi: 10.32493/jtsi.v3i3.5343.