BoomChaCha: a Rhythm-based, Physical Role-Playing Game that Facilitates Cooperation among Players

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Abstract

We designed a new genre of gaming that is rhythm-based, cooperative, physical and involves role-playing. In the game, three players as a team combat monsters by waving physical weapons on certain beats of the background music. The game requires a collective effort, as each player plays a certain role that is responsible for attacking, healing or defending respectively. To defeat the monster, the three players need to wave the physical weapons according to the rhythm of a six-beat waltz, which encourages cooperation and promotes pro-social behaviors.

Author Keywords

Cooperative games; music-based games; physical games; role-playing games (RPGs); video games; gaming culture.

ACM Classification Keywords

H.5.m [Information interfaces and presentation (e.g., HCI)]: Miscellaneous; K.8.0 [Personal Computing]: Games; H.5.2. [Information interfaces and presentation]: User Interfaces – Interaction Styles.

Background

RPG games and rhythm games are typically classified as different genres. Rhythm games such as Guitar Hero

Figure 1: One round of the game. The warrior waves on the first beat and other two wave on the second and third beats to launch their attack.

[4] require players dance or perform some instrument to a given rhythm, while RPG games tend to involve more complex acting and decision-making in a fictional setting. Some games combine elements of RPG and rhythm games, such as PATAPON[8] and Crypt of the Necromancer[1]. These games require players to synchronize their actions with musical pieces. The longer players are able to maintain synchronicity during the gameplay, the more rewards they will get.

None of these games, however, is cooperative. We aim to invent a new genre of gaming that is rhythm based, cooperative, and involves role-playing.

Mechanism Design Approach

First, we reviewed the existing game mechanisms and then combined selected elements from both RPG and rhythm games into an appropriate hybrid game mechanism.

Since we encourage players to work together, one possible approach is to ask for a group decision. For example, like the experiment conducted by Loren Carpenter during the SIGGRAPH 91 [6], by observing other people's performance and the overall game condition, the whole group accomplished complex tasks.

As Loren Carpenter's experiment suggested, the timing to 'vote' and to 'execute' is critical. The game should provide triggers to signal the different actions. Rhythm can serve as such triggers. In addition, performing simple actions according to the music makes the game more fun [3].

Many music-based games like OSU [7] require players to take complex and rapid actions on the beat. In this game, however, rather than pressing a button or touching the screen, players wave a physical weapon. We believe that the simplicity of the action will help players stay focused on the task and, ultimately, increase their enjoyment of the game.

For most RPG games, players make a decision and the characters react instantly. Some games, such as Dragon Quest [2], employ console RPG mechanism. In each round, players make their decision first and then manipulate the characters to execute the command. In our game, the decision is made collectively, and thus there is a brief lag in time between the decision-making phase and the execution phase.

Here is a brief summary of the design of our game mechanism:

- Like console RPGs, we divided each cycle into a decision stage and an execution stage.
- The decision and execution stages are divided by the bars of background music.
- During the decision stage, three players can wave their physical weapons on beats. Their physical performance determines the actions in their character's subsequent actions that collectively determine the group performance.
- During the execution stage, the characters execute the commands from the team.

Game Scenario

In the game, there is a warrior attacking the monsters, a defender protecting the team, and a mage healing the team. The three characters share the same life, in other word, they get hurt or healed at the same time and the same degree. During each round, three players
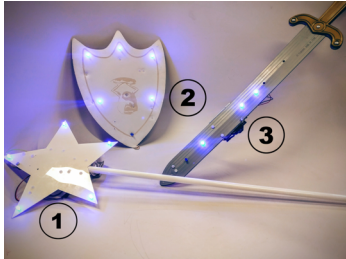
Figure 2: The physical devices we made for the game. The LEDs light up if the players perform on beat during the game.
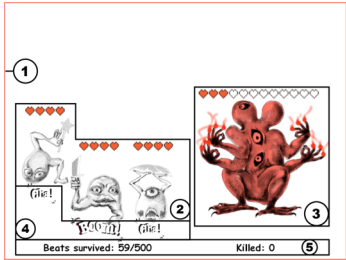1- Wand;
2- Shield;
3- Sword

Figure 3: The UI of the game.
1- Blinking border. It blinks during command stage;
2- Characters. Mage, warrior, defender (from left to right);
3- Enemy. It turns red when preparing to attack.
4- BoomChaCha signs. Words signal the players if they have hit on the beat.
5- Status bar. Indicates how many times the monster has been killed in past rounds.

interact with the game by waving their physical weapons.

The background music is in a six-beat pattern "boom cha cha, boom cha cha" repeating itself in the 6/8 background music, which creates an atmosphere akin to that of a ballroom dance party rather than a fight. The first three beats are the command stage, players should make their group decision by waving their weapons on certain beats, and during the next three beats the players will see the effects of their actions.

At the beginning, we play a tutorial video of the game. When the game starts, a group of monsters attacks the whole team. Players try to kill more monsters and survive within the time limit.

Implementation
Software and Visualization
We programmed the game in Processing3. All the actions in this game are coordinated with the musical beats. The software listens to the serial port to receive the players' decisions from physical devices and translates commands like {sword, shield, wand} into an order like "attack, power=2". In the visualization, we designed a comical appearance of the animated characters. Their motions are also synchronized with the music beats.

Physical devices
We built three separate wireless weapons: sword, wand and shield. Each device has an accelerometer, an Arduino board and a xBee module [9]. A simple pattern recognition algorithm is executed in the Arduino loop. When a player swipes the sword or moves the shield, the Arduino detects the behavior and sends a command

back to the corresponding xBee that is linked with the computer. Meanwhile, the LEDs on the weapons light up.
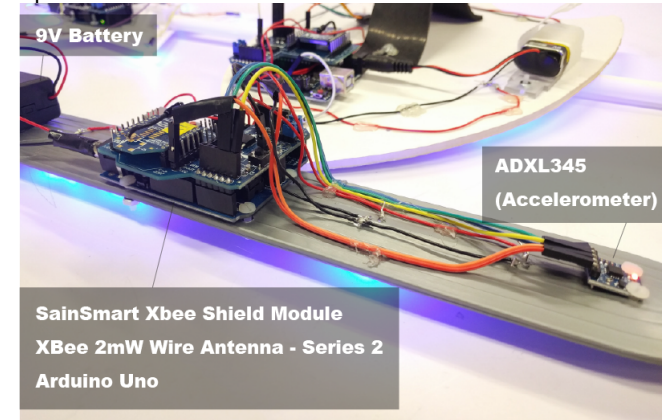

Figure 4: The arrangement of the hardware parts. Each weapon has the same sensors, micro-computers and wireless modules.

Music:
We composed our music in a six-beat pattern in a playful waltz style in order to encourage cooperation among the players. We added several sound effects to the game to provide users with feedback.

User Testing and Feedback
We performed approximately 30 rounds of user tests on Dec 20th and Dec 21st, 2015. Each round included three players, including a range of ages and genders.

Most of the players understood the rules and intent of the game after introduction. Many of the players were able to collaborate. According to our record, 13 groups successfully survived to the end of the game. In some instances, some members in the group wanted to make

their own decisions without considering the actions of the other players.

We found that the music had an impact on how the game was played. When we asked five of the most effective players about their experiences in the post-testing interview, we discovered that all of them had experience with playing instruments, which likely gave them a better sense of rhythm. On the other hand, we found that participants who did not have musical backgrounds had a more difficult time listening to the rhythm and acting on beat. Therefore, we plan to add visual cues to help players stay on beat in the next version of the game.

Conclusion

We designed a game that combines the genres of physical music-based game and RPG. We employed hybrid game mechanisms to generate a cooperative gaming. Evaluation with players showed that our game could successfully guide the players towards a positive, cooperative experience.

Acknowledgement

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Figure 5: Typical scenarios of how the game is played. People stand in front of the game projection and physically wave the weapons.