Constructing a Platform for Generating Music with Emotion

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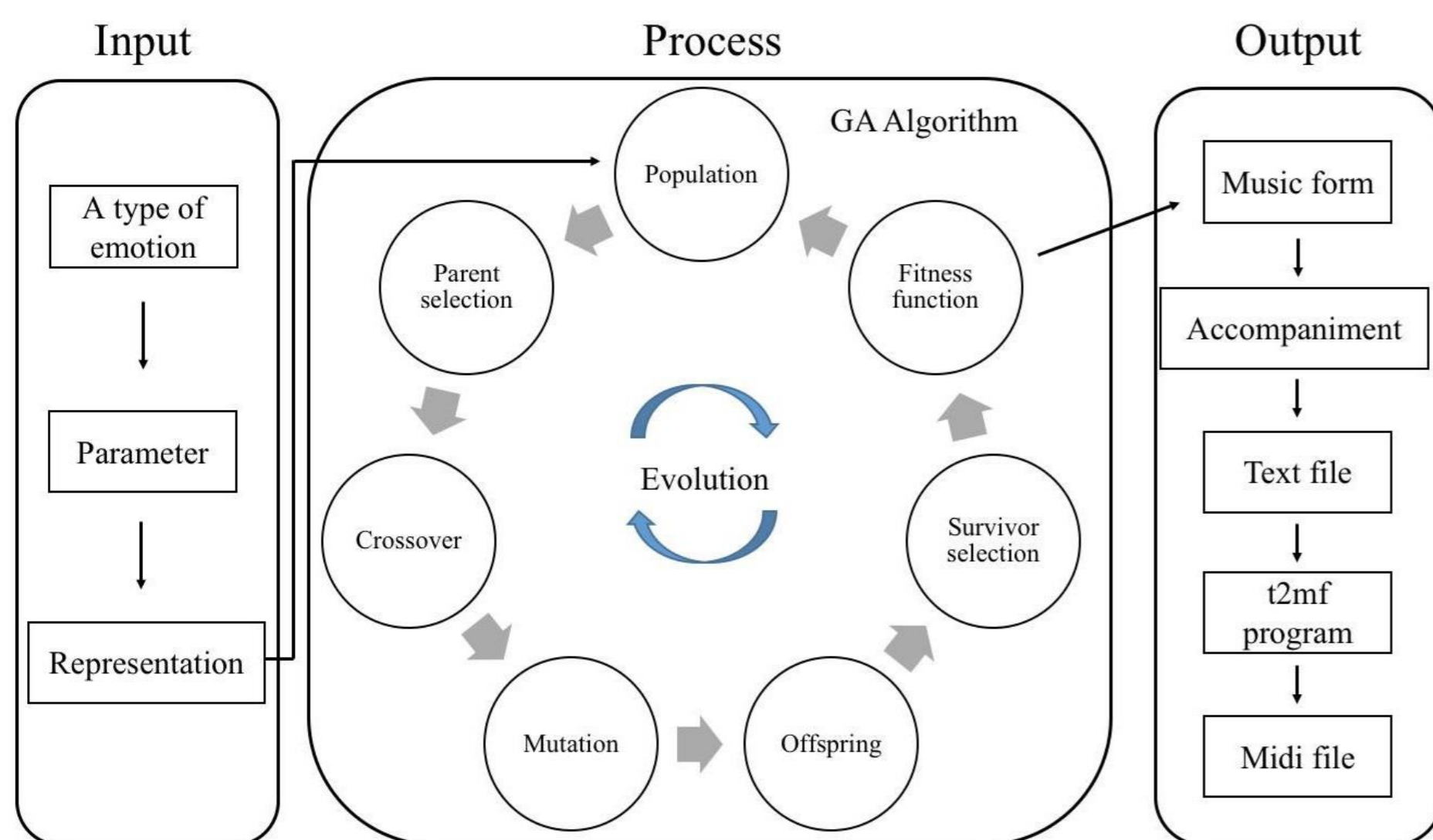
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Introduction

It is no longer a fantasy, but a tangible method for computers to generate a piece of melody automatically. But how about let it produces a short music with "emotions"?

A person, who is depressed or heartbroken, may not want to listen to slow-rhythm music, which will make him held deeply into the terrible sensation. On contrast, these generations of music are suitable for accompanying the runner when jogging, which provide their mind with relaxation and tranquility.

In this project, we establish a platform on the website. With the use of Genetic Algorithm (GA), the platform will automatically generate a short melody subjected to the types of emotions which are determined by the user.
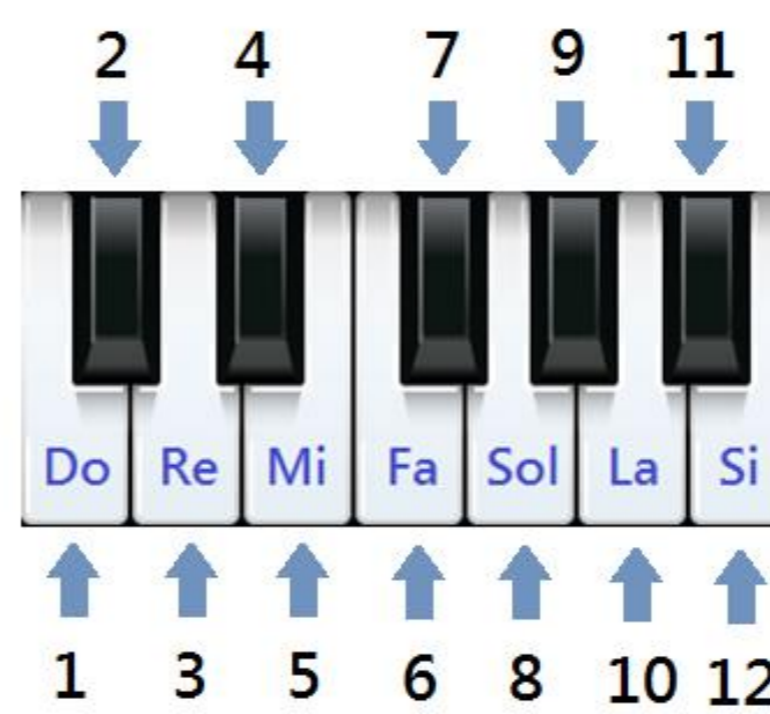
Architecture

Website

The environment of this website is based on 32-bit Windows system. After the parameter with single type emotion is chosen by the user, the PHP program gives instructions to the server and executes the corresponding actions.

There are three types of emotion for the user to choose: (1) Merry (2) Majestic (3) Leisurely. And each type is conducted by matching C code with the batch file. In the final stage, the website generates the following two different short melodies respectively for comparison: Random music and Revolution music. A download button is implemented on the website which enables the user to collect and make further use of the music.

Approach

Representation

Note	Number	Note	Number
C(Do)	1	#F	7
#C	2	G(Sol)	8
D(Re)	3	#G	9
#D	4	A(La)	10
E(Mi)	5	#A	11
F(Fa)	6	B(Si)	12

Fitness function

Major:

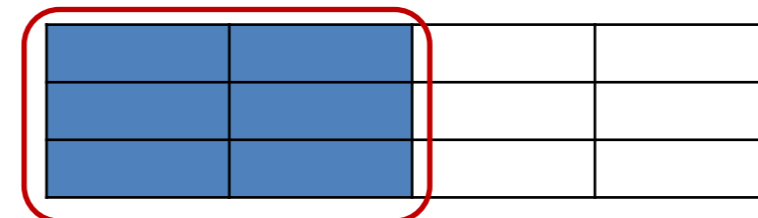| Rules	True
Chord note	+4
Harmony note	+2
Not chord note & harmony note	-4
Measure start from main chord note	+10
Measure start from other chord note	+6
Measure start from other note	-8
Measure end at chord note	+10
Measure end at other note	-10
Music end at chord note	+6
Music end at rest	-10
Music end at fermata	+20
Music end at other note	-4
Chord note followed by chord note	+2
Chord note followed by harmony note	+4
Chord note followed by Fa & Si	-4
Chord note followed by other note	-8
Other note followed by chord note	+2
Fermata & rest	+15
Have more than 6 half steps difference	-10
Have more than 6 half steps difference & 1st chord note	+2
Have no difference	-8
Have 1 half step difference	-3
Have 2 half steps difference	+2
Have 2 half steps difference & 1st is chord note	+4
Have 3 half steps difference	-4
Have 4 half steps difference	-2
Have 4 half steps difference & 1st is chord note	+4

Minor:

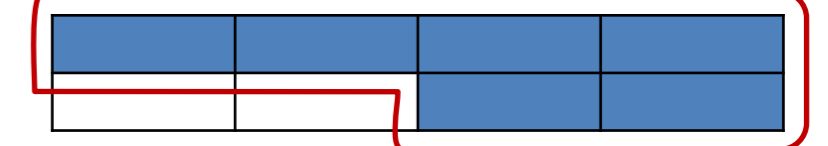| Rules	True
Chord note	+3
Harmony note	+1
Not chord note & harmony note	-2
Measure start from main chord note	+10
Measure start from other chord note	+6
Measure start from other note	-8
Measure end at chord note	+10
Measure end at other note	-10
Music end at chord note	+2
Music end at rest	-10
Music end at fermata	+15
Music end at other note	-8
Chord note followed by fermata/rest	+6
Chord note followed by chord note	+2
Chord note followed by other note	+4
Other note followed by chord note	+2
Have more than 6 half steps difference	-10
Have no difference	-2
Have less than 5 half steps difference	+7

Musical form(post-process)

Major:

Same type of chord

Minor:

Same type of chord

Outcome

A text file for the input of t2mf program is generated, and it will export a midi file to the user.

Merry:

Majestic: