Mood & Emotion Detection: Whistling Ball Movement Game

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Abstract: In this investigation, a modified and improved version of the ball-throwing game is presented. The goal is to boost mood and promote mental health utilizing the game system Ball movement and music therapy. The user's whistle pitch determines how the ball moves in this paper. Whistling can serve as a stimulant for the medical reduction of stress, which makes it useful for rehabilitation. Our algorithm adjusts the ball movement performance dependent on the player's whistling score after analyzing it. This article focuses on the system's development and operations.

Keywords: Ball, Stress, rehabilitation, random, therapy, mental health.

1. INTRODUCTION

Games made for a specific purpose[8], such as treatment for physical or mental health, social interaction, memory improvement, etc., are referred to as serious games. In addition to serious games, music therapy and singing also strengthens social bonds[4], increases feelings of belonging and self-confidence, and decreases anxiety, depression, and stress. These benefits are used in rehabilitation and treatment. However, there aren't enough studies showing how useful singing games are for mental health research. Whistling also be relaxing, lower blood pressure, be distraction for people who have a ‘lot going on’ or for those who have to ‘think a lot’. Whistling can both help us concentrate or serve as a distraction. For some, it is musical, and carries the same power (& stimulus) that music does. Some interesting research on shepherds in the Canary Islands (who herd their flocks by whistling) may indicate bi-lateral brain stimulation which causes the brain to recreate brain movement between left/right, logical/emotive sides of the brain. It may be one of the reasons whistling reduces tension and stress. Whistling may be quite cerebral and healthy for the brain.

Strangely, there are also other physical reasons why whistling might improve our moods and lift our spirits. Whistling helps distract us from fears or worries and gives us increased confidence, security and bravery. A pretty good deal, especially if that works even if you are a lousy whistler. The famous American composer, Henri Mancini, composed the musical score and lyrics for “Whistling Away the Dark” , understanding that whistling helps decrease feelings of fear. In our proposed system presenting mood and stress detection based on whistling game.

2. RELATED WORK

[1] This research suggests a way for creating Angry Birds-style game levels with a domino impact using mechanics inspired by Rube Goldberg Machines (RGMs), allowing them to be finished with a single shot from a bird. A level is generated using the suggested technique by picking segments from a pool which each include many items placed in a manner which creates a chain reaction. The suggested technique uses a preset segment to procedurally construct a varied structure on top of certain blocks, increasing the resulting levels' variety. In relation to stability, the RGM generator being proposed demonstrates comparable performance to two established generators, one of which was the victor in 2018 AIBIRDS Level Generation Competition. Additionally, it surpasses both baseline generators in

regards to operating time as well as novel metric identified as "dynamic," which is introduced in this study to quantify duration during which mobile entities, such as shooting bird, are present within a specific level. In addition, it is worth noting that suggested generator exhibits a significant propensity for generating levels that may result in a cascading sequence of events with severe consequences, particularly in cases where levels consist of 3-4 interconnected segments.

[2] This study shows a revised and enhanced version of a singing-based Angry Birds-like game. We utilize Science Birds gaming system in conjunction with music therapy to encourage positive mental health as well as improve mood. In this article, we were able to create levels that were additionally varied & non-linear but also had unpredictable collapse flow of items and firing directions for birds. Research indicates that singing therapy may successfully alleviate stress & serves like an rehabilitation technique for patients, therefore we decided to include singing like a input method for game.

[3] This study surveys current systems & explores roles which music therapy & video games play in treatment and rehabilitation. The positive impacts of singing and dancing on health, education, & brain development are explored. Previous studies have shown that singing as an aspect of music therapy have beneficial effect upon stress hormones as well as aids in medical rehabilitation. Therefore, the purpose of this work is to illuminate the potential for future research to inspire creation of voice-input based games for use in music therapy & stress reduction.

[5] The number of women who use addictive drugs has risen steadily over previous several decades. Women and men start drug misuse for various reasons and have distinct treatment requirements. Treatment programs for addicts should be designed with women in mind, according to the study's authors. Goal of this research was to compare effectiveness of three distinct music therapy sessions in reducing depressive, anxious, & angry feelings among women undergoing drug misuse treatment. Ten women in an outpatient drug misuse recovery program participated in music therapy program twice weekly for six weeks. During these sessions, they engaged in movement-to-music exercises, rhythmic games, & competitive activities. We assessed changes in state-trait stress and rage after every treatment. Data collected on daily scores, prior to and after each session, showed individuals revealed a reduction in depressive disorders, anxiety, stress; yet, ANOVA with repeated measures showed no statistically significant variations for 3 types of music therapy interventions.

3. PROPOSED SYSTEM

User's whistle pitch in the proposed system controls how the ball moves. Whistling is helpful for rehabilitation since it can act as a stimulant for the medicinal decrease of stress. Following analysis, our algorithm modifies the ball movement performance based on the player's whistling score. The creation and use of the system are the main topics of this project.

4. METHODOLOGY

1. Player : When the player starts whistling, the ball moves in the specified area based on the pitch of the whistling. Simultaneously the camera capturing the video of the player. This video further divides into number of still images called frames.

2. Face Detection: Pre-trained models for face identification are included in OpenCV package, saving us the time and effort of developing our own method. Library primarily uses machine learning technique of Haar cascade to detect objects in images. Picture size and position of item being sought are both irrelevant to effectiveness of Haar cascade technique for object detection. Following are stages of Viola-Jones algorithm:

- ✓ Training Haar classifier
- ✓ Haar feature selection
- ✓ Creating an integral image
- ✓ Applying Adaboost algorithm
- ✓ Cascade classifiers

Here is an example of Viola-Jones algorithm being used in a face detection system.

Training Haar classifier

The first step is to use many photos to teach the Haar classifier. It's machine learning technique wherein cascade function is taught using examples of both positive and negative photos. Faces are present in positive photographs, whereas they are absent in negative ones. In order to recognize faces in test photos and videos, we utilize them as training data to train Haar classifiers.

Haar feature selection

After the positive and negative pictures have been gathered by Haar classifier, Haar features from those pictures are gathered utilizing sliding windows of basic rectangular blocks. Subtracting the total intensity of pixels within white rectangles from those under black rectangles yields the a Haar features. To put it simply, we want to find the area in a picture wherein one element is noticeably darker or lighter than rest of picture.

Haar value calculation:

PV=(X/Y)−(P/Q) ----(1)

Where

X: Sum of the Dark pixels

Y: Number of Dark pixels

P: Sum of the Light pixel

Q: Number of Light pixel

PV: Pixel Value

The algorithm used by Haar Classifier to identify objects. The image's characteristics can be extracted for use in object detection & identification. The haar pixel value may be determined with the help of Equation (1). depicts the algorithmic structure of Haar cascade classifier. After camera takes a picture, it changes colors to grayscale. If a face is found, cascade classifier recognizes it.

3. Based on User’s face the system detects the emotion of the player and finds the mood of the player.

Deliberation of Haar like characteristics Integral picture

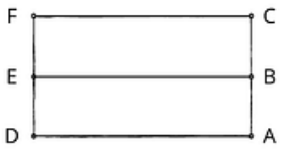
Integral pictures allow us to evaluate Haar features in constant time.

1. Six memory lookups are all that is needed for edge features or for two rectangles.
2. Eight memory lookups are all that is needed to process line features or three rectangular features.
3. The number of memory lookups for 9 diagonal features or 4 rectangular features is little.

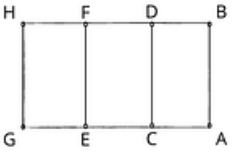
$$\textbf{2 Rectangle} = A\text{-}2B\text{+}C\text{-}D\text{+}2E\text{-}F$$

$$\textbf{3 Rectangle} = A\text{-}B\text{-}2C\text{+}2D\text{+}2E\text{-}2F\text{-}G\text{+}H$$

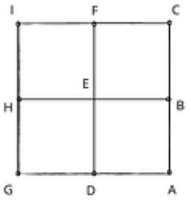
$$\textbf{4 Rectangle} = A\text{-}2B\text{+}C\text{-}2D\text{+}4E\text{-}2F\text{+}H\text{-}2I\text{+}J$$



2 Rectangle Feature



3 Rectangle Feature



4 Rectangle Feature

5. SYSTEM ARCHITECTURE

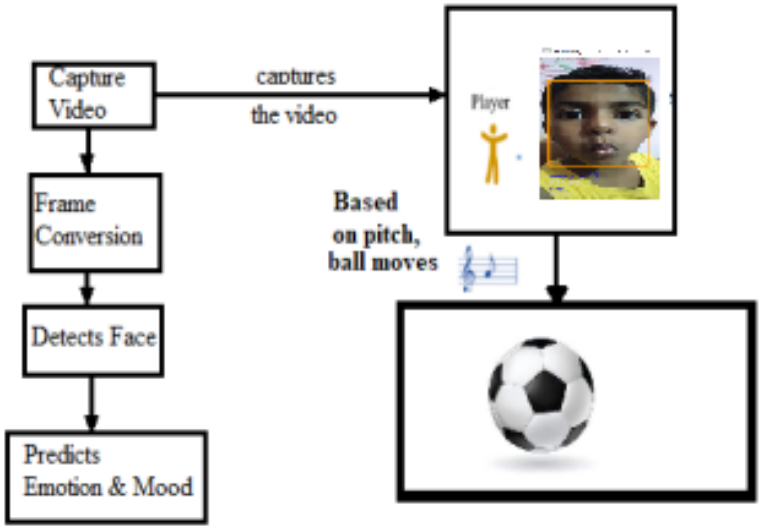


Figure 1: System Architecture

The system captures the video of the player while playing. Converts the video to still images using frame conversion and detects the face of the player using haar algorithm and predicts the player's mood and emotion using FER

6. RESULTS AND DISCUSSION

In this system the new game we are playing i.e. ball movement based on whistle of the player. And also it is detecting the mood and emotion of the player.

Figure 2: Menu

This is program menu through which starting the program

Figure 3: Read Image of the player

In this module the system accepts the image of player

Figure 4: Face detection

In this module detects the face of the player. Commonly used Haar features for face identification are a pair of neighboring rectangles which extend into space between upper eyelid and the cheek. These rectangles have their coordinates determined in terms of location of detection window which serves as bounding box around item of interest.

Figure 5: Emotion Detection

Using Fer detects emotion of the player.

The term "Facial Emotion Recognition" (FER) refers to the science of deducing an individual's emotional state based on their facial expressions, which may be captured in still photos or films..

7. CONCLUSION

Advised a method whereby the player may direct the ball's trajectory by whistling. For the purpose of promoting mental health, this setup shall be utilized to research results of using whistling as controller input in video games.

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