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Final Project Report

Project Members:

1) Abdul Haziq Bin Abd Khalid	B031810256
2) Ahmad Naufal Bin Mohd Saleh	B031810382
3) Muhammad Nabil Imran Bin Solehan	B031810234
4) Muhamad Nur Bin Muhamad Zaidi	B031810314

Introduction

Listening to music has become one of the necessary factors in our daily life to achieve a peace of mind to some people. The aim of this project was to develop a software centered on a particular or multiple music artists that can generate song lyrics.

The goal of this project is to help users ranging from artists or just normal people that are having trouble in thinking up lyrics for a song themselves. Although the LyricBot does not always rhyme or have the right pronunciation, the user can easily change the lyrics to create songs that make sense and have the original artist's sound.

Analysis of the System

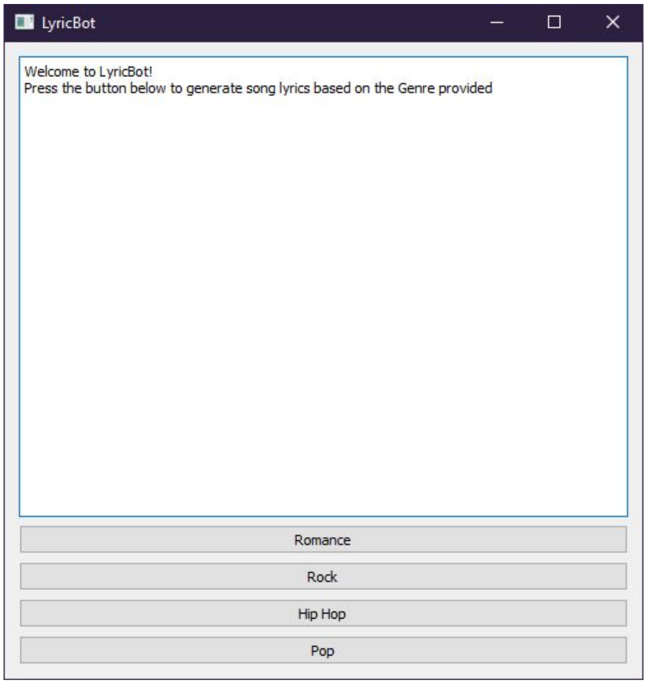
Creating lyrics is not a simple task at all because it requires not only a clear understanding of the natural language processing, but also a knowledge of songwriting techniques. Some people find that it is hard to create a song or lyric because they do not know how the flow of a song should be. So the system helps give the idea to the user to create their own lyrics based on the genre chosen by them.

Each song genre has a different song structure which we have analysed that a song structure also plays an important role in creating a song. The system also provides a common song structure for the user. For example, song structure for a romance genre is not suitable for the hip hop genre because the music flow is different. Romance songs usually do not have a hype or fancy beat compared to hip hop and that is why the system has a different song structure for each genre.

Design

Tool and library used when it comes to design of the User Interface (UI) are Qt designer and PyQt5. The mentioned tools need to be installed in the python environment. We chose this type of design because it is simple and easy to use.

LyricBot GUI



Welcome to LyricBot!
Press the button below to generate song lyrics based on the Genre provided

Figure 1: UI of the system.

The UI consists of five elements which are text browser, romance button, rock button,hip hop button and pop button. Each element of the UI is created by using PyQt5. Then we linked to the python files by using the PyQt5 library. Each button was connected to each process of the lyric generator and the output should be displayed at the text browser using the append function. Unfortunately, we cannot display the generated lyric using the append function because it would not accept a process and only accept strings. Therefore, we decide to displayed it in console and using the UI as a controller.

LyricBot Model

When training our model, we chose to use the Markov Chain. A Markov Chain is a stochastic model. A stochastic or random process is a mathematical object commonly described as a family of random variables in probability theory and related fields. Markov Chain describes a sequence of possible events in which the probability of each event depends only on the state attained in the previous event.

Our model will be trained with lyrics from 4 different genres which are Romance,Pop,Hip Hop and Rock. Each genre will have multiple songs lyrics based on their respective genre from which the Markov Chain will use to mold and create our model.

The model will then be able to generate song lyrics based on 4 different genres that are stated before. It will create new sequences of possible lyrics based on the data that it had. This will ensure that the output for genre Romance will always be about Romance due to the data that our model had been trained with. This is also true for the other genres.

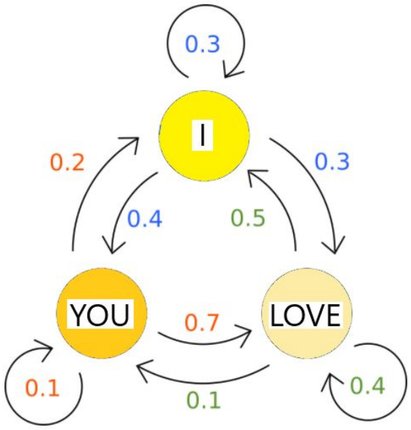


Figure 2: Example of Markov Chain

Implementation

Every song has a genre or type that describes the style or element of music. Each genre has a structure that contains verses, choruses and bridges. The arrangement of these structure components depends on the genre. These structure components arrangement gives different effects and emotions on the song. Our model will generate the lyrics based on the structure of the chosen genre.

Pop

For the pop genre, we use the common song structure to generate the lyrics even though this genre has many versions of song structure depending on the composer of the song. These are the structure of the pop genre:

1. Verse 1
2. Chorus
3. Verse 2
4. Chorus
5. Bridge
6. Chorus

The total amount of words and lines for the verses and choruses are ranged between six to eight words or lines and the difference in total number of words or lines for the verses and choruses are not that big. However the bridge part contains fewer words and lines compared to the verses and choruses because this part is often being sung just for a short amount of time. The only way to differentiate the verses and choruses part depends on the musician and singer because those parts often sound different depending on how the musician or singer sings the part and it is hard to differentiate both verses and choruses using words and lines.

Romance

For the Romance genre, we use the standard romance song structure which is :

1. Verse 1
2. Chorus x2
3. Verse 2
4. Chorus x2
5. Final Chorus

Each line for verse and chorus will not have too many words as romance songs tend to be sung slowly and with a fiery passion. Therefore, few words will do the trick better.

Rock

In the Rock genre, we use the standard song structure of a rock song which consist of:

1. Verse 1
2. Chorus
3. Verse 2
4. Chorus
5. Bridge
6. Final Chorus

The significant difference between rock and others is the usage of a bridge in the song. Usually in a rock song, the bridge used to connect a part of the song to a verse or to a final chorus of the song. Bridge usually the slow part of the song, to give listener time to breath, before the climax of the song.

HipHop

For the Hip Hop genre, we use a common structure which contains intro, hook, verse and outro. The verse aka the chorus is typically the busiest part of the hip hop song. This is where most of the instruments are presented which creates a high point in the song and oftentimes carries some type of melody. In this case, the song structure is:

1. Intro
2. Hook
3. Verse 1 (rap)
4. Hook
5. Verse 2 (rap)
6. Hook
7. Outro

The outro is typically where the song fades out. Sometimes a hook may be repeated a second time in this place. Also at times there may be a change in musical arrangement such as taking out the drums to lower the energy level as was done previously in the intro.

The Strength And Weakness of the System

One of the strengths of this system is that the Markov Chain can be trained quickly and the system can generate lyrics based on new data on-the-go without taking too much time.

Another strength of using Markov Chain to train our model is that the lyrics produced have a high chance of having the correct grammar. Apart from that, each time the lyrics are generated, it will always give different results. This means that the user could use it many times while still having a fresh set of lyrics each time.

However, the lyrics produced also have a high chance of not making any sense in terms of context. The grammar would be correct but the context just doesn’t seem related or quite right. This is one of the major weaknesses of the system as a song generally requires meaningful context to be understood by people.

The generated lyrics also contain certain symbols like open and close bracket since we didn’t do normalization. The words generated sometimes include a symbol like “(would”. These problems don't affect the context or meaning of the words or sentences but the lyrics displayed will look messy.

Ideally, the lyrics generated should be displayed in the text browser but the function for displaying, the function append, would display only strings instead of a process of generating strings. In the end, we have no choice but to use the console as a main display of the lyric generator.

Conclusions

For future enhancements, we will add more songs genre to expand the system and will improve the rhyme of the lyrics so that users will get a better experience using the system. We will also do filtering or normalization on the lyrics used to remove all the unwanted symbols so that we can properly display the lyrics. For the UI of the system, we should be able to find other ways to display the generated lyrics in the future and improve our system flows of displaying lyrics.

Our group opinion upon completing the system development is mostly unsatisfied. This is because we are not able to implement a lot of the things that we had originally planned into the final product. This is mostly due to time restrictions and lack of resources. Hence the dissatisfaction feelings that we had.

The system may contribute to people who have problems in creating a song and ease their work and also might boost their career as an artist. The system can be used by anyone who wishes to create a song for themselves. Sometimes creating lyrics can help someone to express their feelings and they might not have the words to do it. That's how useful the system can be.