

Patterns Thematic Tracing of the Hadith of the Prophet Muhammad SAW Using the FP-Growth Algorithm and ECLAT

Nurbojatmiko^{1*}, Eri Rustamaji², Abdul Wadud³, Abdul Mutholib⁴

Abstract—The limited ability to memorize, understand Arabic, and access sources are obstacles to understanding Islamic knowledge, especially understanding hadith. Searching for access to sources to obtain hadiths that are in accordance with the theme and the interrelationships between themes improves the quality of the preachers towards religious understanding. This study investigates how to automate the thematic tracking pattern of Prophet Muhammad's hadith using the FP-Growth (Frequent Pattern-Growth) and ECLAT algorithms. The research was conducted using qualitative and quantitative approaches. The next step involves creating a prototype using the dataset development framework. The result of this study is a prototype of hadith tracing using the FP-Growth algorithm with the prophet's hadith dataset based on the *Bulughul Maram* book.

Index Terms—Patterns thematic, hadith, FP-growth, ECLAT, optimization, search.

I. INTRODUCTION

Azami said Allah the Exalted sent down gradually the best hadiths (treatises) in book form. This means a completely new book [1]. The meaning of hadith according to Muhaditsin is what was conveyed by the Prophet, including speech, tacit approval, or its characteristics (ie the physical condition of a Prophet). Hadith or also Sunnah is an interpretation of the Qur'an in practice or the application of Islamic teachings in a factual and ideal manner which is understood by the wife of the Prophet named Aisyah r.a. who said that "His character (Prophet Muhammad SAW) is the Qur'an" [2]. The position of hadith in Islamic law is at the second level after the Qur'an.

A. Hassan Bangil offers several criteria for a hadith that can be used as *hujjah* (reasonable for adjustment) or not. This criterion is widely adopted by most scholars in Indonesia.

Zainuddin in his paper disagrees with several hadiths determined by A. Hassan for several reasons. First, a biography with his background related to gaining knowledge. Second, how *manhaj* is used in determining the degree of hadith validation. Third, how its rationality can be criticized so that it appears the positive and negative sides and some examples of hadith where contradictions occur? It contributes academically to determining the level of hadith validation and can be used as a reference for researching the validity of hadith [3].

This study will examine how the thematic tracing pattern of the hadith of the Prophet Muhammad SAW using the FP-Growth and ECLAT algorithms. This algorithm will create patterns for how people, especially preachers/students or other users search for hadith sources. FP-Growth creates patterns of interrelationships between themes based on the number of themes that occur frequently. By understanding the pattern of people searching, in developing the source of the hadith database, we follow that pattern or the hadith dataset or knowledge base. It is hoped that this hadith dataset will make it easier for developers of thematic-based hadith services.

The frequent Pattern-Growth Algorithm is one of the association techniques in data mining. The FP-Growth itself is an alternative algorithm that can be used to determine the data set that appears most often (frequent itemset) in a data set [4]. The FP-Growth algorithm and the ECLAT algorithm are basically depth-first search algorithms using defined intersections. Each item is stored along with its cover (also called a *tidlist*) and uses an intersection-based approach to calculate the support for an itemset [5].

FP-Growth and ECLAT use different approaches to mine frequently used item sets. Therefore combination of the two algorithms in this research is expected to improve the overall performance of the mining process.

Thematic study of hadith is important in order to gain a more comprehensive understanding of a particular hadith. Meanwhile, existing research trends include the creation of thematic search applications for Muslim historical hadith [6], mapping themes and writing patterns of hadith [7], thematic study of hadith using software [8], or research devoted to certain themes, for example about self-healing [9]. There has been no research that has led to the creation of a hadith data set for the Prophet Muhammad SAW based on thematic

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hadith patterns applied by students, lecturers and preachers of the Islamic religion in Indonesia.

II. RELATED WORK

A. Hadith Classifications

Saloot in the Study Literature Review (SLR) uses two main methods of artificial intelligence for hadith texts, namely classifying hadith and mining. The classification approach that has been tested is carried out on 14 groups of hadith: personal problems, ethics, food, forbidden things, previous countries, faith, crime, jihad, behavior, worship, science, Quran, ornaments, and transactions [3]. In the research on the classification of Hadith translated into Malay based on the *sanad*, it is explained how Machine Learning techniques are used to classify the Malay Hadith documents which are translated based on the sand. SVM, NB, and k-NN engines were used to identify and evaluate the performance of the hadith translated in Malay based on the *sanad*. Its performance is evaluated based on standard performance metrics used in text classification, namely accuracy and response time [10].

Harrag focuses on information extraction, i.e. information that does not require complex linguistic processing to categorize. The aim is to detect and extract passages or sequences of words that contain relevant information from prophetic narrative texts [11]. Alkatib et al. also used computational linguistic research tools for Al-Hadith Al-Shareef. Language processing tasks require an understanding of language meaning, including information retrieval, Word Sense, Disambiguation, machine translation, QA (question and answer), Text Classification, and Text Summary. They develop linguistic resources. Specifically build semantic connections between words to achieve a good understanding of the meaning of Al-Hadith words, using the Classical Arabic dictionary and Al-Hadith ontology for text classification [12].

Zakaria researches and reports on the development trends of DQC (Digital Qur'an Computing) and analyzes the latest theme categories and articles published in the literature. First, this study provides a categorization based on topical trends of conferences and symposia related to DQC [13]. The same can be done with hadith analysis.

B. Association Rule Meaning

Association rule mining is one method to determine an interesting relationship or pattern between variables in big data. This concept was first introduced in the case of transactions in supermarkets that are stored on a Point of Sales (POS) system to find goods purchased simultaneously by consumers [14]. So this method is commonly called market basket analysis. The main goal is to find behavior or patterns of customer shopping in online stores, supermarkets, and others [4].

The problem that often occurs in using this method is that there are many possible data sets (itemsets) that appear, making the naive approach not feasible because of the long execution time [15]. However, there is a more sophisticated

approach known as the ECLAT algorithm. In determining an association rule mining there is a measure of attractiveness, namely [5]:

- Support, is a comparison of the occurrence of a data set (itemset) to the total number of transactions in the dataset.

$$\text{Support}(A \Rightarrow B) = S(A \cup B)$$

$$\text{Support} = S(A \cup B) = \frac{\text{Number of transaction containing A and B}}{\text{Total Transaction}} \quad (1)$$

- Confidence, is used to show the strength of the relationship between data sets in an association rule:

$$\text{Confidence}(A \Rightarrow B) = P(B | A)$$

$$\text{Confidence} = P(B|A) = \frac{\text{Number of transaction containing A and B}}{\text{Total Transaction containing A}} \quad (2)$$

- Correlation, is another alternative to find interesting relationships between data sets (itemsets). The attractiveness relationship can be determined by calculating the lift value.

$$\text{ift}(A, B) = \frac{S(A \cup B)}{P(A)P(B)} \quad (3)$$

C. FP-Growth Algorithm

The FP-Growth algorithm is a development of the Apriori algorithm. So that this algorithm fixes the shortcomings of the Apriori algorithm. Frequent Pattern Growth (FP-Growth) is an alternative algorithm that can be used to determine the most frequently occurring data set (frequent itemset) in a dataset [4].

Required to generate candidates in the Apriori algorithm to get frequent itemset. In the FP-Growth Algorithm generating a candidate is not done because the FP-Growth algorithm uses the concept of tree construction to find frequent itemsets. Therefore, the FP-Growth algorithm is said to be faster than the Apriori algorithm. The characteristic of this FP-Growth algorithm is that the data structure used is FP-Tree. The use of the FP-Tree is what causes the use of FP-Growth to directly extract frequent itemset from the FP-Tree [4], [16].

D. FP-ECLAT Algorithm

The ECLAT (Equivalence Class Transformation) algorithm is a program that is used to find itemsets that often appear [15]. This algorithm generates the candidate or selected item by searching depth-first and using *tidlist* intersections between the candidates [5]. The ECLAT algorithm process is defined recursively, meaning that the search for a desired itemset occurs continuously as long as there are itemsets available.

The advantage of using the ECLAT method is that the frequent itemset calculation process is faster than the Apriori algorithm [17]. This is because in the in-depth itemset search process and when frequently visited itemsets are found, the process ends. In contrast to the use of the Apriori algorithm, the search process is wide, so it takes a long time to determine the frequent itemset.

III. RESEARCH METHOD

To get the thematic tracking pattern of hadith to the prototype output, a software development life cycle framework is used, namely analysis, design, and implementation as shown in Fig. 1.

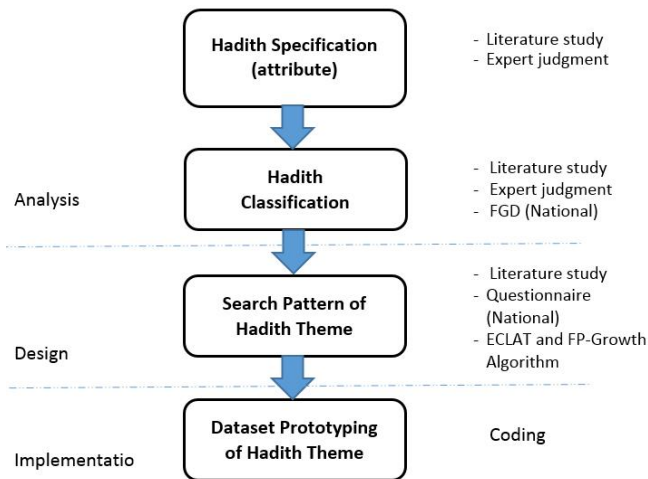


Fig. 1. Framework development

In designing the thematic tracing pattern of hadith, the dataset design stages are carried out as shown in Fig. 2.

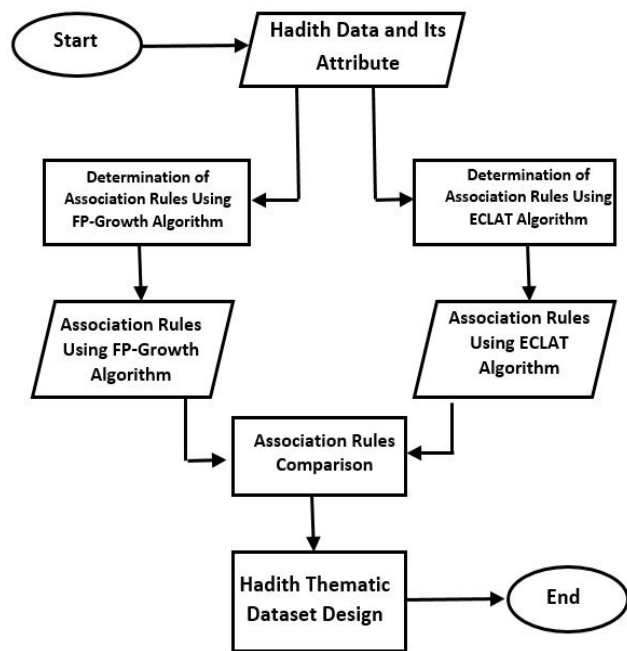


Fig. 2. Hadith dataset design process.

IV. RESULT AND DISCUSSION

A. Determination Hadith and Attribute

Books of hadith in search, which are determined are books of Popular hadith, Bhulughul Maram, Sahih Muslim, Sahih Bukhari, Riyadh Al-Salihin, and Arbain Al-Nawawi. The questionnaire provides an option to write something else. The questionnaire survey results the Bulughul Maram hadith

was the most chosen by 40%, then Sahih Bukhari by 34%, Popular Hadith by 34%, Sahih Muslim by 29%, Riyadh Al-Salihin by 11%, Kutubus Sittah 6%, Arbain Al-Nawawi 5%, Muktabah Syamilah 2%, Musnad Imam Ahmad bin Hambal 2%, Al-Lu'lu wal Marjan 1%, and others below 1%. Hadiths data collection in this research is the Bulughul Maram hadith book according to the survey results with the largest percentage.

The search of several hadith books has the attributes of sanad, theme, content of hadith, quality of hadith, and source of hadith. Sanad is someone who quotes sayings, deeds/customs/conduct directly from the Prophet. The source of the hadith is someone who collects and researches and qualifies every content of the hadith. Hadith sources consist of Al-Bukhari, Muslim, Sunan Abu Dawud, Sunan at-Tirmidhi, Sunan an-Nasa'i, Sunan Ibn Majah, and Musnad Ahmad. The quality of the contents of the hadith consists of Mutawatir, Sahih, Hasan, and Dhaif. The quality level of hadith is the truth level of hadith contents against the main source (Prophet). The quality of mutawatir hadith is the hadith quality level that is the highest truth or authenticity from the Prophet. Dhaif hadith quality is the level of hadith quality that is the lowest in truth or authenticity from the Prophet or fake. Measuring the quality of a hadith is based on 2 factors, namely the meaning and the sanad. The themes based on hadith books consist of 21 themes, 252 sanad, and 7 hadith sources. The attributes of hadith based on literature studies and expert judgments are determined as follows, the type of hadith resources, themes, hadith level and sanad. Hadith sources consist of Al-Bukhari, Muslim, Sunan Abu Dawud, Sunan at-Tirmidhi, Sunan an-Nasa'i, Sunan Ibnu Majah, and Musnad Ahmad. The themes in the search for hadiths that have been determined consist of; taharah/purification, prayer, corpse, zakat, fasting/fasting, hajj, buying and selling, marriage, criminal affairs, punishment, jihad, food, oaths, and vows, deciding cases, freeing slaves, adab, kindness, zuhud, and wara, avoiding ugliness, doing good, dhikr and prayer. However, the questionnaire provides space to write down themes that may not have been stated.

Tracing the hadith is carried out by considering the quality of the hadith in the order of Mutawatir-Sahih-Hasan-Dhaif. In addition, the search also considers Sanad Hadith 5 which represents such as Abdullah Ibn Abbas, Abu Hurairah, Aisyah, Ali bin Abi Talib, and Umar bin Khattab. The questionnaire still allows respondents to fill in additional sanad in addition to the 5 sanad.

B. Sample Spread

The target respondents include most of those who frequently search for hadith such as students, students, teachers, lecturers, and the general public. The questionnaire was created using Google Forms and distributed to educational institutions as shown in Table 1.

Table 1
Distribution of Questionnaires

No	Location	Target	Respondents
1	Faculty of Adab and Humanities (UIN Jakarta)	Religion lecturer/preacher	5
2	Faculty of Adab and Humanities (UIN Jakarta)	Student/researcher	5
3	IIQ Ciputat	Religion lecturer/preacher	5
4	IIQ Ciputat	Student/researcher	5
5	IIQ Pamulang Wates	Religion lecturer/preacher	5
6	IIQ Pamulang Wates	Student/researcher	5
7	LIPIA	Religion lecturer/preacher	5
8	LIPIA	Student/researcher	5
9	Faculty of Dirasat Islamiyah	Religion lecturer/preacher	5
10	Faculty of Dirasat Islamiyah	Student/researcher	5

C. Data Processing

The data processing process involves initial data mining activities like adjustment, selection, integration, and transformation, followed by optimization using the FP-Growth algorithm. Results from literature review and questionnaire analysis generate rules for recommendation.

1) Data Adjustment

The data adjustment process is carried out by removing incomplete data and tidying up the resulting data from the answers to the existing questionnaires so that the data results can be optimal.

2) Data Integration

This stage involves the merging of several kinds of data from various data formats or at different times in order to multiply the data used so that the results can be more accurate. The research exclusively uses survey questionnaire results for the recommendation application in this data integration process. The use of questionnaire data is taken from the attributes of the theme of hadith and sanad, while the attributes of the book have been determined from the Bulughul Maram book.

3) Data Selection

Selection of data from a set of data from questionnaire answers as a form of choice from each transaction. The application will process answers from the Hadith Book, Hadith Themes, and Sanad. The study of literature determines the value of each attribute.

4) Data Accuracy Test

Program testing is carried out to find out how strong the recommendations generated by the system are. The strength of the recommendation is measured by using the lift ratio value. The data used in this test is the entire hadith database from the Bulughul Maram Hadith book, the dataset uses data from a predetermined questionnaire, namely the hadith theme attributes and sanad attributes with minimum support 1% and minimum confidence 1% of the total data tested, 1177 datasets from survey questionnaires.

The stages of the FP-Growth Algorithm include the formation of a questionnaire dataset of 1177 data in Table 2, item frequency data in Table 3, an ordered item list in Table 4, and the creation of an FP-Tree in Fig. 5. The generation phase of the conditional pattern base and conditional FP-tree is shown in Table 5, and the frequency of item generation is shown in Table 6. While the lift ratio results greater than 1 are presented in Table 7, the test results are listed in Table 8.

Table 2
Dataset Sample

Number	Name	Hadith Theme	Sanad
1	1	Shalat	Abdullah Ibnu Umar
2	2	Shalat	Abu Hurairah
3	3	Shalat	Abdullah Ibnu Abbas
4	4	Shalat	Abu Sa'id Al-Khudri
5	5	Dhikr and Pray	Abu Hurairah
6	6	Dhikr dan Doa	Abu Hurairah
7	7	Marriage	Abdullah Ibnu Abbas
8	8	Shalat	Abdullah Ibnu Abbas
9	9	Shalat	Abu Hurairah
10	10	Shalat	Abu Sa'id Al-Khudri
11	11	Shalat	Abu Hurairah
12	12	Dhikr and Pray	Abu Hurairah
13	13	Dhikr and Pray	Abdullah Ibnu Umar
14	14	Marriage	Abdullah Ibnu Abbas
15	15	Dhikr and Pray	Abdullah Ibnu Umar
16	16	Shalat	Jabir Ibnu Abdullah
17	17	Shalat	Abdullah Ibnu Abbas
18	18	Shalat	Abu Hurairah
19	19	Shalat	Jabir Ibnu Abdullah
20	20	Shalat	Abu Hurairah
21	21	Shalat	Abdullah Ibnu Mas'ud
22	22	Marriage	Abdullah Ibnu Abbas

Table 3
Item Frequent Data

No	Itemset	Support Count	Support	No	Itemset	Support Count	Support
1	Shalat	447	37.98%	15	Fast	43	3.65%
2	Abu Hurairah	385	32.71%	16	Friendly kindness	35	2.97%
3	Dhikr and Praying	241	20.48%	17	Etiquette	32	2.72%
4	Abdullah Ibnu Abbas	118	10.03%	18	Abu Dzar Al-Ghifary	27	2.29%
5	Abdullah Ibnu Mas'ud	109	9.26%	19	Corpse	23	1.95%
6	Jihad	102	8.67%	20	Food	17	1.44%
7	Abdullah Ibnu Umar	101	8.58%	21	Abu Barzah al-Aslamy	16	1.36%
8	Marry	83	7.05%	22	Juwairiyah Binti al-Harits	15	1.27%
9	Doing Good	78	6.63%	23	Umar Ibnu khattab	14	1.19%
10	Anas Bin Malik	77	6.54%	24	Abu Darda	13	1.10%

11	Aisyah	76	6.46%	25	Buy and Sell	12	1.02%
12	Ali Ibnu Abi Thalib	72	6.12%	26	Hajj	12	1.02%
13	Abu Sa'id Al-Khudri	57	4.84%	27	Zuhud and Wara	12	1.02%
14	Jabir Ibnu Abdullah	54	4.59%				

Table 4
Ordered Item List

Data	Itemset
1151	Shalat, Abdullah Ibnu Mas'ud
1152	Dhikr dan Doa, Aisyah
1153	Dhikr dan Doa, Aisyah
1154	Dhikr and Pray, Juwairiyah Binti al-Harits
1155	Dhikr and Pray, Abdullah Ibnu Mas'ud
1156	Dhikr and Pray, Aisyah
1157	Dhikr and Pray, Juwairiyah Binti al-Harits
1158	Dhikr and Pray, Abdullah Ibnu Mas'ud
1159	Abdullah Ibnu Abbas
1160	Food
1161	Abdullah Ibnu Umar, Food
1162	Food
1163	Abdullah Ibnu Umar, Food
1164	Corpse
1165	Jabir Ibnu Abdullah, Jenazah
1166	Anas Bin Malik, Shaum
1167	Abu Hurairah, Shaum
1168	Abu Hurairah, Jual Beli
1169	Corpse
1170	Abu Hurairah, Shaum
1171	Jabir Ibnu Abdullah, Corpse

Juwairiyah Binti al-Harits	{ Dhikr and Praying:15}	{ Dhikr and Praying:15}
Abu Barzah al-Aslami	{Shalat:16}	{Shalat:16}
Food	{Abdullah Ibnu Umar:7}	
Corpse	{Aisyah:5}, {Jabir Ibnu Abdullah:10}	
Abu Dzar Al-Ghifary	{Shalat:8}, {Friendly Kindness:16}	{Friendly Kindness:16}
Etiquette	{Abu Hurairah:4}, {Anas Bin Malik:3}, {Ali Ibnu Abi Thalib:25}	{Ali Ibnu Abi Thalib:25}
Friendly Kindness	{Abu Hurairah:19}	{Abu Hurairah:19}
Fast	{Abu Hurairah:20}, {Aisyah:11}, {Anas Bin Malik:8}	{Abu Hurairah:20}
Jabir Ibnu Abdullah	{Shalat:25}, {Marry:15}	{Shalat:25}, {Marry:15}
Abu Sa'id Al-Khudri	{Shalat:47}, {Marry:10}	{Shalat:47}
Ali Ibnu Abi Thalib	{Jihad:43}	{Jihad:43}
Aisyah	{Shalat:23}, { Dhikr and Praying:26}, {Marry:3}	{Shalat:23}, { Dhikr and Praying:26}
Anas Bin Malik	{Shalat:23}, {Marry:18}, {Jihad:16}	{Shalat:23}, {Marry:18}, {Jihad:16}
Doing Good	{Abu Hurairah:41}, {Abdullah Ibnu Mas'ud:27}	{Abu Hurairah:41}, {Abdullah Ibnu Mas'ud:27}
Marry	{Abu Hurairah:6}, {Abdullah Ibnu Abbas:31}	{Abdullah Ibnu Abbas:31}
Abdullah Ibnu Umar	{Shalat:15}, { Dhikr and Praying:46}, {Jihad:33}	{Shalat:15}, { Dhikr and Praying:46}, {Jihad:33}
Abdullah Ibnu Mas'ud	{Shalat:51}, { Dhikr and Praying:31}	{Shalat:51}, { Dhikr and Praying:31}
Abdullah Ibnu Abbas	{Shalat:77}	{Shalat:77}
Dhikr and Praying	{Abu Hurairah:123}	{Abu Hurairah:123}
Abu Hurairah	{Shalat:155}	{Shalat:155}

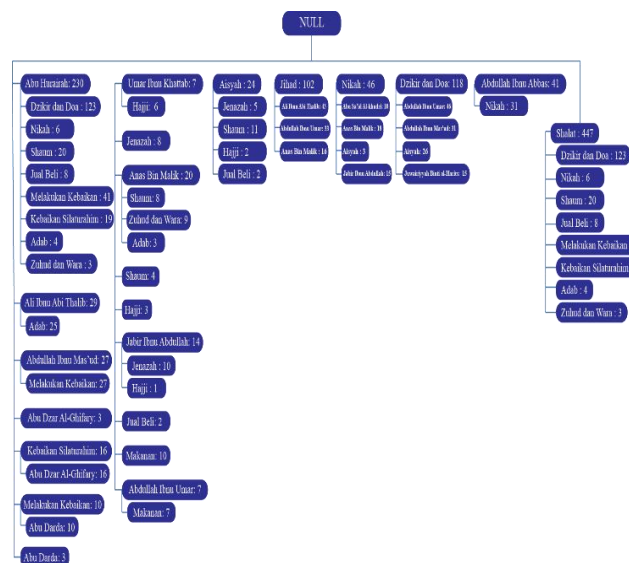


Fig. 5. FP-Tree

Table 5
Conditional Pattern Base and FP-Tree

Item	Conditional Pattern Base	Conditional FP Tree
Zuhud and Wara	{Abu Hurairah:3}, {Anas Bin Malik:9}	
Hajj	{Aisyah:2}, {Umar Ibnu khattab:6}, {Jabir Ibnu Abdullah:1}	
Buy and Sell	{Abu Hurairah:8}, {Aisyah:2}	
Abu Darda	{Doing Good:10}	
Umar Ibnu khattab	{Shalat:7}	

Table 6
Itemset Frequent Generator

No	Item	Conditional FP Tree
1	Ascetic dan Piety	
2	Hajj	
3	Buy and Sell	
4	Abu Darda	
5	Umar Ibnu khattab	
6	Juwairiyah Binti al-Harits	{Dhikr and Praying:15}

7	Abu Barzah al-Aslamy	{Shalat:16}
8	Food	
9	Corpse	
10	Abu Dzar Al-Ghifary	{Friendly Kindness:16}
11	Etiquette	{Ali Ibnu Abi Thalib:25}
12	Friendly Kindness	{Abu Hurairah:19}
13	Fast	{Abu Hurairah:20}
14	Jabir Ibnu Abdullah	{Shalat:25}, {Nikah:15}
15	Abu Sa'id Al-Khudri	{Shalat:47}
16	Ali Ibnu Abi Thalib	{Jihad:43}
17	Aisyah	{Shalat:23}, { Dhikr and Praying:26}
18	Anas Bin Malik	{Shalat:23}, {Nikah:18}, {Jihad:16}
19	Doing Good	{Abu Hurairah:41}, {Abdullah Ibnu Mas'ud:27}
20	Marry	{Abdullah Ibnu Abbas:31}
21	Abdullah Ibnu Umar	{Shalat:15}, { Dhikr and Praying:46}, {Jihad:33}
22	Abdullah Ibnu Mas'ud	{Shalat:51}, { Dhikr and Praying:31}
23	Abdullah Ibnu Abbas	{Shalat:77}
24	Dhikr and Praying	{Abu Hurairah:123}
25	Abu Hurairah	{Shalat:155}

Table 7
Lift Ratio Result Greater than One

No	Rule	Support	Conf.	Lift Ratio	Lift Ratio > 1?
1	Juwairiyah Binti al-Harits => Dhikr and Praying	1.27%	100%	4.88	yes
2	Dhikr and Praying => Juwairiyah Binti al-Harits	1.27%	6.22%	4.88	yes
3	Abu Barzah al-Aslamy => Shalat	1.36%	100%	2.63	yes
4	Shalat => Abu Barzah al-Aslamy	1.36%	3.58%	2.63	yes
5	Abu Dzar Al-Ghifary => Friendly Kindness	1.36%	59.26%	19.93	yes
6	c => Abu Dzar Al-Ghifary	1.36%	45.71%	19.93	yes
7	Etiquette => Ali Ibnu Abi Thalib	2.12%	78.13%	12.77	yes
8	Ali Ibnu Abi Thalib => Etiquette	2.12%	34.72%	12.77	yes
9	Friendly Kindness => Abu Hurairah	1.61%	54.29%	1.66	yes
10	Abu Hurairah => Friendly Kindness	1.61%	4.94%	1.66	yes
11	Fast => Abu Hurairah	1.70%	46.51%	1.42	yes
12	Abu Hurairah => Fast	1.70%	5.19%	1.42	yes

13	Jabir Ibnu Abdullah => Shalat	2.12%	46.30%	1.22	yes
14	Shalat => Jabir Ibnu Abdullah	2.12%	5.59%	1.22	yes
15	Jabir Ibnu Abdullah => Marry	1.27%	27.78%	3.94	yes
16	Marry => Jabir Ibnu Abdullah	1.27%	18.07%	3.94	yes
17	Abu Sa'id Al-Khudri => Shalat	3.99%	82.46%	2.17	yes
18	Shalat => Abu Sa'id Al-Khudri	3.99%	10.51%	2.17	yes
19	Ali Ibnu Abi Thalib => Jihad	3.65%	59.72%	6.89	yes
20	Jihad => Ali Ibnu Abi Thalib	3.65%	42.16%	6.89	yes
21	Aisyah => Shalat	1.95%	30.26%	0.8	no
22	Shalat => Aisyah	1.95%	5.15%	0.8	no
23	Aisyah => Dhikr and Praying	2.21%	34.21%	1.67	yes

Table 8
Test Result

No	Rule	Support	Conf.	Lift Ratio	Rule Satisfying Concept Tema => Sanad ?
1	If Juwairiyah Binti al-Harits then Dzikir dan Doa	1.27%	100%	4.88	no
2	If Dzikir dan Doa then Juwairiyah Binti al-Harits	1.27%	6.22%	4.88	yes
3	If Abu Barzah al-Aslamy then Shalat	1.36%	100%	2.63	no
4	If Shalat then Abu Barzah al-Aslamy	1.36%	3.58%	2.63	yes
5	If Abu Dzar Al-Ghifary then Kebaikan Silaturahmi	1.36%	59.26%	19.93	no
6	If Kebaikan Silaturahmi then Abu Dzar Al-Ghifary	1.36%	45.71%	19.93	yes
7	If Adab then Ali Ibnu Abi Thalib	2.12%	78.13%	12.77	yes
8	If Ali Ibnu Abi Thalib then Adab	2.12%	34.72%	12.77	no
9	If Kebaikan Silaturahmi then Abu Hurairah	1.61%	54.29%	1.66	yes
10	If Abu Hurairah then Kebaikan Silaturahmi	1.61%	4.94%	1.66	no
11	If Shaum then Abu Hurairah	1.70%	46.51%	1.42	yes
12	If Abu Hurairah then Shaum	1.70%	5.19%	1.42	no
13	If Jabir Ibnu Abdullah then Shalat	2.12%	46.30%	1.22	yes
14	If Shalat then Jabir Ibnu Abdullah	2.12%	5.59%	1.22	yes
15	If Jabir Ibnu Abdullah then	1.27%	27.78%	3.94	no

Nikah					
16	If Nikah then Jabir Ibnu Abdullah	1.27%	18.07%	3.94	yes
17	If Abu Sa'id Al-Khudri then Shalat	3.99%	82.46%	2.17	no
18	If Shalat then Abu Sa'id Al-Khudri	3.99%	10.51%	2.17	yes
19	If Ali Ibnu Abi Thalib then Jihad	3.65%	59.72%	6.89	no
20	If Jihad then Ali Ibnu Abi Thalib	3.65%	42.16%	6.89	yes
21	If Aisyah then Dzikir dan Doa	2.21%	34.21%	1.67	no
22	If Dzikir dan Doa then Aisyah	2.21%	10.79%	1.67	yes
23	If Anas Bin Malik then Nikah	1.53%	23.38%	3.31	no
24	If Nikah then Anas Bin Malik	1.53%	21.69%	3.31	yes
25	If Anas Bin Malik then Jihad	1.36%	20.78%	2.4	no
26	If Jihad then Anas Bin Malik	1.36%	15.69%	2.4	yes
27	If Melakukan Kebaikan then Abu Hurairah	3.48%	52.56%	1.61	yes
28	If Abu Hurairah then Melakukan Kebaikan	3.48%	10.65%	1.61	no
29	If Melakukan Kebaikan then Abdullah Ibnu Mas'ud	2.29%	34.62%	3.74	yes

The next stage is to see the results that meet the "if-then" conditions according to the values taken. These results are to be proposed in the hadith sequentially to be displayed in the recommendation, namely "Hadith theme => Sanad". So table 4.10 found rules that meet as many as 24 rules. By knowing the number of rules that meet the 1177 datasets with a minimum limit of 1% support, then the accuracy of the algorithm is calculated by (4).

$$\text{Accuracy Level} = \frac{\text{number of successful h rule}}{\text{Total Rule}} \times 100\% \quad (4)$$

The accuracy is = $(24/46) \times 100\% = 52.17\%$.

D. Use Case

The design of this application consists of design in the form of diagrams including a UC (Use Case) Diagram as shown in Fig. 6.

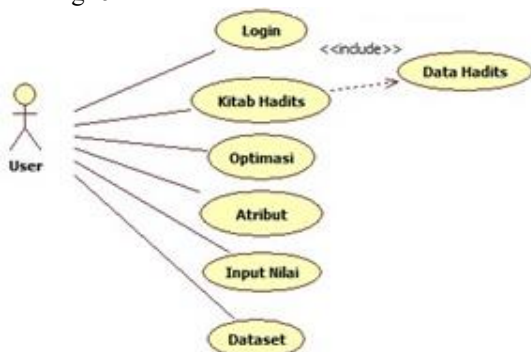


Fig. 6. Use Case Diagram for Hadith Optimization Applications

V. CONCLUSION

The FP-Growth algorithm can be used in hadith optimization applications and produces output in the form of hadith recommendations that are often used to advise the next user. The level of accuracy of the FP-Growth algorithm in optimizing the hadith of the Bhulughul Maram book from 1177 datasets is 52.17%. Which means that FP Growth is good enough at making prediction or classification on pattern thematic hadith. The pattern thematic hadith dataset can be used as a base to suggest next user for certain theme. The pattern can also be used to support Islamic educational institution to develop general thematic hadith application as needed.

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