

Modeling of number to Javanese voice recursion using sliding through audio window location

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Submission date: 04-Jun-2020 05:19PM (UTC+0700)

Submission ID: 1337605325


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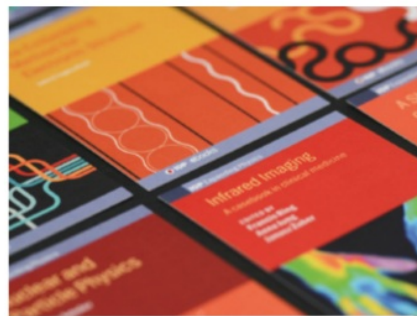
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 To cite this article: Solekhan *et al* 2020 *J. Phys.: Conf. Ser.* **1430** 012039

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Modelling of Number to Javanese Voice Recursion using Sliding through Audio window Location

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Abstract. This study tries to display a number to Javanese voice using recursion through sliding audio location. The modelling process is done by making the conversion of number to text and number to index, which is then used to create a voice index. Furthermore, the audio recording is adjusted to the voice index created. This audio recording is then carried out the process of determining the location of the voice index. When the numbers are entered, this number will change to the index form, from this index the next will be the location of the voice index, and from this voice index then play according to the location of the voice index. From the test results, 999 conversions can go as planned, and can change from number to Javanese voice.

1. Introduction

Indonesia is a country with many islands, which has a diversity of cultures and languages there are about 200 more languages. On the island of Java there are several languages used including Baduy, Betawi, Javindo, Javanese, Kangean, Cirebon, Madurese, Osing, Pecok, Sundanese and Tengger language. Javanese language can be divided into two parts ngoko language and kromo language. For the use of formal and politeness usually used Javanese kromo.

Most public queue systems in Java, there are still many notifications only in Indonesian. For some users it will be difficult to understand notifications if they only know Javanese or others. So we need a notification system that is able to sound in Indonesian and also in others language for example in Javanese language.

Number to Javanese voice is a way to convert numbers into audio Javanese language voice. Nowadays there are many uses of voice in research. Among them Voice is used for Visually Impaired individuals [1], some are even used for Notification System Based on Hand Movement Tracking as in research [2]. Besides that there are also those who use it in the Man-Machine Interface (MMI) using voice technology [3].

For some situations there are also those who use text to voice for impaired people [4] and in medical [2]. Voice can also be used for smart disaster notification system [5] and also as a web account secure [6]. None of these studies have discussed Javanese voice for notifications. Besides being useful for users who speak Javanese, this system will help also understanding for users who speak Indonesian to understand Javanese Language.

This paper will describe the process of converting numbers into Javanese voice. To convert a number into sound, it can be done by utilizing audio recording of Javanese voice. The audio used is not separated, but tagged by using the location of the audio voice to be played according to the number index. This research will use the splitting location audio window process to change the number to Javanese voice.



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2. Research Method

To model this system, it is done with an open source programming language and can be used on various operating systems. For this stage using the python programming language. Python Language is a very popular programming language with relatively easy and powerful usage.

For the number to javanese voice using recursion method, it is done by utilizing the function of converting numbers to text, and also changing to index pattern. The function is then used to arrange conversion from number to index. In the next step, it is a function of changing number to voice, in this section following the first pattern by changing the index into voice-index, as shown in table 1.

Table 1. Notification scheme.

voice																
Index	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Javanese Text and Voice	Blank	Setunggal	Kalih	Tigo	herd	Gangsal	Enem	Pitu	Wolu	Songo	Sedoso	Setunggal Welas	Welas	Doso	Setunggal atus	atus

From Table 1. For the text to voice conversion function to run as expected, the voice-index is prepared for the initial stage. Javanese voice recordings are performed in a sequence tailored to the voice index. After that in each voice index the location of voice start and end of voice is selected, for all voice indexes. Voice index is obtained from audio recordings sequentially referring to the number-index sequence. Javanese voice recordings, arranged in sequence as Table 1., so that only one audio is needed. For the number to index function using the python language can be seen in Code 1.

```
def number2index(bil):
    number=["","1","2","3","4","5","6","7","8","9","10","11","12","13","14","15"]
    Result=""

    n = int(bil)
    if n >= 0 and n <= 11:
        Result = Result + figures[n]
    elif n < 20:
        Result = number2index(n % 10) + figures[12]
    elif n < 100:
        Result = number2index(n / 10) + figures[13] + number2index(n % 10)
    elif n < 200:
        Result = number[14] + number2index(n - 100)
    elif n < 1000:
        Result = number2index(n / 100) + figures[15] + number2index(n % 100)
    return Result
```

Code 1. Number to index

From Code 1. it can be used to change the number to voice, by recording a voice in accordance with a pattern like Table 1. The results of the recording made are then marked starting and ending location.

3. results and Analysis

After we know the conversion model, audio recording is done in the order as in Table 1. To record audio Javanese voice can be done using an application on a PC or by using an Android application.

In the initial stages of recording done using the WAV format. The use of the WAV format was chosen because it was to facilitate further processing. Furthermore, the results of the audio recording mark the location of the audio. To mark the location of the audio can be done by using software. At this stage audacity software is chosen because it is based on opensource and can be used on a variety of Operating Systems. For the results of the recording can be seen in Figure 1.

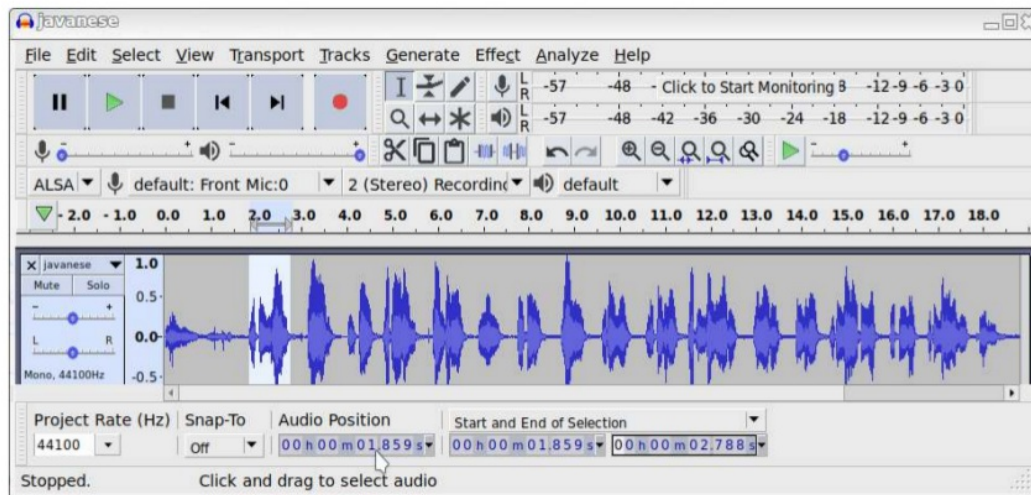


Figure 1. Audio Recording

From Figure 1. is the result of recording in the order according to Table 1. The audio of this recording, then the audio location is determined. For location determination, see Code 2.

```
split = np.array([[0,0],[1859,2788],[3123,3748],[4052,4616],[4784,5622],[5881,6658],[6871,7587],
[7754,8410],[8699,9354],[9628,10268],[10573,11365],[11487,12675],
[12949,13650],[13833,14534],[14625,15783],[15905,16636],])

voice, fs, n = wavread('Javanese.wav')

vs = split*fs /1000

def muni(number):
    return play(voice[vs[number] [0]: vs[number] [1]])

def suoro(n):
    g = number2index(n)
    h = g.split()
    for i in h:
        muni(int(i))
```

Code 2. Number to Voice

From the sample in Code 2. split is the location of the sound index. So from the function in code 1 and code 2, it can be converted from number to javanese voice with output in the form of sound. To find out whether the function is as expected, a test which includes:

1. Number to text testing
2. Number to index testing
3. Number to voice testing.

The results of these tests can be seen in Table 2.

Table 2.Testing Text to Voice

Nb	id	Javanese	V	Nb	id	Javanese	V
1	1	Setunggal	√	669	6 15 6 13 9	Enematus Enemdosong Songo	√
2	2	Kalih	√	670	6 15 7 13	Enematus Pitudosong	√
13	3 12	Tigowelas	√	671	6 15 7 13 1	Enematus Pitudosong Setunggal	√
14	4 12	Sekawanwelas	√	672	6 15 7 13 2	Enematus Pitudosong Kalih	√
15	5 12	Gangsawelas	√	673	6 15 7 13 3	Enematus Pitudosong Tigo	√
45	4 13 5	Sekawandosong Gangsal	√	674	6 15 7 13 4	Enematus Pitudosong Sekawan	√
46	4 13 6	Sekawandosong Enem	√	680	6 15 8 13	Enematus Woludosong	√
47	4 13 7	Sekawandosong Pitu	√	681	6 15 8 13 1	Enematus Woludosong Setunggal	√
48	4 13 8	Sekawandosong Wolu	√	682	6 15 8 13 2	Enematus Woludosong Kalih	√
49	4 13 9	Sekawandosong Songo	√	683	6 15 8 13 3	Enematus Woludosong Tigo	√
50	5 13	Gangsaldosong	√	684	6 15 8 13 4	Enematus Woludosong Sekawan	√
81	8 13 1	Woludosong Setunggal	√	685	6 15 8 13 5	Enematus Woludosong Gangsal	√
82	8 13 2	Woludosong Kalih	√	691	6 15 9 13 1	Enematus Songodosong Setunggal	√
83	8 13 3	Tigo Woludosong	√	692	6 15 9 13 2	Enematus Songodosong Kalih	√
96	9 13 6	Songodosong Enem	√	693	6 15 9 13 3	Enematus Songodosong Tigo	√
97	9 13 7	Songodosong Pitu	√	694	6 15 9 13 4	Enematus Songodosong Sekawan	√
98	9 13 8	Songodosong Wolu	√	695	6 15 9 13 5	Enematus Songodosong Gangsal	√
99	9 13 9	Songodosong Songo	√	696	6 15 9 13 6	Enematus Songodosong Enem	√
100	14	setunggal atus	√	704	7 15 4	Pituatus Sekawan	√
101	14 1	setunggal atus Setunggal	√	705	7 15 5	Pituatus Gangsal	√
137	14 3 13 7	setunggal atus Tigodosong Pitu	√	706	7 15 6	Pituatus Enem	√
138	14 3 13 8	setunggal atus Tigodosong Wolu	√	707	7 15 7	Pituatus Pitu	√
220	2 15 2 13	Kalihatus Kalihdosong	√	708	7 15 8	Pituatus Wolu	√
221	2 15 2 13 1	Kalihatus Kalihdosong Setunggal	√	709	7 15 9	Pituatus Songo	√
316	3 15 6 12	Tigoatus Enemwelas	√	710	7 15 10	Pituatus Sedosong	√
317	3 15 7 12	Tigoatus Pituwelas	√	711	7 15 11	Pituatus Setunggal compassion	√
425	4 15 2 13 5	Sekawanatus Kalihdosong Gangsal	√	720	7 15 2 13	Pituatus Kalihdosong	√
426	4 15 2 13 6	Sekawanatus Kalihdosong Enem	√	997	9 15 9 13 7	Songoatus Songodosong Pitu	√
427	4 15 2 13 7	Sekawanatus Kalihdosong Pitu	√	998	9 15 9 13 8	Songoatus Songodosong Wolu	√
564	5 15 6 13 4	Gangsaldatus Enemdosong Sekawan	√	999	9 15 9 13 9	Songoatus Songodosong Songo	√

From Table 2. is the result of conversion testing from number to Javanese voice. In that table, Nb is Number, Id is index, V is Voice. For the number to index function in column 2, as well as for number to Javanese text in column 3 and number to voice in column 4.

In this test audio recording Javanese voice is used, and from this file the voice index and location are determined. So splitting is based on voice index, thus saving audio size.

In this system it is able to convert a maximum of up to 999. For testing, 999 testing (from 1 to 999) is carried out, in this paper, only a few (60 lines) are taken to make it not too long. The test shows that the system can work as planned.

4. Conclusion

From the test results, it can be seen that the use of sliding windows saves and simplifies the process of selecting and converting number to Javanese voice. Seen from the results of testing the number to Javanese voice can work well, and is able to change up to a number from 1 to 999. To increase the maximum conversion limit, it can be done by adding an index and voice index.

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