Generating music from tweets: TwitterRadio

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Abstract

TwitterRadio allows visitors to explore the social world of tweets by means of music and graphics. By selecting the desired hashtag, a musical coherent with the contents of the associated tweets is automatically generated. For instance, the hashtag *#starvation* plays a sad, dramatic music, while *#happybirthday* generates a joyful melody. Visual information describing the tweets and the associated moods are displayed as well. To interact with the system, users have the possibility of proposing new hashtags and vote for existing ones. Further, they can fine-tune the generated music by deciding the orchestration. Visitors could engage with TwitterRadio in a number of different ways, which differ on the level of active involvement in the interaction. At this end, they can listen to the generated music, vote for the next hashtag to be played, propose a new hashtag or fine-tune the music.

Author Keywords

Musical interface, artistic installation, user-experience

ACM Classification Keywords

H.5.5. Sound And Music Computing: Systems
H.5.2. User Interfaces: Input Device And Strategies

General Terms

Design, Human Factors
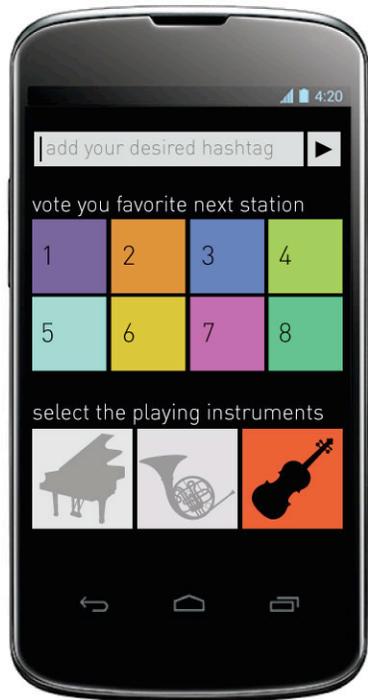
System Design

TwitterRadio aims at providing a new way of experiencing theme-related tweet flows from an auditory and a visual perspective. The main input for TwitterRadio are the tweets marked with a particular hashtag. A number of features connected with the selected tweets are translated into the musical domain in order to match the mood of the tweets with the generated music. TwitterRadio provides a collaborative experience of selecting hashtags to "listen to" and tuning musical settings. In addiction, it provides an individual experience of tuning visual representation of tweet flows. The auditory part is composed of an algorithmic composer that automatically generates music that is played by quality loudspeakers. The visual part is composed of a large monitor that shows information on the tweets and on the composition. To interact with the composition, 10 remote controllers (in the form of mobile phones applications) are positioned close to the monitor in order to send information regarding the desired hashtag and the orchestration. A desktop keyboard serves as input for selecting the preferred visual feedback.

Interactive scenarios

We envisioned five different user-interaction scenarios that vary with the level of involvement of the visitor: (i) *Listener* - The visitor simply enjoys TwitterRadio by listening to the music and watching the graphic display; (ii) *Voter* - The visitor votes the preferred hashtag from the available list. (iii) *Contributor* - The user actively contributes to generate the list for the successive hashtags by adding her desired hashtag; (iv) *Director* - The user directs the music orchestration by selecting the instruments she wants to hear in the composition;

(v) *Designer* - The user tunes the graphics in order to match the visual representation he prefers.

Interface Design

The interface has to allow for voting existing hashtags and proposing new ones; for selecting the preferred orchestration by choosing the playing instruments; and for personalizing the look of the tweets flow. At this purpose, general usability requirements [1] should be taken into account. The UI has to transparently react on user actions, reflect changes in music (i.e., in incoming tweets) and depict the current status of the system. Several other usability requirements, such as providing help documentation or easy recovery from errors [1], are left for future versions of TwitterRadio.

System Architecture

TwitterRadio counts of a mobile and a desktop component. The mobile component supports all the collaborative activities. Users can vote and propose hashtags and choose the orchestration level by means of playing instruments (Figure 1). The desktop component visualizes the flow of the incoming tweets and the state of the system, and allows users to experiment with their favourite look of the tweet flow (Figure 2). Initially, all tweets differ in their font type, font size, background color, height and other parameters. Users can customize the visual flow by choosing how all tweets should be similar and how different groups of tweets (e.g., positive vs negative tweets) should differ. This feature supports individuality expression.

Four parameters from the incoming tweets are extracted to feed the music generation module (details on the following section): tweet mood, tweet

Figure 1. The prototype of TwitterRadio mobile application.

frequency, replies and re-tweets. The mood of the tweets is computed using the MPQA Subjectivity Lexicon [2], which describes the polarity (positive, neutral, negative) of 8221 English words (thus, only tweets in English are analyzed). The frequency of the tweets is the number of tweets per minute. The percentages of replies and re-tweets are computed relatively to the overall amount of tweets.
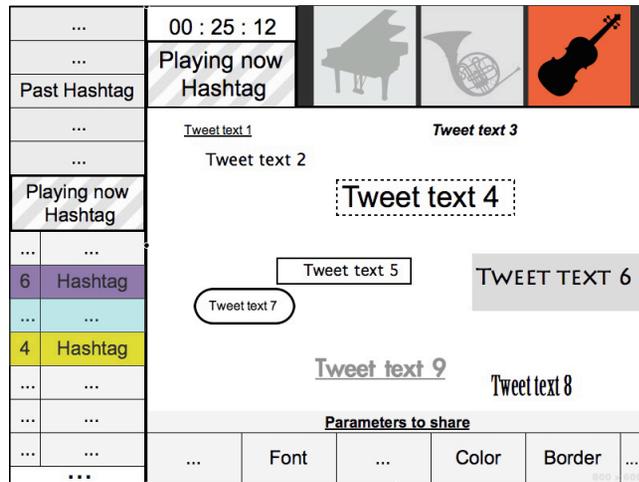

Figure 2. The standalone information display.

The music played on TwitterRadio is generated by Robin, an algorithmic composer that automatically creates original classical music with emotional characterization [3]. The moods of the tweets are communicated to the system and then translated into musical parameters. The mapping between tweet features and musical parameters is schematized in Table 1.

Tweet Frequency	Note density (BPM)
Tweet Mood	The mapping between emotion and musical parameters comes from related literature and from ad-hoc experiments [4,5]
Replies	Duet (an harmonization of the previous phrase is played)
Re-tweets	Repeated theme and patterns (melody and rhythm)

Table 1. Mapping between the selected components of the tweets and the musical parameters managed by Robin.

System Evaluation
For evaluating the experience of the users we are going to adopt a mixed approach composed of: (i) qualitative interviews to be conducted after the experience; (ii) quantitative interviews to be gathered through an online questionnaire; (iii) log analysis of users behaviour during the experience. These three data sources will provide us with information regarding behavioral patterns. In particular, we are interested in understanding the engagement of the users, the preferred level of involvement and the preferred visual display. We plan on assessing user engagement based on the amount of people that interacted with the system, their feedback regarding their positive/negative experiences and improvement suggestions, and the average interaction time. Further,

we will measure the preferred level of involvement as the number of times that a particular scenario was chosen, and the average time spent. As regard behavioral patterns, we will consider the most frequently played hashtags, the overall amount of hashtags proposed, and the amount of hashtags and votes per person. The analysis of preferred style of visual display will consists on finding the most popular combinations of shared and non-shared visual features of tweets (i.e. font type, font size, color, background color, vertical and horizontal alignment, and other features).

Conclusions

TwitterRadio provides a novel environment to experience twitter-generated contents in an artistic form. This installation is ideated to be fully exploited in collaborative situation. Indeed, users are pushed to collaborate in order to convince the other visitors on voting for their preferred hashtag. Competitive situations are likely to happen thus leading interesting aspect: will they discuss to find a democratic choice or will they try to push for their proposed hashtag? As regards the selection of instruments, they need to interact with each other if they don't want to keep muting/selecting instruments. Individual experiences are also considered, as a single user can be in charge of selecting a specific visual feedback at time.

Thanks to this installation, twitter contents - that are generally presented in textual form - are enhanced with a different visual representation and with music. Furthermore, visitors will be actively involved in the progress of the system by contributing to produce an original and creative outcome by collaborating with each other.

References

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