

Egotone: Generative Ringtone Engine

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ABSTRACT

Today's mobile phone customers are becoming increasingly sophisticated in their demand for personalized audio on their mobile phones. Generative Ringtone Engines give the user the ability to produce a unique, personalized ringtone for their mobile devices on the fly. In this article I present the work in progress of *Egotone*, a Generative Ringtone Engine that is designed to generate interactive music compositions using mobile device data.

Keywords

Interactive Music Systems, Ringtones, Algorithmic Composition, Generative Ringtone Engine, Interactive Audio.

1. INTRODUCTION

The communication overload of the 21st century has evolved us into a superhighway society that encounters repetitive doses of information and placed several electronic mobile devices in the centre of our everyday lifestyle. These, playing a prominent role in our daily life experiences, demanding to treat them well, as for certain societies, function as a cultural icon – a brand or a carrier of style and fashion. One of the fundamentals of these devices is our personal mobile phone. The mobile phone's external characteristics such as its design, its color and the sound it produces, are those that shape its image and appearance. This, in certain sectors of society indirectly relates to the phone user's own character, lifestyle or social class. Of all these characteristics, the ringtone, the sound made by a mobile phone when an incoming call is received, is probably the most interactive and revealing one, as it interacts, in a fashionably unexpected manner, with the mobile phone's owner and the environment, sometimes carrying a message or offering an insight into its user's own taste of aesthetics and style. The rapid increase in mobile phone usage and the advancements in mobile technology have set new standards, where customers are much interested in the uniqueness and originality of their mobile device. The implication of these on the ringtone industry have increased the customer demands for personalized audio content for their mobile phones, and has led mobile music technology developers to explore the idea of Generative Music Systems. These software-based systems allow the user to create constantly evolving music in different genres, which is original, non-repeating and copyright-free.

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2. RELATED WORK

There are several mobile technology companies who have already implemented the idea of generative music systems. One of the most popular ones is Tao's Advanced Polyphonic Ringtone System, intent Sound System (iSS), which incorporates Koan PRO, the award winning interactive audio and generative music authoring system developed by SSEYO. Another example is the MadMixer software developed by MadWaves. MadMixer is based on MadWave's Generative Music Algorithms (GMA) Technology, which can automatically generate original, non-repeating music in various musical genres. MadMixer enables the user to create his own customized ringtone. While these technologies focus on the automatic generation of ringtones based on parameters and controls adjusted by the user himself, none of them uses the mobile device data content as a source material for generative music composition.

3. EGOTONE

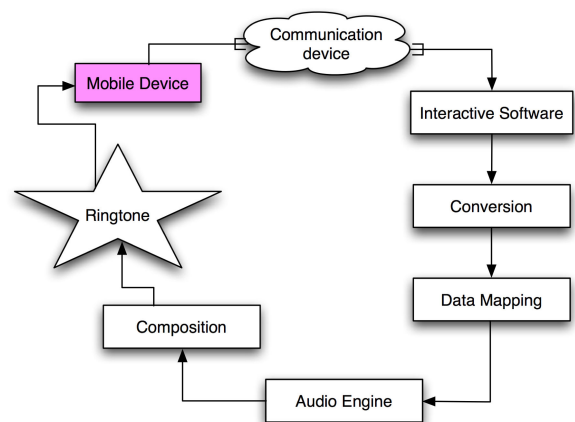


Figure 1. A Schematic overview of *Egotone* loop. Data packet being transmitted from the mobile device to the interactive software, transformed and mapped to an audio engine, composed into a ring-tone and sent back to the mobile device.

Egotone is an innovative medium of interaction between a mobile phone - its user and the environment. It aims to take the essence of the ringtone towards other directions and to artistically enrich it with intelligence and personal aspects. *Egotone* is an interactive software system that is designed to transform data retrieved from a mobile device into digital sound, and to arrange it into a musical composition. This embeds itself into a computer sound file format, which is mobile device compatible and can be used as a ringtone. This custom-made 'personalized ringtone' is the result

of logical data mapping processes that lead to generative creation of a musical piece with an exclusive form and sound.

4. THEORY OF OPERATION

The core of the mechanism is an algorithm that converts certain information within a mobile device into plain data, which is then mapped to control and trigger various parameters within a software-based audio engine - a network of audio instruments that are designed to generate musical materials from data and to output a ringtone sound file format. For instance, statistical information from the device such as Free Memory and Used Memory, can be converted into musical parameters like Tempo/Speed, Pitch or Velocity, while other information such as Manufacturer of the mobile device, Model or Company, can be converted to control rhythmic patterns, melodic structures and quality of sound.



Figure 2.: Simplified example of data mapping to musical parameters in the audio engine. Data from the mobile device is classified in three groups – Model/Company, Loudness Level, Used Memory. These are being mapped to variables and control parameters in the audio engine, varying the characteristics of the sound and the structure of the composition.

'Loudness Level' is the level at which a mobile phone user adjusts the volume of the ring-tone produced when an incoming call is received.

The algorithmic composition of the ringtone involves dynamic processes of conditional probability and restricted randomness such as Markov chains, Brownian motion and other time-discrete stochastic mathematical models. These are used to add sonic diversity to the ring tones by giving the generating system a bounded life of its own, in which musical variations may take place without modifying the main form – an audible reflection of the mobile device's characteristics and inner data content. The Biographical note:

system can be implemented as an interactive web application on the Internet, as multi-platform standalone software, or as a mobile application directly running from the mobile device's operating system.

* The variables used in the described model (Model / Used Memory / Loudness Level), are just an example of a brief method for using mobile device data content. Other variables from the device can be used and transformed to control parameters of the audio engine. The 'natural' alteration of each variable may result in a different musical output. Global statistical variables can be reduced to more direct, focused variables, e.g. Used Memory can be reduced to the utilization of the mobile device inner phonebook (the amount of stored numbers in the phonebook).

5. DEVELOPMENT

An experimental version of *Egotone* was developed for testing the model. The current version is able to automatically generate potentially endless number of non-repeating, original ringtones from three different musical prototypes. Realization of the complete model requires integration of different cross-media technologies and is currently in the works.

6. CONCLUSIONS AND FUTURE WORK

The artistic concept of *Egotone* is based on the assumption that similar people, whom are users of information storage devices, tend to share similar content of information in which patterns of data can be found. The limitations of a mobile phone as an electronic device, already stands as an initial factor for the generation of patterns in the ways people tend to use the device, and many related content can be found in a group of people who share the same friends or acquaintances, a similar lifestyle or people who come from the same socio-economic class. *Egotone* is able to give an audible representation to these relations, and to somewhat function as an audible mirror of the mobile device's owner, a group of people, or a social cross-section. Selected elements from the mobile device's content will be transformed to parameters, control values and triggers of the implemented audio engine. Various prototypes of ring tones will be generated, and in the abstract result, people who use different machines will tend to generate different prototypes of ring tones, while people who share similar information content will tend to generate ring tone prototypes with mutual musical relations and sound characteristics.

7. REFERENCES

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