Designing Rhythm Game Interfaces for Touchscreen Devices

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1 Introduction

Over the past few years, touchscreen devices have become increasingly common in the consumer market. With the adoption of this new input paradigm comes the natural expectation of increased software support for new touch-focused interfaces, allowing for faster and more natural human-device interactions [Hayes].

One area that touchscreen support can be leveraged is in the design of rhythm games. Rhythm games often focus the player's beat recognition abilities, which can be measured by the tapping of objects on a touchscreen to the rhythm of the song. The success of a rhythm game depends on two main factors: 1) user responsiveness during gameplay, and 2) gameplay experience as a whole.

In this study, different touchscreen user interface designs were compared for user responsiveness and gameplay experience through the development, release, and data/user feedback collection of *Beats2 Prototypes*, a rhythm game designed for Android tablets.

2 Our Approach

This study compared rhythm game interfaces through the following three stages: *Design*, *Prototype*, and *Evaluation*.

In the *Design* stage, a wide range of existing commercial rhythm games were analyzed and categorized based on their interface characteristics. These categories were used to draft eight simplified interface designs, as shown in Figure 1.

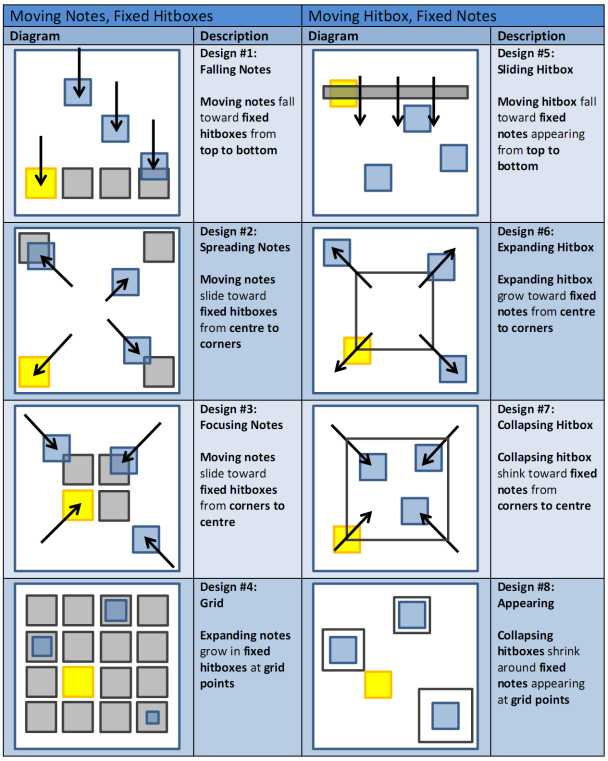

Figure 1: *Interfaces designs studied in the prototype app.*

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In the *Prototyping* stage of the study, a prototype rhythm game was created implementing the designs drafted in the previous *Design* stage as eight selectable "Modes". The game was titled *Beats2 Prototypes* and developed using the *Unity3* game engine, targeting Android tablets. In the starting mode select screen, the player would choose one of the eight game modes to play. In the following gameplay screen, the player would play through the rhythm game featuring the interface design selected but with the same song data, note patterns, and scoring system. At the end of the song, a feedback form would display, prompting the player to give 1-5 star ratings on various aspects of the gameplay.

In the *Evaluation* stage of the study, the rhythm game prototype was published on *Google Play*, an Android app store from Google. Through the use of a built-in tracker, data was collected from app users for comparing each individual interface designs. The score and timing accuracy of note hits were used as quantitative metrics for comparing user responsiveness. The feedback ratings, given on the five categories: *Challenge, Intuitive, Fun, Unique,* and *Overall* (losely based on the *GameFlow* model [Sweetser and Wyeth 2005]), were used as qualitative metrics for comparing gameplay experience. The results of these comparisons are shown in Figure 2.

Design	User Responsiveness	Gameplay Experience
#1: Falling Notes	Great	Bad
#2: Spreading Notes	Great	Great
#3: Focusing Notes	Good	Good
#4: Grid	Poor	Great
#5: Sliding Hitbox	Good	Good
#6: Expanding Hitbox	Poor	Poor
#7: Collapsing Hitbox	Bad	Bad
#8: Appearing	Poor	Great

Figure 2: *Relative comparisons of the studied interface designs.*

Of the eight designs studied, Design #2 is the best candidate for usage in future rhythm game development on touchscreen devices. These results can also be applied in the design of user interfaces for other future touch-based applications. As touchscreen technology become more and more commonplace, user interfaces for interacting with touchscreen elements in time-critical scenarios (such as military or medical applications) will benefit from designs improving user responsiveness as well as user experience.

References

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