

Sound Low Fun

Yu-Chung Tseng

eamusic.tseng@msa.hinet.net

Che-Wei Liu

drummerwei@gmail.com

Tzu-Heng Chi

davidchi0623@gmail.com

Hui-Yu Wang

huiyu18@gmail.com

National Chiao Tung University Master Program
of sound and music Innovative Technologies

EE526 1001 University Road,
Hsinchu, Taiwan 300, ROC

ABSTRACT

Sound Low Fun, a large sphere, is an interactive sound installation. The installation could produce low-frequency sound (Low Sound) to make people feel relax, to have "Fun" effect ("Fun" also pronounced close to Chinese word "放", which also means relax. This is our main concern and fundamental idea of the project. Our work present a sense of technology, and then we follow the structure by "C60" to divide into 32 blocks; Regarding the part of internal circuit design, we employed the force sensor and ADXL335 three-axis accelerometer connect with Arduino I/O and The Mux (Multiplexer) Shield, then it can produce different music with different lighting effects through Max/MSP programming. As music was concerned, we make use a type of meditative long-sustained low-frequency sound, accompanied by some transparency high-frequency sounds as sphere was shaken. When user presses, hugs and pushes the sphere, it trigger the soft low sound and lighting effects generated, as a result, user relieve his/her pressure eventually.

Keywords

Large-scale, interactive installation, low-frequency sounds, stress relief, Max/MSP computer music programming, Arduino

1. DESIGN CONCEPT AND CREATION IDEA

Our Installation to "Relieve Stress" for the design concept. We design by "Low Frequency" sound, and Interactive installation of large sphere with touch. Sound Low Fun can produce different music and light by user who push different blocks, and then try to make people relieve their stress. "Music" is one of the ways with curative effect of stress relief. Whatever Eastern culture or Western culture, they both have considerable research of "Music Therapy", The Eastern culture have five notes of traditional Chinese music "宫(Do) 商(Re) 角(Mi) 徵(Sol) 羽(La)" are same medical principles with five internal organs (liver, Heart, lung and Kidney). [1] And then, The Western culture also proved that music therapy created faster effects than traditional treatment for four times to eight times.

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, to republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

NIME '11, 30 May–1 June 2011, Oslo, Norway.

Copyright remains with the author(s).

¹ Wikipedia-C60 <http://zh.wikipedia.org/zh-tw/C60>

2. IMPLEMENTATION METHODS AND TECHNIQUES

2.1. Interactive Design

This installation, "Sound Low Fun", has exhibition mode and interaction mode. In exhibition mode, has exhibition mode and interaction mode. In exhibition mode, the sphere can randomly generate scales and lights flashing, so that the installation can be regarding as a static device to present to all viewers. In Interaction mode, it has interaction between users and the installation, so that users can press or push the sphere to make it not only rotate or sway, but also generate or change music.

2.2. Appearance Design

This installation is a sphere. In order to distribute it completely, we adopt the structure of "Carbon 60"(Figure 4.) [3], and then we divide the sphere into thirty-two blocks. Through pressing each block which has DIY sponge pressure sensor, it can send different arguments to trigger music. Additionally, we attach a piranha LED lights to sixty apices and use silver fabric to packing the sphere. When users press the sphere, the intensity of press can affect the brightness of the lights, and then making it light or shade.

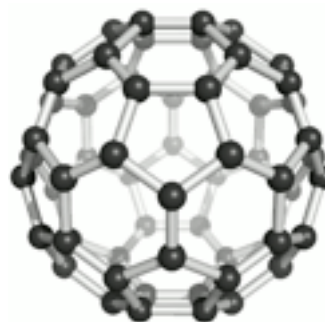


Figure 4. Structural drawing of Carbon 60¹

2.3. Hardware Design

The DIY pressure sensor (Figure 7.) , which structure as follows : Using the conductive fabric as positive and negative, and placing conductive sponge among the conductive fabric as the resistance. The sponge deformation caused by people after they press it , the density become larger , the resistance become smaller so that the current that through the sponge will become larger, make the LED brighter. Briefly , people are able to control the LED of light shading by pressing the DIY pressure sensor.

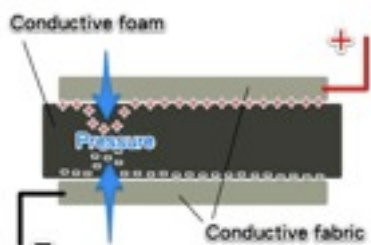


Figure 7. DIY Pressure Sensor

2.4. Software Design

In software, using Max/MSP communication between SimpleMessageSystem and Arduino. SimpleMessageSystem is a library which Arduino can send or receive the character and integer, and then analyse in Max/MSP.

3. MUSIC DESIGN

In music design, we use structure of “C60” to make the surface of sphere which have twelve pentagon and twenty Hexagon, each represents a different tone and harmony. We design our twelve-tone scale by “Pythagorean”, and then begin at F (Fà Cà Gà Dà Aà Eà Bà F#à C#à G#à D#à A#). Each notes are follow by order, and then backward to take three notes become harmony (FCG, CGD, GDA ...). Followed later by analogy, and the order that we define “H”. (Figure 12.)

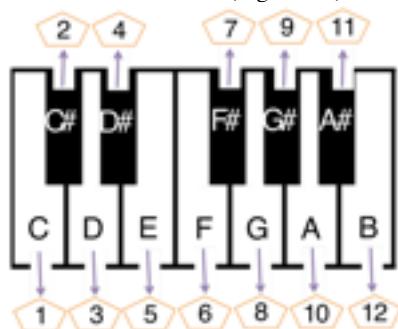


Figure 12. All the twelve notes of twelve pentagon can be a scale

There have one hexagon between every three pentagon (note), then the sound of hexagon is the harmony which combine with three pentagon (Figure 13.).

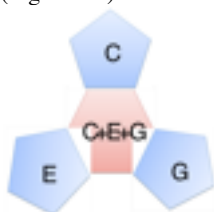


Figure 13. The hexagons of harmony constituted by three pentagons of single tone

We can choose one of the pentagons and regard it as pitch “F”. Then basing on "order h", corresponding to the two adjacent pentagons are pitch “C” and “G”. According to this rule, we can give each of ten pentagons a pitch, but the remaining two pentagons can not be Corresponded. It is the unexpected characteristic of the installation. Finally, twenty-six sides will be defined as different combinations of the harmony. (Figure 14.)

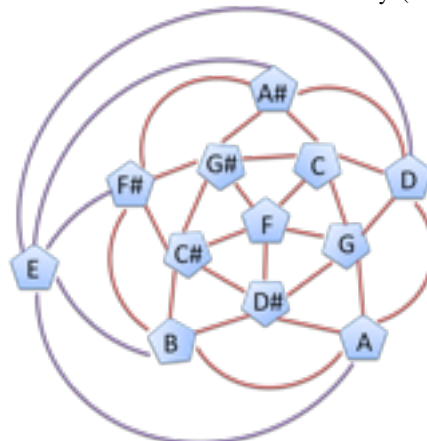


Figure 14. Pentagon corresponding to the pitch

Two low-frequency ambient sounds , one is pressing this spherical installation block, the other is with the LED flashes, a total of four. The sound source is used Ableton Live to the performance of the three sound sources, and the range of low-frequency range selected in the MIDI pitch on the note name C1 to B1. Through the communication by Ableton Live and Max/MSP, the midi signal sent to the Ableton Live to trigger the sound on and off. Further by interaction of touch, pressure and swing the spherical installation , do more effect in Ableton Live , make the sound more rich and colorful.

4. CONCLUSIONS

"Sound Low Fun" is a new digital art installation which integrating audition,visual and tactile.Through touching or pressing the surface of "Sound Low Fun", users can change the intensity of the lights and trigger low-frequency sounds.In this way, users do not only get the feedback of visual and audition, but also release the press.

5. REFERENCES

- [1] Five notes of traditional Chinese music (Do)(Re)(Mi) (Sol)(La)” are same medical principles with five internal organs (liver, Heart, lung and Kidney) <http://www.dfg.cn/big5/yspd/jzxsh/47-wy-gong-1.html>
- [2] The music therapy are faster than traditional treatment for four times to eight times. <http://tinyurl.com/3e8gw98>
- [3] Structure of "Carbon 60" <http://zh.wikipedia.org/zh-tw/%E7%A2%B360>
- [4] The 2th K.T. Creativity Award Silver http://140.115.78.29/rctedcontest/wp/?page_id=56
- [5] RedBall <http://redballproject.com/taipei/1174/moca>
- [6] Music of relieve stress http://www.windmusic.com.tw/shop/edm/edm0812_relaxation/001.htm