Combining visual elements as a new method to browse and discover music mood

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Abstract—Recently, there are many ways of browsing and discovering new music using some type of visual form that has been introduced in the field of Music Information Retrieval (MIR) such as album cover, avatar, colour and mood picture. However, there is no research focusing explicitly on visualising music genre using textures especially in mood category. To create new method of browsing music, we proposed a framework to visualise music mood using texture image. In this paper, we will present working progress which discusses the first stage of establishing the proposed framework and results from pilot study. We will present a review on the visual elements such as colours, colour values, lines and shapes and their ability to convey mood. Outcome from the review will be used in a survey that will be conducted to confirm which visual element has the ability to represent certain moods. Combination of these visual elements will then create a texture image which represent a particular mood and can be used as a new way to browse and discover music in mood category using visual form.

Keywords- mood, music mood, music recommendation, visual texture; visual elements

I. INTRODUCTION

A texture is defined as the look and feel of any surface. Textures can be divided into two categories, namely tactile and visual textures. Tactile texture refers to the tangible feel of a surface, whereas visual texture is the illusion of having a physical texture. These illusory effects can be achieved through the use of design elements such as contrast, form, light, line, pattern, point, shape and tone [1]. There are a number of research findings in different areas such as psychology, consumer research, product design and user interface, which suggest that texture has some kind of emotional connection to human feelings. Research on product material shows that people tend to give more positive emotional response such as cheerful and elegant to smooth textures [2]. In the product design field, it has also suggested that the surfaces of their product packaging would enhance consumers’ emotional engagement with their product [3]. In other research on product design that is based on Kansei evaluation, the effect of creative texture design of a product can arouse users’ perception of its image [4]. These findings indicate that texture image is capable as a new method to select songs in the music mood category. Thus we proposed a framework for visualizing music mood using texture image [5] to assist listeners in discovering new songs and artists that might have not been discovered otherwise using conventional means.

II. PROPOSED FRAMEWORK

In order to establish the proposed framework for visualizing music mood using texture image, we need to go through three different stages (Fig. 1) [5]. In this paper, we will only discuss the processes in Stage 1. We will review the visual elements and find out their ability to convey mood.

Figure 1. Stages to establish the proposed framework [5]

Outcome from the review will be used as the justification in preparing an online survey to identify suitable texture characteristic and reconfirm the mood that an element can represent. Stage 2 will see us combining selected visual elements to design a texture image.

III. MOOD MODEL

Before we move on to explain the visual elements in the next section, it is crucial that we first understand the mood model.

In general, emotional models are divided into two: categorical and dimensional. In the categorical model, emotions are classified into basic elements such as anger, fear, sadness, happiness and disgust. In the dimensional model, emotions are presented by two or three axes. Russell proposes a two-dimensional model, and the most widely used dimensional emotional scale is the Russell’s circumplex model (Fig. 2) [6].

This model suggests that emotions are distributed in a two-dimensional circular space containing arousal and valence dimension. The emotional states can be represented at any level of valence and arousal, or at a neutral level of one or both of these factors. The adaptation of this model is essential for a
mood-based music recommendation as it allows for the categorisation of mood and emotion [6].

In this research, moods from every quarter of Russell’s model which are happy, sad, angry and calm will be used to discuss about the ability of visual elements to express emotion.

Figure 2. Russell’s circumplex model of emotions [6]

IV. VISUAL ELEMENTS

Humans see images as a whole rather than in parts. However, images can be broken down into visual elements that have certain meanings and the ability to express emotion. Like other images, visual texture also consists of a few visual elements such as line, shape, colour and colour value. Previous research from various areas shows that these visual elements have meaning and the ability to express emotion.

A. Lines

Line is one of the most basic artistic elements that can be used for different purposes. It communicates division, organization, emphasis, sequence and hierarchy [1]. A line can express emotion and character based on how heavy or light, scratchy or smooth, angular or curvy the line is. Different types of lines (Fig 2), express different emotive qualities.

Thin lines can be experienced by some as unstable and vulnerable. It is also fragile and seems easy to be broken or knocked over. Thick lines alternatively appear as difficult to break. It suggests strength and gives emphasis to nearby elements. Thick lines are bold and able to make a statement [7].

Besides the width of the line, the orientation of a line can further influence a visual message [1]. Horizontal lines are parallel to the horizon like lying down, at rest, supine position or asleep. Horizontal lines suggest calm and quiet and serene. Vertical lines stretch from the earth to the heavens and often connect with religious feelings. Their tallness and formality may give the impression of dignity [7].

Curved lines are softer than straight lines. It sweeps and turns gracefully between end points. Curved lines are less definite and predictable than straight lines. It bends, changes direction and expresses fluid movement. Curved lines can also be calm or dynamic depending on how much they curve. The less active the curve, the calmer it shows [7].

Thin and curved lines are assumed to have the ability to represent sadness whereas thick, jagged lines are more likely to be linked to anger. Besides that, horizontal, curved lines are assumed to have the ability to gravitate towards happiness and calmness.

Figure 3. Type of lines
B. Shapes

Shapes are another way to emphasize mood [8]. Examples of basic shapes are circles, squares and triangles (Fig. 2). Basically, there are two types of shapes; organic and geometric. Geometric shapes have angles and straight lines and have an industrialised feel. Organic shapes are curvy, free-form and have a more natural feel to them. The overall configuration of the type of shape can determine their inherent message and meaning. Soft, curvilinear shape may appear warm and welcoming, whereas a sharp, angular shape may appear cold and threatening [1].

![Basic shapes]

Among all the known shapes, the square is a unique and special one. Most of the human artifacts are made up of squares or its variations. For instance, houses are composed of windows, floors, tables, televisions and doors that are square or square-like shapes [9]. Square and rectangle appear to be familiar and trusted shapes and suggest honesty, conformity, peacefulness, solidity, security, and equality [8].

The next basic shape is a circle. The circle also shows unique properties, but unlike the square it appears mostly in nature. In every culture in the world, circles represent the sun, the earth, the moon, the universe, and other celestial objects in between [8]. However, besides natural shapes, circles are used to suggest familiar man-made objects such as wheels and balls. The invention of the wheel is likely one of the most important inventions of all time. It was at the root of the Industrial Revolution [9]. Circle suggests well-roundedness and completeness. It is graceful, warm, comforting and gives a sense of sensuality and love. Circles protect, endure and restrict. It confines what’s within and keeps things out, hence offering safety and connection. Circles suggest community, integrity, and perfection.

Triangles suggest action. They are dynamic. The corners of a triangle tend to feel sharp and dangerous, but when used properly can convey a great sense of movement and progression. Triangles can direct movement based on which way they point. Upward pointed triangles represent progress or a better future. Downward facing triangles typically convey a message of danger and they can feel off-balanced and awkward.

In summary, we assume that the rectangle, square and circle have the ability to represent calmness and happiness. Circles can also represent sadness due to the human tendency to look for a warm and comforting shape when we are sad. Due to the dynamic property of its shape, triangles are assumed to have the ability to represent anger.

C. Colours

Colour is an inseparable part of our everyday life. It is widely recognised that colours have a strong impact on our emotions and feeling [10]. A number of researches have been conducted on various fields about the link between colours and human emotions, and have found that certain colours are certainly able to portray certain moods.

In interior design research about colour, red has been associated with excitement, orange with distressing and upsetting. Purple has been perceived as dignified, yellow as cheerful and blue associated with comfort and security [11].

A genetic psychology research conducted on the subject of children’s emotional association with colour [12] found that a light colours such as yellow and blue are generally associated with positive emotions like happiness and cheerfulness, while a dark colour such as black is typically associated with negative emotion such as sadness and anger. Similar results were obtained when the same investigation was done among college students [10].

Colour conventions differ from one society to another [13]. A well-known example is with the two achromatic colours i.e. black and white. Death and mourning are associated with the colour black in Western traditions, whereas in China the colour of death is white. Ancient Egyptians were known to mourn in yellow, while it is grayish brown in Ethiopia as that is the colour of the earth, to which they believe the dead will return. In Syria and Armenia it is sky blue, which indicates that the deceased has gone to heaven. Hence, some colours may be associated with several different emotions and some emotions are associated with more than one colour [14]. We can conclude that mourning, which is linked to sadness, can be
associated with more than one colour, namely black, blue, white and yellow.

In Table 1, we summarise a list of colours that represent the moods happy, calm, sad and angry. However, it must be kept in mind that colour related emotion is highly dependent on personal preference and one’s past experience with that particular colour [15].

<table>
<thead>
<tr>
<th>Mood</th>
<th>Colour</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happy</td>
<td>Yellow</td>
<td>Cheerful [11]</td>
</tr>
<tr>
<td></td>
<td>Blue</td>
<td>Happy [12]</td>
</tr>
<tr>
<td>Calm</td>
<td>Green, Blue</td>
<td>Relaxation, calmness and happiness, comfort, peace and hope [15] [16]</td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>Peace [15]</td>
</tr>
<tr>
<td>Sad</td>
<td>Blue</td>
<td>Sadness depression [15]</td>
</tr>
<tr>
<td></td>
<td>Black</td>
<td>Funeral [15] [12]</td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>Image of death [14]</td>
</tr>
<tr>
<td></td>
<td>Yellow</td>
<td>Death [12]</td>
</tr>
<tr>
<td>Angry</td>
<td>Orange</td>
<td>Depressing and upsetting [11]</td>
</tr>
<tr>
<td></td>
<td>Blue</td>
<td>Depression [15]</td>
</tr>
</tbody>
</table>

D. Colour values

Value or brightness refers to the lightness or darkness of an item. The more white added to a color, the lighter the value and it creates a light element to an object. Whereas the more black added to a color, the darker the value it creates a dark element to a object. Value is used to convey emotion or direct the eye to a focal point. The human eye is immediately drawn to a light element against a dark element. This creates the focal point of interest. Bright colours, for example yellow and blue, are associated with positive emotions such as being happy and calm. Dark colours such as black and grey are associated with negative emotions such as being sad and angry [10, 12].

V. ONLINE SURVEY

Based on the review, an online survey will be set up to identify which specific type of visual element is mostly related to a particular mood. The survey will be divided into four mood sections which are angry, sad, happy and calm. In each section, there will be four different subsections which are colour, colour values, lines and shapes (Fig. 5). All possible type for the particular elements will be listed in the answer option. Respondents will select one from the list which they think represents the particular mood and move on to the next subsection and submit the survey once they have finished.

In the line subsection, we will provide a figure that is made up of types of lines with different width which are; horizontal line, vertical line, jagged line and curved line (Fig. 3). Respondent will be asked “Which type of line from the given images do you think represents an angry mood?” and they will need to select one answer and move on to the next subsection.

In the shape subsection, we will provide a figure that is made up of types of shapes which are circle, rectangle and triangle (Fig. 4). Respondent will be asked “Which type of shape from the given images do you think represents an angry mood?” and they will need to select one answer and move on to the next subsection.

In the Colour subsection, we will provide an image that is made up of different colour boxes (Fig. 6). Respondent will be asked “Which colour from the given images do you think represents an angry mood?” Respondent will select one answer and move on to the next subsection.

Lastly, in the colour value subsection, we will provide an image that consists of different colour values of a certain colour. For example, if the respondent chose Blue in the Colour subsection, they will see two colour values for blue which are dark blue and bright blue (Fig. 7) in the next question and they will be asked “Which colour value do you think represents an angry mood?” Respondent will select one answer and submit the survey form.

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The same procedure will be conducted for 3 other moods which are calm, happy and sad. Once we have identified the visual elements for each mood, we will continue our work on combining those elements to design a texture image and use it in an online music collection application sample. The application will then be tested on participants by giving them a task to browse for music based on the texture images provided.

VI. PILOT STUDY

Before conducting the actual online survey, a pilot study of the survey was carried out. The purpose of this pilot study is to test the survey questions and gather information prior to a larger study, in order to improve the actual experiment’s quality and efficiency. The pilot study was conducted online involving 23 respondents. From this pilot study we have some overview of the expected result as in Table II.

Based on the Pilot Study, 82.6% of the respondents chose the thick jagged line, 95.7% chose the triangle, 87% chose the colour red, and 70% chose the bright colour value to represent the angry mood.

To represent the sad mood, 47.8% of the respondents chose the curved line, 65.2% chose the circle, and 56.5% chose the colour white.

As for happy, 56.5% of the respondents chose the curved line, 52.2% chose the circle, 52.2% chose the colour yellow, and 83.3% chose the bright colour value.

Finally, 56.5% of the respondents chose the thin horizontal line, 69.6% chose the rectangle, 30.4% chose the colour green/blue, and 71.4% chose the bright colour value to represent the mood angry.

VII. CONCLUSION AND FUTURE WORK

By reviewing the visual elements such as colours, colour values, lines and shapes with its meaning towards moods, we have come out with the list of suitable characteristic of texture image. To confirm which one is mostly related to the particular mood, we will conduct an online survey. Before launching the actual online survey, we have conducted a pilot study of the survey. An overview of expected result were gathered and discussed.

Once we have conducted the online survey and gathered sufficient results in Stage 1 (Fig. 1) [5], we will move on to Stage 2 (Fig.1) [5]. In Stage 2, we will combine selected visual elements and come out with the framework for visualising music mood using texture image. Later, texture image will be designed and used in digital music collection application. The images will then be evaluated by users in Stage 3 (Fig. 1) [5].

This research is expected to help the digital music service developer to design a recognisable visualisations using texture image for music collection in music mood category. While to the wider community, this research will provide an alternative method to browse digital music collection and assist listeners in discovering new songs and artists that might not have been discovered otherwise using conventional means.

REFERENCES