**IslamXplorer**

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**By:**

**Ahmad Hassan**

**23324**

**Supervised by:**

**Shahid Ali Khan**

**Faculty of Computing**

**Riphah International University, Islamabad**

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**Final Approval**

This is to certify that we have read the report submitted by ***name of student(s) (CMS #)***, for the partial fulfillment of the requirements for the degree of the Bachelors of Science in Software Engineering (BSSE). It is our judgment that this report is of sufficient standard to warrant its acceptance by Riphah International University, Islamabad for the degree of Bachelors of Science in Software Engineering (BSSE).

**Committee:**

| **1** | [Name Supervisor]  (Supervisor) |
| --- | --- |
|  |  |
| **2** | [Name of HOD/chairman]  (Head of Department/chairman) |

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**[Name of Student 1]**

**[SAP Id]**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**[Name of Student 2]**

**[SAP Id]**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**[Name of Student 3]**

**[SAP Id]**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**[Name of Student 4]**

**[SAP Id]**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**[Name of Student 5]**

**[SAP Id]**

**Dedication**

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**Acknowledgement**

First of all we are obliged to Allah Almighty the Merciful, the Beneficent and the source of all Knowledge, for granting us the courage and knowledge to complete this Project.

[Students will acknowledge here anyone who has helped in the project. It can include Supervisor(s), Teachers, Class mates, Friends and Family]

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**[Name of Student 1]**

**[SAP Id]**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**[Name of Student 2]**

**[SAP Id]**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**[Name of Student 3]**

**[SAP Id]**

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**[Name of Student 4]**

**[SAP Id]**

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**[Name of Student 5]**

**[SAP Id]**

**Abstract**

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**Chapter 1:**

**Introduction**

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**Introduction**

IslamXplorer, a sophisticated mobile application meticulously crafted to enrich your connection with Islam. More than just a tool, IslamXplorer serves as your comprehensive companion, seamlessly integrating essential features to enhance your daily practices and foster a deeper understanding of Islamic principles.

At the heart of IslamXplorer lies a powerful Knowledge Graph, meticulously curated to provide a nuanced exploration of Islamic concepts. This dynamic graph includes nodes for fundamental pillars like Zakat, Salat, Pilgrimage, Tawheed, and Fasting. Complementing these are Concept nodes, delving into topics such as Punishments, Rewards, and Exceptions. Each node is intricately connected to relevant Quranic verses and Hadiths, ensuring a rich and interconnected tapestry of knowledge.

* 1. **Opportunity & Stakeholders**

In the realm of Islamic Apps, a search engine can help people find information about Islam from a variety of sources, including the Quran, the Hadith, and scholarly works. This can be a valuable resource for people who are new to Islam or who are looking for more information about a particular topic. A Knowledge Graph also helps in preserving the Islamic heritage by making it making everything digitalised, storing everything in an interconnected manner, that captures the true essence of the Islamic texts

**1.1.1 Opportunity**

* **Educational Resource:** This project can serve as a valuable educational resource for individuals seeking to study the Quran and Hadith, scholars, students, and the general public.
* **Research Aid:** It can aid researchers and scholars in analyzing and extracting valuable insights from Islamic texts more efficiently.
* **Interfaith Dialogue:** The project can facilitate interfaith dialogue by providing accessible information about Islamic teachings.
* **Content Accessibility:** It can make Quranic and Hadith content easily accessible to a global audience.

**1.1.2 Stakeholders**

***Knowledge Seekers***

* **Muslim Community:**

This is your primary user base, consisting of individuals who may be using your application for a variety of purposes, including personal learning, spiritual growth, or research. Catering to the needs of this group is crucial.

* **Experts, Scholars, Researchers:**

Access to authentic and reliable Islamic texts is essential for scholars and researchers in the field of Islamic studies. Providing them with a resource for in-depth research and analysis is a valuable service.

* **Institutions:**

Schools, universities, and Islamic educational institutions often require quality resources for teaching Islamic studies. Your application could become a valuable tool for educators and students alike.

* 1. **Motivations and Challenges**

IslamXplorer is an Islamic search engine app that uses a Knowledge Graph to provide users with access to authentic and reliable Islamic knowledge. The app is motivated by the goal of enriching the spiritual journey of its users, disseminating authentic Islamic knowledge, facilitating daily Islamic practices, and adapting to technological advancements.

Some of the challenges that IslamXplorer faces include ensuring the accuracy and authenticity of its content, encouraging consistent user engagement and education, and adapting to the ever-changing landscape of Islamic knowledge.

**1.2.1 Motivations**

* **Spiritual Enrichment:**

IslamXplorer is motivated by the profound goal of enriching the spiritual journey of its users. It aims to provide a comprehensive platform where individuals can deepen their understanding of Islamic principles, fostering a closer connection to their faith.

* **Knowledge Dissemination:**

The app is driven by the desire to disseminate authentic Islamic knowledge. By incorporating a robust Knowledge Graph that includes Quranic verses, Hadiths, and insights into various Islamic concepts, IslamXplorer aims to serve as a reliable source of information for users seeking to expand their understanding of Islam.

* **Facilitating Daily Practices:**

IslamXplorer is designed to facilitate and enhance daily Islamic practices. The inclusion of features such as Qibla direction, Masjid finder, and prayer times aims to make it easier for users to incorporate religious obligations into their daily routines, fostering a more mindful and organized approach to worship.

* **Adapting to Technological Advancements:**

Motivated by the rapid advancements in technology, IslamXplorer seeks to leverage these innovations to make Islamic knowledge more accessible and engaging. By embracing mobile technology, the app aims to reach a global audience, transcending geographical boundaries and cultural differences.

**1.2.2 Challenges**

* **Content Accuracy and Authenticity:**

Ensuring the accuracy and authenticity of the content within IslamXplorer poses a significant challenge. The app must carefully curate and verify Quranic verses, Hadiths, and other information to provide users with reliable and trustworthy knowledge.

* **User Engagement and Education:**

Encouraging consistent user engagement and education presents a challenge. IslamXplorer must implement strategies to keep users actively involved, motivated, and informed, especially in a digital landscape where attention spans can be limited.

* **Effective Knowledge Graph Creation:**

At the heart of IslamXplorer lies an intricate and vast Knowledge Graph, that interconnects topics and concepts to various Verses and Hadiths. The graph needs to be created in a manner so that it remains open for adding further nodes in the future, and it should capture the semantic relations between different topics through relationships in an effective manner.

* **Cultural Sensitivity and Inclusivity:**

IslamXplorer faces the challenge of being culturally sensitive and inclusive. The app must cater to a diverse global Muslim audience, considering variations in cultural practices, interpretations, and traditions.

* **Adaptation to User Feedback:**

Responding effectively to user feedback and evolving user needs is an ongoing challenge. IslamXplorer must have mechanisms in place to gather feedback, analyze it, and implement improvements to meet the dynamic expectations of its user base.

* 1. **Goals And Objectives**

The goals of creating an Islamic search engine app for Quran and Hadith that uses Knowledge Graphs are to Facilitate a profound spiritual journey for users by providing authentic Islamic knowledge,Serve as a reliable and accessible platform for the dissemination of accurate and authentic Islamic knowledge,Facilitate and enhance daily Islamic practices by providing tools such as Qibla direction, Masjid finder, and prayer times,Build a comprehensive corpus of Islamic teachings and values based on themes, concepts and topics, Embrace technological advancements to make Islamic knowledge more accessible and engaging.

**1.3.1 Goals**

1. **Spiritual Empowerment:**

Facilitate a profound spiritual journey for users by providing authentic Islamic knowledge, fostering a deep connection to faith, and empowering individuals to lead a more purposeful and spiritually enriched life, by providing options at the fingertips of the user

1. **Knowledge Dissemination:**

Serve as a reliable and accessible platform for the dissemination of accurate and authentic Islamic knowledge, making essential teachings, Quranic verses, and Hadiths easily accessible to a global audience.

1. **Enhanced Daily Practices:**

Facilitate and enhance daily Islamic practices by providing tools such as Qibla direction, Masjid finder, and prayer times, enabling users to seamlessly incorporate religious obligations into their routines.

1. **Islamic Knowledge Corpus:**

To build a comprehensive corpus of Islamic teachings and values based on themes, concepts and topics, that would allow storing of verses, hadiths, and other Islamic texts in a new and digitalised manner. An Islamic Knowledge Graph would incorporate semantic details, allowing for effective results based on query

1. **Technological Innovation:**

Embrace technological advancements to make Islamic knowledge more accessible and engaging. Leverage mobile technology to reach a diverse global audience, transcending geographical boundaries and cultural differences.

**1.3.1 Objectives**

1. **Curate a Comprehensive Knowledge Graph:**

Develop and maintain a dynamic Knowledge Graph that encompasses key Islamic concepts, principles, and teachings. Ensure the inclusion of authentic Quranic verses and Hadiths, creating a robust repository for users to explore and understand.

1. **Provide Users with tools to Enhance their Daily Practices:**

Offer users an accurate and reliable Qibla direction feature, utilizing device sensors to guide them towards the Kaaba in Mecca. Ensure a visually intuitive interface that aids users in aligning their prayers with precision.Develop a Masjid finder feature that enables users to locate nearby mosques effortlessly. Include essential details such as addresses, contact information, prayer times, and additional facilities, fostering a sense of community engagement.

1. **Implement Responsive and User-Friendly Design:**

Design an intuitive and responsive user interface that adapts to various devices and screen sizes. Prioritize user experience to ensure that IslamXplorer is accessible and user-friendly for individuals with diverse technological backgrounds.

1. **Encourage Active User Engagement:**

Implement strategies to encourage active user engagement through regular updates, informative content, and interactive features. Foster a sense of belonging and community among users to enhance their overall experience.

1. **Adapt and Grow Based on User Feedback:**

Establish mechanisms for gathering user feedback and insights. Analyze feedback to identify areas for improvement, innovation, and adaptation, ensuring that IslamXplorer evolves in response to the dynamic needs and expectations of its user base.

* 1. **Solution Overview**

Knowledge graphs excel in capturing semantic relationships between entities. They use nodes (entities) and edges (relationships) to connect data points. This makes them ideal for representing Quranic verses, and Hadiths, which are often interconnected in complex ways, and also, in turn, by providing a way to explore the intricate relationships between them.

Knowledge graphs are also inherently flexible. We can easily add new entities or relationships as our dataset expands, or it can be connected with other large datasets. This is advantageous as we are dealing with a diverse and intricate Islamic textual data, that needs to be continuously updated and enhanced. They can be used to identify and visualize the relationships between different Quranic verses and Hadiths. This can help users to understand the context of verses and Hadiths, and to see how they fit together in the overall body of Islamic teachings.

Knowledge graphs enable users to explore content within a contextual framework. Users can navigate between Quranic verses, and Hadiths seamlessly, as they are inherently connected. This allows users to gain a deeper understanding of the relationships between different Islamic concepts and how they fit together in the overall picture. They can be used to develop new research tools for scholars of the Quran and Hadith. For example, knowledge graphs could be used to identify patterns and trends in the Quran and Hadith, or to develop new hypotheses about the meaning and interpretation of verses and Hadiths.

**Chapter 2:**

**Literature/ Market Survey**

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**Literature/ Markey Survey**

2.1 **Introduction**

IslamXplorer is an Islamic search engine application that uses knowledge graphs to provide users with a comprehensive and interactive way to explore the Quran and Hadith. The application is designed to be user-friendly and accessible to individuals with diverse technological backgrounds. It features a variety of features that make it an ideal tool for learning about Islam, including:

* A comprehensive database of Quranic verses and Hadiths
* A powerful search engine that allows users to search for specific content
* A knowledge graph that visualizes the relationships between different Quranic verses and Hadiths
* Interactive features that allow users to explore content in a variety of ways

The IslamXplorer application has the potential to be a valuable resource for Muslims and non-Muslims alike. It can be used to learn about Islam, to explore the relationships between different Quranic verses and Hadiths, and to engage in interactive learning experiences. The application is still under development, but it has already made significant progress. With continued development, IslamXplorer has the potential to become a leading Islamic search engine application.

**2.1.1 Problem Ellaboration**

Current platforms offer Quranic texts, Hadith collections, and other related material in isolation, making it difficult for users to establish meaningful connections between them. This fragmentation hinders comprehensive understanding of Islamic teachings. Representing the complex semantic relationships between Quranic verses, Hadiths, and other entities in a traditional database is challenging.

While various resources exist for Islamic studies, they are often scattered across books, websites, and libraries. This makes it difficult for users to find the information they need efficiently and effectively. There is a need for a centralized and comprehensive platform to access these resources, which would make it easier for users to learn about Islam.

Conventional search engines do not cater to the unique challenges of Quranic and Hadith study. Quranic verses and Hadiths are often interconnected, and users may need to be able to search for content based on these relationships. Additionally, Quranic and Hadith verses may have multiple meanings, and users may need to be able to search for content based on different interpretations.

As a result of these challenges, users often face difficulties in conducting precise, context-aware searches for Islamic knowledge. This can lead to inadequate exploration of the material and a limited understanding of Islamic teachings.

2.2 **Literature Review/ Technologies Overview**

2.2.1 Literature Review

2.2.1.1 **Summary of AL-QURAN ONTOLOGY BASED ON KNOWLEDGE THEMES by A. Ta'a, Q. A. Abed, and M. Ahmad**

The paper "AL-QURAN ONTOLOGY BASED ON KNOWLEDGE THEMES" by A. Ta'a, Q. A. Abed, and M. Ahmad presents a new approach to developing an ontology for the Quran based on knowledge themes. The authors argue that traditional ontology approaches are not well-suited for representing the complex and interconnected knowledge contained in the Quran. Instead, they propose a new approach that organizes the Quran's knowledge into a set of interrelated themes. The authors begin by identifying a set of 10 knowledge themes in the Quran:

1. Tawheed,
2. Risalah,
3. Akhirah,
4. Akhlaq,
5. Aqidah,
6. Ibadah,
7. Muamalah,
8. Tarikh
9. Qasas
10. Ayat.

They then define a set of sub-themes for each knowledge theme. For example, the sub-themes for the Tawheed knowledge theme include the **oneness of Allah**, **the attributes of Allah**, and **the names of Allah**. Once the knowledge themes and sub-themes have been identified, the authors develop an ontology that represents the relationships between the different concepts. The ontology is developed using the Web Ontology Language (OWL), which is a standard language for representing ontologies on the web.

The authors evaluate the ontology by conducting a series of experiments. The experiments show that the ontology can be used to effectively retrieve and classify Quranic knowledge. The authors also conclude that the ontology can be used to develop new applications for the Quran, such as intelligent search engines and question answering systems.

The authors have developed an ontology that represents the relationships between the different concepts in the Quran. These ontologies can be used as a model for developing our own ontologies for the Quran and Hadith

The research of these ontologies is still under development. The authors have focused on developing the ontology for the Tawheed knowledge theme, and they have not yet completed have not yet been integrated with a natural language processing (NLP) system. This means that users cannot yet query the ontology using natural language.

Overall, this research paper presents a valuable contribution to the field of Quranic knowledge representation. The authors' ontology is based on the concept of knowledge themes, which is a novel and effective approach for representing Quranic knowledge. We will use this research to carve our own Knowledge Graph by implementing the authors' ontologies and also by adding NLP capabilities.

2.2.1.2 **An experience of developing Quran ontology with contextual information support Rizwan Iqbal and Aida Mustapha**

This research paper presents an experience of developing a Quran ontology with contextual information support. The authors argue that existing Quran ontologies are limited in scope and knowledge, and that they do not support contextual information that is considered necessary for the correct interpretation of Quranic verses. The authors propose a new Quran ontology that encapsulates contextual information support, such as translations, revelation places, tafsir, and hadiths. The ontology was developed using a methodology merging approach, which made the ontology development more effective and intuitive. The authors evaluated the developed ontology and found that it satisfied the requirements specification. They also found that the ontology can be reused and further enhanced to support many Quran-related semantic applications in the future.

One of the most relevant aspects of this research paper for your project is the authors' focus on developing an ontology that supports the contextual interpretation of Quranic verses. This is an important consideration for any Quran ontology, as it allows users to better understand the meaning of the Quran in light of its historical and religious context.

The ontology includes a number of features that support contextual information, such as:

● **Revelation context:** The ontology includes information about the revelation context of each verse, such as the time and place of revelation.

● **Tafsir:** The ontology includes links to tafsir, which are commentaries on the Quran.

● **Hadith:** The ontology includes links to hadith, which are the sayings and actions of the Prophet Muhammad.

Another relevant aspect is the authors' use of a methodology merging approach to develop the ontology. This approach allows the authors to take advantage of the strengths of both top-down and bottom-up ontology development.

One limitation of this research paper is that it does not provide a detailed description of the ontology's classes and properties. This means that you will need to read the paper carefully to understand how the ontology is structured and how it can be used.

Overall, this research paper presents a valuable contribution to the field of Quran ontology development. The authors' ontology includes additional classes and properties to represent contextual information, which is an important consideration for any Quran ontology. We can use the research in this paper to improve your Knowledge Graph by implementing the authors' methodology merging approach and adding classes and properties to represent contextual information.

2.2.1.3 **Towards a Joint Ontology of Quran and Hadith Shatha Altammami, Eric Atwell, Ammar Alsalka**

This research paper presents the idea of a joint ontology of the Quran and Hadith. The authors argue that such an ontology would be a valuable resource for scholars and researchers, as it would allow for the integration of knowledge from the two primary sources of Islamic law.

The authors also discuss the challenges involved in developing a joint ontology, such as the need to reconcile differences in terminology and interpretation. However, they believe that these challenges are surmountable, and that the benefits of a joint ontology would outweigh the costs.

The authors propose a new ontology that is based on the following principles:

● **Comprehensiveness:** The ontology should cover all of the major concepts and relationships in the Quran and Hadith.

● **Accuracy:** The ontology should be accurate and up-to-date.

● **Flexibility:** The ontology should be flexible enough to support different types of applications.

● **Interoperability:** The ontology should be interoperable with existing Quran and Hadith ontologies.

The authors developed the ontology using a methodology that involved the following steps:

1. **Identify the core concepts and relationships in the Quran and Hadith.**
2. **Define classes and properties to represent the core concepts and relationships.**
3. **Populate the ontology with data from the Quran and Hadith.**
4. **Evaluate the ontology for accuracy, completeness, and consistency.**

The ontology includes a number of features that support interoperability, such as:

● **Unique identifiers for all classes and properties.**

● **Links to existing Quran and Hadith ontologies.**

● **Use of standard ontological vocabularies.**

One of the most relevant aspects of this research paper is the authors' focus on developing a joint ontology of the Quran and Hadith. This is essential, as it will allow us to create a Knowledge Graph that represents the full range of Islamic knowledge. Another relevant aspect is the authors' methodology for developing the ontology. This methodology is well-defined and comprehensive, and it can be very well be used (or take reference from the principles) to develop our own ontologies.

One limitation of this research paper is that it does not provide any implementation details for the ontology. It does provides the principles that need to be taken care, and the steps taht need to be followed. It also provides with certain examples from the Quran and Hadith, for the identification of different concepts and how they are interlinked. But it does not go into dept so as to make an ontology from the provided details.

2.2.1.4 **Statistical Parsing by Machine Learning from a Classical Arabic Treebank Kais Dukes**

The research paper "Statistical Parsing by Machine Learning from a Classical Arabic Treebank" by Kais Dukes presents a novel approach to statistical parsing for Classical Arabic. Dukes argues that traditional statistical parsing methods are not well-suited for Classical Arabic due to its rich morphology and free word order.

Dukes proposes a new hybrid parsing approach that combines statistical methods with traditional Arabic grammatical knowledge. The approach is based on a new treebank of Classical Arabic sentences that has been manually annotated with grammatical information.

Dukes evaluated the proposed parsing approach on a held-out test set and achieved an F1-score of 89.03%. This is significantly higher than the performance of traditional statistical parsing methods on Classical Arabic.

One of the most relevant aspects of this research paper for your project is the author's proposed hybrid parsing approach. This approach combines the strengths of statistical methods with the strengths of traditional Arabic grammatical knowledge. This makes it well-suited for parsing Classical Arabic, which is a language with rich morphology and free word order.

● **Extract more accurate semantic information from the Quran and Hadith text.** Dukes' hybrid parsing approach can be used to extract the semantic meaning of sentences in Classical Arabic more accurately and reliably than traditional statistical parsing methods. This semantic information can then be used to populate your Knowledge Graph with more accurate and informative data.

● **Identify and extract concept nodes more accurately.** Dukes' treebank of Classical Arabic sentences is manually annotated with grammatical information, which makes it possible to identify and extract concept nodes from the Quran and Hadith text more accurately. This will help you to create a more comprehensive and informative Knowledge Graph.

One limitation is that Dukes' thesis does not explicitly address the issue of knowledge representation. Ontologies require a formal and explicit representation of concepts and relationships between concepts. Dukes' thesis does not provide a specific methodology or framework for representing knowledge in an ontological form.

Another limitation is that Dukes' thesis does not address the issue of ontology reasoning. Ontologies are used to support a variety of reasoning tasks, such as concept classification, query answering, and inference. Dukes' thesis does not provide any specific techniques for using statistical parsing to improve the performance of these reasoning tasks.

Overall, the research paper presents a valuable contribution to the field of Classical Arabic natural language processing. The author's proposed hybrid parsing approach is well-suited for parsing Classical Arabic, and the author's new treebank of Classical Arabic sentences is a valuable resource for developing and evaluating parsing algorithms for Classical Arabic. We can use the research in this paper to improve our project by integrating the proposed parsing approach into your Knowledge Graph pipeline and evaluating your Knowledge Graph on a variety of tasks.

2.2.1.5 **Summary**

2.2.2 Market Survey

Existing Islamic apps and platforms, while useful, often come with several limitations and defects. Understanding these shortcomings can help you identify areas where your project can offer improvements. Here are some common defects in existing systems:

* **Limited Content Depth:** Many existing Islamic apps offer a limited selection of Quranic verses and hadiths. Users may not find comprehensive content or detailed explanations on various topics.
* **Lack of Contextual Understanding:** Some apps don't provide the necessary context for users to understand the significance and meaning of Quranic verses and hadiths. Context is crucial for interpreting and applying these texts correctly.
* **Scattered Information:** Information is often scattered across various sources and platforms, making it challenging for users to find all the relevant content in one place.
* **Search Limitations:** The search functionality in many apps may be basic and not optimized for advanced queries. Users may have trouble finding specific content or relevant information.
* **Scalability:** With the use of Traditional databases, existing apps are not much scalable as their content and data is fixed and static, making it impossible for them to grow as new researches are happening everyday.

2.2.2.1 **Islam360**

**Islam360** is a comprehensive Islamic application that caters to a wide range of users seeking Islamic knowledge and guidance. It offers a plethora of features, including:

* **The Quran:** Islam360 provides access to the Quran in Arabic script, accompanied by translations in English and other languages. This allows users to recite, study, and understand the Quran in their preferred language.
* **Hadith Collections:** The application houses a vast collection of hadith, the sayings and teachings of Prophet Muhammad (PBUH). Users can browse through various hadith collections, search for specific hadith, and gain insights into Islamic principles and practices.
* **Prayer Times:** Islam360 offers accurate prayer times based on the user's location. This helps Muslims stay informed about their prayer obligations and perform them at the correct time.
* **Dua (Supplications):** Islam360 features a collection of dua, supplications, and prayers that Muslims can recite for various occasions and needs. This helps users connect with their faith and seek guidance and blessings from Allah.
* **Articles and Videos on Islamic Topics:** Islam360 offers a wealth of articles and videos on various Islamic topics, covering a wide spectrum of Islamic knowledge, from Quranic interpretation to Islamic history and jurisprudence.
* **Community Forum:** The application provides a community forum where users can connect with fellow Muslims, ask questions, share experiences, and engage in discussions about Islam.

Islam360 stands out as a valuable resource for Muslims seeking to deepen their understanding of Islam and connect with their faith. Its comprehensive features, user-friendly interface, and active community make it a popular choice among Muslims worldwide.

While Islam360 shares similarities with IslamXplorer in providing Islamic information, it differs in its broader scope and more general-purpose nature. IslamXplorer is focused on building a knowledge graph of Islamic knowledge, a structured representation of Islamic information that can be used to answer questions, generate insights, and develop new applications.

Overall, Islam360 is a well-established and well-regarded Islamic application that caters to a wide range of users seeking Islamic knowledge and guidance. Its comprehensive features, user-friendly interface, and active community make it a popular choice among Muslims worldwide.

2.2.2.2 **Tarteel.ai**

**Tarteel.ai** is an innovative Islamic application that utilizes artificial intelligence (AI) to enhance the learning and recitation of the Quran. It offers a range of features, including:

* **Personalized Quran Recitation:** Tarteel.ai employs AI to provide real-time feedback on the user's pronunciation and tajweed (Quranic recitation rules). This personalized feedback helps users improve their recitation accuracy and fluency.
* **Interactive Quran Learning:** The application offers interactive learning modules that guide users through the Quran, providing explanations of Arabic grammar, vocabulary, and tafsir (Quranic exegesis).
* **Quran Memorization Assistance:** Tarteel.ai features tools to aid in Quran memorization, such as spaced repetition and customizable memorization plans.
* **Gamified Quran Engagement:** The application incorporates gamified elements, such as badges and rewards, to motivate users and make the learning process more engaging.
* **Multi-Lingual Support:** Tarteel.ai supports multiple languages, making it accessible to a wide range of users worldwide.

Tarteel.ai has garnered positive feedback from users, praising its innovative AI-powered features, user-friendly interface, and overall effectiveness in enhancing Quran learning and recitation. The application has been recognized for its contributions to Islamic education and has received several awards, including the "Best Islamic App" award at the World Islamic Apps Summit.

While Tarteel.ai shares similarities with IslamXplorer in promoting Quran learning and recitation, it differs in its focus on AI-powered personalized feedback and gamified engagement. IslamXplorer, on the other hand, aims to build a comprehensive knowledge graph of Islamic knowledge, encompassing not only the Quran but also hadith.

Overall, Tarteel.ai stands as a nouvelle approach in the emerging field of AI that can help Muslims, seeking to improve their Quran recitation and deepen their understanding of the Quran. Its innovative AI-powered features, user-friendly interface, and emphasis on personalized feedback make it a popular choice among Quran learners worldwide.

2.2.2.3 **Corpus.quran.com**

**Corpus.quran.com** is an extensive online resource dedicated to the Holy Quran, offering a multitude of features to aid in exploration, understanding, and memorization of the sacred text. It serves as a comprehensive repository of Quranic data, catering to individuals seeking to deepen their connection with the Quran and enhance their knowledge of Islam.

At the heart of Corpus.quran.com lies its vast collection of Quranic texts, available in Arabic script and accompanied by translations in over 100 languages. This extensive multilingual collection caters to a diverse global audience, making the Quran accessible to individuals from various linguistic backgrounds.

Corpus.quran.com is a website that provides a comprehensive resource for studying the Quran. It offers a variety of features, including:

* **Quranic Text:** The website provides the full text of the Quran in Arabic script, along with translations in over 100 languages.
* **Tajweed:** Corpus.quran.com offers tajweed tools to help users learn the proper recitation of the Quran. These tools include tajweed rules, recitation guides, and audio recordings of Quran recitations.
* **Arabic Grammar:** Corpus.quran.com offers Arabic grammar resources to help users understand the Arabic language of the Quran. These resources include grammar rules, vocabulary lists, and exercises.
* **Search Function:** The website has a powerful search function that allows users to search the Quranic text, tafsir, and Arabic grammar resources.

Corpus.quran.com is a valuable resource for Muslims seeking to deepen their understanding of the Quran. Its comprehensive features, user-friendly interface, and reliable sources make it a popular choice among Quran scholars and students worldwide. IslamXplorer, on the other hand, aims to build a comprehensive knowledge graph of Islamic knowledge, using Quran and Hadith, to provide thematic and topic-wise search capabilities.

Corpus.quran.com provides IslamXplorer with a wide array of resources to build its Knowledge Graph. It provides several ontologies that can be used to provide a base for the Graph. It also helps in understanding the Arabic verses for the identification of different topics and themes that the verse is discussing about. It also plays an important part to understand the hierarchy of topics mentioned in the Quran.

Overall, Corpus.quran.com stands as a valuable tool for Muslims seeking to study and understand the Quran. Its comprehensive features, user-friendly interface, and reliable sources make it a popular choice among Quran scholars and students worldwide.

2.2.2.4 **Google**

**Google** is the state of the art Search Engine used by billions of users. It uses Knowledge Graphs for the structuring of its data (including web pages, websites and web apps), by extracting concepts and keywords using Web Crawlers and Bots. These crawlers constantly check the content of the existing web pages and the new web pages, and link them using different relationships in its Knowledge Graph. It is a valuable resource for gathering vast amounts of information easily through searching.

Despite the vastness and depth of Google's Knowledge Graph, it is not Islam Oriented, meaning that in its core, it links different Islamic concepts based on the existing data of the web pages (written by all sorts of different people). Based on user search query, it provides different websites and web pages, making the user go through a myriad of knowledge. IslamXplorar addresses this issue to produce bite-sized information (i.e. specific verses and hadiths based on search query), that would allow the users to easily understand the concept that they are looking for.

2.2.2.5 **Quran.com & Sunnah.com**

Both **Quran.com** and **Sunnah.com** contain large amounts of Quranic data (All the Surahs and their verses in Arabic, and translations in various other languages) and Hadiths (Prominent books of Hadith like Sahih Bukhari, Sahih Muslim, etc. in Arabic and various other languages) respectively. They have vast amounts of data, digitalised, for easy access. They not only provide users with Quran learning, but also Arabic language learning, by providing users with word to word translations (with root syntax), and it provides explanations of Hadiths and Quranic Verses by offering Tafseers of different scholars. They can help users get better insights on the actual meaning and discussion of the concepts in the verses.

These resources provide users with several digitized Islamic sources, but they don't have the facility of searching incorporated in them. Despite the fact that they have such large databases, they don't provide interconnected and interlinked knowledge of various Islamic topics and concepts that are discussed in the Quran and Hadith. They serve as a valuable source for IslamXplorer to gather (authentic) Quranic and Hadith data that can be used for the extraction of different topics and concepts for the construction of the Knowledge Graph. They also help in understanding how different verses are linked to various Hadiths, as different (authentic) Tafseers mention them both explicitly and implicitly. Overall, these sites are a great source of information for anyone interested in reading and understanding the Quran and Hadith.

2.2.2.6 **Summary**

|  | *Google* | *Islam 360* | *Quran.com* | *Tarteel* | **IslamXplorar** |
| --- | --- | --- | --- | --- | --- |
| Islamic Content Focused |  | ✓ | ✓ | ✓ | **✓** |
| Central Islamic DB |  | ✓ | ✓ | ✓ | **✓** |
| Interconnected Data | ✓ |  |  |  | **✓** |
| Search Engine | ✓ | ✓ | ✓ |  | **✓** |
| Context Awareness | ✓ |  |  |  | **✓** |
| Semantic Analysis | ✓ |  |  |  | **✓** |
| Bookmarks/ Favourites | ✓ | ✓ |  | ✓ | **✓** |

2.3 **Summary**

**Chapter 3:**

**Requirements Engineering**

**Chapter 3:**

**Requirements Engineering**

3.1 **Introduction**

3.2 **Problem Scenarios**

3.3 **Functional Requirements**

3.4 **Non-Functional Requirements**

3.5 **SQA Activities: Defect Detection**

3.5.1 **Test Case Design**

**Reference and Bibliography**

[1] M. Sher, M. Rehman, “*Title of the Paper*” Conference name/Journal Name, Edition, Volume, Issue, ISBN/ISSN, PP, Publisher/City-Country, Year.

[2] ……

\***Appendix A:**

**Heading (20-Point Size, Times New Roman, Bold)**

Text in 12-Point Size, Times New Roman, 1.5 Line Spacing.

* 1. **First Level heading [14-Point Size, Times New Roman, Bold and left aligned**

Text in 12-Point Size, Times New Roman, 1.5 Line Spacing.

**1.1.1 Second level heading [12-Point Size, Times New Roman, Bold and left aligned]**

Text in 12-Point Size, Times New Roman, 1.5 Line Spacing.