Tone Beat Counter using Excel Macro

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Abstract—**In our life, it is very common for us to meet music. With the current technology we have right now, it is very likely that something common such as music is processed by using softwares. There are softwares for composer, sound processing, etc. This paper is about processing a score. We can see a song representation in the scores. One thing we can program is to count how many beat does a specific tone play in that song (represented by the score). This paper explain the use of Microsoft Excel and "Partitur" as a font to make a score. Then, adding a program using the developer tools. The program that is explain here is a tone beat counter. In other words, the program will count how many beat does a specific tone (user define) play in that song.**

Keywords—music, score, beat

I. INTRODUCTION

Music is sounds that are sung by voices or played on musical instruments (merriam-webster.com). It is very commong for us to meet music in evveryday life. It is filled with many instrument all around the world since a very long time ago. As we know, music appear before technology develop like today. When music appear, it has no connection with technology. But we can see nowadays, there are electric musical instrument. It uses technology to improve music.

There are ways to improve music by using technology. We have softwares right now that can improve music. Come to think of it. The world has changed into automation where technology make things easier, and technology have to make music production and processing easier. This paper will focus on how technology can help us to process a numbered musical score

II. LITERATURE STUDY

There are a lot of tools that we can use to build a music from computers. We have audacity (music processor), noteworthy (composer), and other software. Those software are a little bit hard and users need to train or study before using it.

One thing that is very important in music composing is scores. There is always a score in every song. The scoe may contain only the melody, but can also contain every single instrument in the song. How about the tools (softwares) we can use to build scores? Well, there are plenty of tools. Some are free, some are licenses (commercials). The important thing is user friendly.

This paper focus on number notation score (the score that use a nuber to represent tone). Here are some most common software we usually use that we can actually use to make scores.

A. Microsoft Word

Of course Ms. Word are very common to process word. But we can use it to make poster and catalog as well. Ms. Word are flexible in terms of feature. We can put table inside, we can make a textbox, etc.

We can use Ms. Word to make a score. But it is hard to make a template since Ms. Word starts with a blank page and have no provided templates for making a score.

B. Microsoft Excel

Ms. Excel is also good. It is better than Ms. Word in terms of structure. Excel uses cells and it help us not only to tidy up the score, but also to process each beat. Similar to Ms. Word, Ms. Excel is also common, tough more people use word than excel

III. ANALYSIS AND SOLUTION

A. The Main Software

For a good reason, we will use Ms. Excel to make the score. Because they provided cells. It's easier to process cell and to format (manipulate the structure so it's easy for musician to see).

It is very important that we have standardize template so that the program can be generic to any score we have.

B. Font

There is a font named "Partitur". It's a simple and good font to make a score. That is the font we will use. Of course, it doesn't provide a latin alphabet or letter. So, we will also use another font for title and other notes.

C. Programming Language

Excel provide a developer tools. And we can put and manipulate code or programs in VBA (Visual Basic for Applications). So, we will use VBA.

IV. IMPLEMENTATION AND EXPERIMENT

A. Score

This is the score used for the experiment :

B. Algorithm

This is the algorithm that I use to implement this tone beat counter (written in visual basic) :

```
Sub Button1_Click()
    'Kamus
    Dim numbers() As String, size As Integer
    Dim col As Integer
    Dim row As Integer
    Dim i As Integer
    Dim s As String
    Dim c As Range
    Dim nada As String
    Dim count As Single

    'Algoritma
    col = Range("AA9")
    row = Range("AA10")
    size = col * row 'menentukan ukuran array
    ReDim numbers(size)
    i = 1
    s = Range("AA7") + ":" + Range("AA8")
    nada = Range("AA11")

    'insert to array
    For Each c In Range(s)
        numbers(i) = c.Value
        i = i + 1
    Next c

    'count nada
    count = 0
    For i = 1 To size
        If (numbers(i) = nada) Then
            count = count + 1
        ElseIf (InStr(numbers(i), nada) > 0) Then
            If (Mid(numbers(i), InStr(numbers(i), nada) - 1, 1) = "-") Then
                count = count + 0.5
            Else
                count = count + 0.25
            End If
        End If
    Next i

    'Terminasi
    Range("AF5") = count
End Sub
```

C. Result

This is the result screen shot from the excel sheet :

D. Suggestion for Further Development

The program I made is only count the number of specific tone. There are many assumption that I make and limitation for the program. There are still many open suggestion for more development in score processing.

First is to make a better tone beat counter. Sometimes scores have a loop notation such as room, D.S, and else. The current program doesn't handle that. But it's programmable even tough the implementation might be harder. And from beat counter, we can go further analysis by making graph (beat vs tones) etc.

Other suggestion for further development is to process the scores even more. We can make a program that translate number notation scores to block notation. Or maybe we can turn the scores into the sound we like. All we need to do is to make a standard of how we type scores in the Ms. Excel, and use the developer tools to process each cell.

V. CONCLUSION

Music has been established since old days, before there are sufficient technology. Now, we have technology, and many things has already become automation. The current technology is an opportunity for us to build a better music. We have many tools related to music. We can use many tools we have right now to improve music processing. But what about scores? There aren't sufficient software or programs nowadays to process simple number notation scores.

This paper is about my research to use microsoft excel as the main tools. By using the developer tools in Ms. Excel, we can make a program to process scores. For example, I make a program to count the beat of a tone in a song. But furthermore, we can expand to make a program that process scores even better.

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