



APPLICATION FOR LEARNING JAVANESE LANGUAGE OF BANTEN USING KNUUTT MORRIS PRATT ALGORITHM

Haris Triono Sigit

Information Technology Faculty – Informatics Eng. Dept
Universitas Serang Raya (UNSERA)
Banten Province – Indonesia

Sulistiyo

Information Technology Faculty – Informatics Eng. Dept
Universitas Serang Raya (UNSERA)
Banten Province - Indonesia

Abstract: The diversity of regional languages that exist in Indonesia is a cultural richness that must be preserved. This regional language is used as a language of conversation in everyday life in addition to Indonesian. One of them is the Javanese language of Banten that is used as the daily conversation language in Serang, Cilegon and a small part of Tangerang where the three regions are part of Banten province. This language has its own characteristics that distinguish it from the Javanese language and Sundanese. Today Javanese language of Banten is still have a lot of speakers but conservation efforts must be done because the number of speakers of this language will continue to decrease due to eroded by the times. Generally the local language is more dominated by the parents, while the children and grandchildren in this modern life are more often use the Indonesian language as well as foreign languages. Therefore as one of the preservation of this language, it is necessary to build a learning application. This learning applications is built on mobile devices that use Android operating system because the number of Android users is greater than the number of other mobile operating system user. The Javanese language of Banten learning application using Knutt-Morris-Pratt Algorithm to find string of words or sentences of Indonesian language that will be searched the equivalent of words or sentences into the Javanese language of Banten. Searching words or sentences with this algorithm is faster than the usual way of searching. The use of Knutt-Morris-Pratt algorithm within the app can increase the performance of the application.

Keywords: Algorithm, Knutt Morris Pratt, Javanese Language of Banten

1. INTRODUCTION

Indonesia has a diversity of regional languages that must be preserved. One of the many regional languages that exist in Indonesia is the Javanese language of Banten. This regional language is the result of a combination of two major cultures of Javanese and Sundanese. The largest user of Javanese language of Banten is in Serang, Cilegon and a small part of Tangerang. The dialect of Javanese language of Banten has its uniqueness because there are differences with dialect of Central Java and East Java language because this language is result of acculturation of Javanese and Sundanese language. Like Javanese and Sundanese, Javanese language of Banten also recognizes the level of *pasaran* (reguler) and *bebasan* (polite). According to the data available today, the speakers of this language are around 3 million people[1].

A language will still exist when there is still a speaker. Similarly, local languages in Indonesia, its existence will be preserved as many people speak it in everyday language conversations. Based on the fact that has happened in Indonesia, many languages are experiencing extinction. It is estimated that the number of regional languages in Indonesia reaches 726 languages, but those that have been mapped have 456 regional languages only [2]. The non-mapped regions of the language are likely to become extinct because they are no longer the speakers.

By looking at the problems mentioned above, did not rule out that the Javanese language of Banten will go extinct if there are no speakers. Currently there is a tendency of this language speakers will be reduced due to eroded the rate of modernization. Javanese language of Banten is spoken only by the parents, while the children and grandchildren whose life is modern more often use the Indonesian language than this language. As well as in the Rawa Gondang community

in Cilegon, after sampling of 29 families, it is found that the children of 59% of families could not speak Javanese language of Banten. This condition also happened in Lopang Gede village, Serang city. In the previous generation, this village still have many speakers of Javanese language of Banten especially speakers of *bebasan* language. In the daily life from children up to adults using this language. But at this time there has been a shift, the *bebasan* language only spoken by villagers aged 35 years or older. Whereas villagers under the age of 35 years old can only use the *pasaran* language.

The results of research conducted in Gerem - Cilegon city stated that Javanese language of Banten still survives in the family domain (71.56%), neighbors (56%), and religious (64.33%). Instead, Javanese language of Banten did not survive in the realm of intimacy (47.17%), education (40.5%), transactions (41%), and government (32.5%). In terms of age group, Javanese Serang language still survive in groups of children (75.42%). whereas in adolescent group only 38,88% and adult group only 43,75% [3]. Based on the above problems, it is necessary to take concrete steps to preserve the Javanese language of Banten. Today Javanese language of Banten has been included in the curriculum of elementary school into a lesson that is local content (*Mulok*). With the Javanese language of Banten for elementary school students, there is hope that the Javanese language of Banten will still exist and maintained its sustainability. However, because the lessons of this language is only formal to the elementary school level, it is necessary to build a media or supporting facilities for learning activities that can be used by both elementary school students and by the general public. One of them is to build a language learning applications for mobile devices where today almost everyone has considered the use of this gadget as a

necessity. Javanese language of Banten's application will be applied to mobile devices that run Android Operating System. The Android platform was chosen as the base of Javanese language of Banten learning applications because Android-based Smartphone users are the users with the largest number compared with other Smartphone that using other operating system. The application of Javanese language of Banten will be made as simple as possible with an attractive appearance that helps users easily understand the Javanese language of Banten quickly, especially in terms of differentiating the level of *pasaran* (reguler) and *bebasan* (polite).

2. ANDROID

Android is a mobile operating system that adopts the Linux operating system, but has been modified [4]. In 2005 Android, Inc. was taken over by Google by taking over all of Android's work including the team that developed Android. The main advantage of Android is the integrated application approach. Developers only concentrate on the application alone, the application can run on several different devices as long as still powered by Android or in other words the developer does not need to consider the needs of the type of device.

Android is hailed as the first complete, open and free mobile platform [5]. That is as can be explained as follows:

- Complete**
Android is a secure operating system and provides many tools in building software and enabling application development opportunities.
- Open**
The Android platform is provided through an Open Source license so developers can freely develop apps.
- Free**
Android is a platform / application that is free to develop. No licenses or royalty fees to be developed on the Android platform. Applications for Android can be distributed and traded in any form

3. ALGORITHM

Algorithm is a procedure that contains steps to solve a problem or in other words Algorithm is a sequence of steps to solve a problem [6]. Algorithm is the heart of computer science or informatics. Many branches of computer science are referred to in the terminology of algorithms, such as routing algorithms in computer networks, brensenham algorithms for straight-line drawing, Knutt-Morris-Pratt algorithm for finding patterns in text, and so on.

Algorithms written in computer language are called Programs. The computer language used in writing programs is called the Programming Language. People who write computer programs are called Programmers, and the activities of designing and writing programs are called Programming. In programming is the activity of writing program code, this activity is called Coding.

4. KNUTT MORRIS PRATT ALGORITHM

The Knuth-Morris-Pratt (KMP) algorithm is one of the string search algorithms, developed separately by James H. Morris with Vaughan R. Pratt in 1966, and by Donald E.

Knuth in 1967. However, both published simultaneously in the year 1977 [7]. How this algorithm works:

- The Knuth-Morris-Pratt algorithm begins to match the pattern at the beginning of the text.
- From left to right, this algorithm will match the characters per Pattern character with characters in the corresponding Text until one of the following conditions is met.
 - The characters in Pattern and in the compared Text do not match (mismatch).
 - All characters in Pattern match. Then the algorithm will notify the invention in this position.
- The algorithm then shifts Pattern based on the next table (jump), then repeats step 2 until the pattern is at the end of the text [8].

The Example of Knutt Morris Pratt Algorithm as it is shown in figure below :

Text = Menjual Jejualan

Pattern = Jualan

	m	e	n	j	u	a	l		j	e	j	u	a	l	a	n
1	j	u	a	l	a	n										
2		j	u	a	l	a	n									
3			j	u	a	l	a	n								
4				j	u	a	l	a	n							
5									j	u	a	l	a	n		
6										j	u	a	l	a	n	
7											j	u	a	l	a	n

Figure 2. The Example of Knutt Morris Pratt Algorithm

Text = Ngewade Wewadean

Pattern = Wadean

	n	g	e	w	a	d	e		w	e	w	a	d	e	a	n
1	w	a	d	e	a	n										
2		w	a	d	e	a	n									
3			w	a	d	e	a	n								
4				w	a	d	e	a	n							
5									w	a	d	e	a	n		
6										w	a	d	e	a	n	
7											w	a	d	e	a	n

Figure 3. The Example of Knutt Morris Pratt Algorithm

5. UNIFIED MODELLING LANGUAGE

UML is a tool that will be used for system design. UML stands for Unified Modeling Language which means a standard modeling language and is a consistent means of communication in support of current developers [9]. UML is one of the most widely used language standards in the industry to define requirements, create analysis and design, and describe architecture in object-oriented programming [10].

6. ANALYSIS AND DESIGN

Prior to the design, an analysis of users with the following results:

1. Users have a smartphone with a minimal Android operating system version 4.2 (Jelly Bean) and able to operate a smartphone with Android operating system and its applications.
2. Users are individuals who want to master the Javanese language of Banten from start to base level to advanced level.
3. Users with high mobility level, thus require learning Javanese language of Banten application on mobile devices that can help speed up the user mastering the Javanese language of Banten.

The design of Javanese language of Banten learning application uses Unified Modeling Language (UML). One of the diagram used in the design is Use Case Diagram. Use case diagrams describe the relationship between actors and activities that they can do to the system. The following is the learning application design of Javanese language of Banten described with use case diagram below :

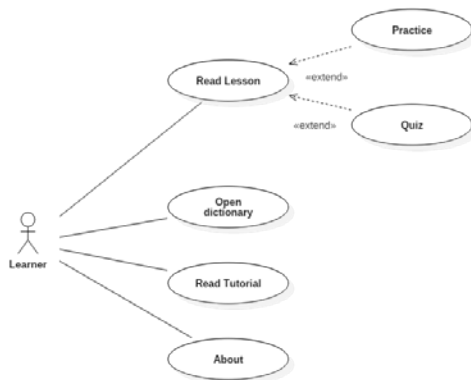


Figure 2. Use case Diagram
Javanese Language of Banten Learning Application

a. Actor Definition

Actor or system user is something outside the system that can be human, device or any other system. In this Use case Diagram, the actor is defined as the explanation in the table below.

Table 1: Actor Definition

Num	Actor	Description
1.	Learner	Individuals who operate Javanese language of Bantent learning applications

b. Definition of Use Case

After determining the actor, the next step is to define what the actor can do to the app.

Table 2: Definition of Use Case

No	Use case	Description
1.	Read Lessons	Use Case describes the user process of reading the subject matter of Javanese language of Banten.

2.	Practice	Use Case describes the process whereby the user does the exercises.
3.	Quiz	Use Case describes the process whereby the user does quiz questions and scores.
4.	Open Dictionary	Use Case describes the process by which a user uses a dictionary to translate words or sentences.
5.	Read Tutorial	This use case describes the process by which the user reads a tutorial that contains how to run the application.
6.	About	Use Case describes the process by which the user sees a description of the application's identity such as the name of the creator and its version.

c. Use Case Scenario

Use cases that have been defined, then translated into scenarios. The scenarios in each use case section show what processes occur in each use case, where the user gives commands on each part and what response the system gives to the user after the user gives commands on each of the parts of the use case.

The following is a scenario of each use case in the application of Javanese language of Banten.

Table 3: Use Case Scenario Reading Lesson

Actor Action	System Reaction
1. Select Lesson's Menu	2. Displays a lesson list of 9 lesson levels
3. Select one of learning Lessons	4. Displays the subject matter of the language

Table 4 : Use Case Scenario of Practice

Actor Action	System Reaction
1. Select Lesson's Menu	2. Displays a lesson list of 9 lesson levels
3. Select one of learning Lessons	4. Displays the subject matter of the language
5. Pressing the Exercise button	6. Displays the exercise questions page in multiple-choice

Table 5: Use Case Scenario of Quiz

Actor Action	System Reaction
1. Select Lesson's Menu	2. Displays a lesson list of 9 lesson levels
3. Select one of learning Lessons	4. Displays the subject matter of the language
5. Pressing the Quiz button	6. Displays the quiz questions page in the multiple-choice form and once all the questions are done the quiz value will appear

Table 6 : Use Case Scenario Open Dictionary

Actor Action	System Reaction
1. Selecting a dictionary menu	2. Displays the dictionary page. Consisting of 2 categories namely Indonesia - Java Banten or Java Banten - Indonesia.
3. Select a dictionary category	4. Enable the text box for word input or sentence
5. Enter a word or phrase to be translated	6. Displays the translation of words or sentences

Table 7 : Use Case Scenario Read Tutorial

Actor Action	System Reaction
1. Selecting a tutorial menu	2. Displays a tutorial page that contains how to run the application

Table 8 : Use Case Scenario of About

Actor Action	System Reaction
1. Selecting an about menu	2. Displays a page containing information about the version of the app and the app builder

7. THE PROCESS OF TRANSLATING WORDS OR PHRASES USING THE KNUTH MORRIS PRATT ALGORITHM

The implementation of Knuth Morris Pratt Algorithm into the application can be explained as follow:

1. Users can enter a word or phrase to be translated.
2. When a user enters a single word, the algorithm will match the string on the list of existing words in the database. But when the user enters a sentence, then the sentence will be split into a separate word and the algorithm searches the translation of each word in the database then each translated word is merged back into translation in one sentence.
3. When a user enters a word or sentence in the Indonesian language, the application will translate into Javanese language of Banten either regular level (*Pasaran*) or polite level (*Bebasan*).

4. When a user enters a sentence in the Javanese language of Banten, the application will advise on the use of appropriate regular (*Pasaran*) and polite (*Bebasan*) language before translating it into Indonesian.

8. CONCLUSION

Based on the results of the research described above, it can be concluded as follows :

1. The Application for learning Javanese language of Banten built by applying the Knuth Morris Pratt algorithm can simplify and accelerate the user's understanding of the Javanese language of Banten.
2. Knuth-Morris-Pratt algorithm is converted into program code and inserted into the composition of program code in Javanese language of Banten learning application to improve performance in searching the word translation or sentence. By using this algorithm, the search for word or sentence translation becomes faster.

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