Jelly Polo: Increasing Richness and Competition in Sports Games Using Small-Scale Exertion

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Abstract
Sports video games should be inherently competitive, but they fall short in providing true competition for the players. The emphasis on statistical simulations in traditional sports video games has taken away the ability for players to gain expertise development, differentiate how they play from other players, and change the way they play throughout the course of the game. Jelly Polo, a 2D 3-on-3 sports video game uses small-scale exertion to counter the drawbacks stated above. By providing impulse-based movement and precision passing, players can gain expertise in running and passing, differentiating how they play. The small-scale exertion aspect also makes players fatigued, forcing them to strategize how they play throughout the course of a game. Jelly Polo is the first game to show that small-scale exertion can increase the richness and competitiveness in sports video games.

Author Keywords
Sports video games; physical controls; exertion games; small-scale exertion

ACM Classification Keywords
H.5.2. Information interfaces (HCI): Interaction techniques

Introduction

Real life sports are not the same as sports video games. This statement is actually very true in many ways. In real life, sports are largely about competition. The winner of the competition is determined by things like who can run faster, shoot better, or maybe who is less fatigued. Sports video games, however, are different. Take running for example. How can a player make the in-game character they are controlling run faster, other than by using something like a sprint button? The answer is: they can't. If the in-game character the player is controlling has the exact same speed statistics as another in-game character, they will be the same speed.

At the moment, in traditional sports video games, there is no way for the player to increase simple skills like running through being *better* at using the game controller. This is because to move your in-game character, all you can do (in most cases) is hold the thumbstick over to one side. There is no real way to do this *better* than anyone else.

Currently, sports video games try to be some of the best simulations possible of the real thing. Characters look like real people, the animations are more life-like, and each in-game character is given different stats based on how good they are in real life. The fact that each character is given a set of predefined statistics is the problem. Sports video games are too much of a statistical simulation. Passes and shots are automatically aimed, statistics determine outcomes of certain situations and teams with better players technically have a better chance at winning a game, simply because they have higher in-game statistics.

This leads to three drawbacks of sports video games compared to real life sports:

- Limited opportunity for *expertise development* in simple skills like running and throwing*;*

- Little *differentiation* between players, again, in terms of running and throwing;

- *Fatigue* is not a factor in the outcome of a game.

Our solution to these drawbacks is to add small-scale physical exertion to sports video games. To show that our solution works, we built a 2D sports game with small-scale exertion called *Jelly Polo*. Through our research that is discussed in detail below, we found that adding small-scale exertion to a sports game fixed all three drawbacks [2]. It enables the opportunity for expertise development, increases differentiation between players, and allows fatigue to become an important gameplay factor.

Jelly Polo

Game Concept

Jelly Polo is a 3-on-3 top-down 2D sports game that is similar to hockey or soccer. Two teams play against each other to see who can score the most points by shooting a ball into the opposing team's net. Games are 10-40 minutes long depending on what the players choose at the beginning of the game. There is also a half-time break where teams switch sides and have a short rest. Jelly Polo is an exergame, which is a game that uses an interface that causes exertion [1]. The movement mechanic, discussed below, is what makes Jelly Polo an exergame.
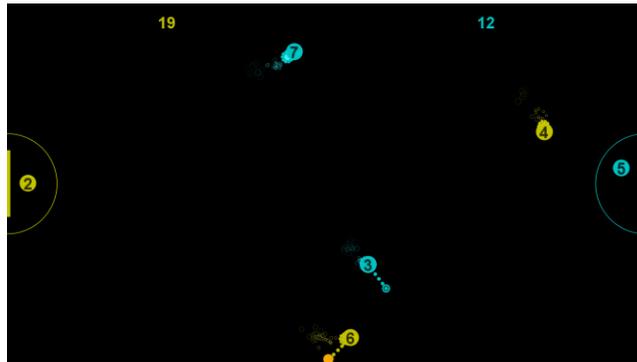
Figure 1. Jelly Polo game in progress (from [2]).

There are only two controls in Jelly Polo, the left and right thumbsticks on a standard gamepad controller. The left thumbstick controls movement and the right thumbstick controls an arm for throwing. The gameplay 'innovations' that will be discussed in its own section below are both the movement and throwing mechanics.

Target Audience
Part of our target audience is male sports fans. This is because recent research has shown that about 95% of all sports video game players are male sports fans [3]. However, we also feel as though our target audience is focused towards any competitive video game player. With small-scale exertion added to the game, competition is much higher between the players. This could lead to players training to compete at their highest levels. Since Jelly Polo is very sport-like and competitive, eSports would be a perfect fit for Jelly Polo.

Gameplay Innovations
Moving in traditional sports games usually involves rate-based movement. Rate-based movement is when
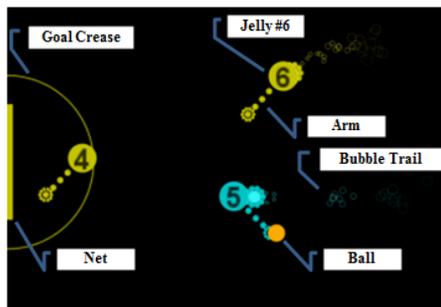

Figure 2. Jelly Polo close-up with annotations (from [2]).

the player can hold the thumbstick over to one side and their in-game character moves at a constant rate in that direction. Jelly Polo, however, uses impulse-based movement where the player has to constantly flick the thumbstick in the direction they want to move. The faster the player flicks the thumbstick, the faster they move. This is what causes small-scale exertion in Jelly Polo.

With impulse-based movement, players have very different top speeds and levels of endurance. This leads to certain situations that would not be found in most traditional sports games. For example, in Jelly Polo, players switch positions in the middle of the game to strategize against fatigue (e.g., switching to the goalie position because it is less fatiguing).

Another phenomenon that happens in Jelly Polo is that players can catch up to other players that are on a breakaway. In traditional sports games, only if the character you are controlling has a higher speed statistic than the character on the breakaway can you have a chance at catching up to them. In Jelly Polo, if you are physically faster (i.e., better) at flicking the thumbstick, then you can catch up to another, slower, player if they are on a breakaway. With this control scheme, we switch the competitive aspects of the game to be controlled by the player rather than by the statistics of characters in the game.

The other control mechanic in Jelly Polo is precision throwing. Using the right thumbstick, if the player has the ball, flicking the thumbstick will cause the ball to be thrown in the exact direction the thumbstick is pointing. The speed of the ball as it is thrown is determined by how hard the thumbstick is flicked. This leads to much

more skill development in passing and shooting as opposed to some traditional sports video games which only need a single button press to make a perfect pass.

We want to stress, though, that these mechanics (i.e., impulse-based movement and precision passing) are by no means original control mechanics. They have been around for many years, but seem to have been lost in the world of ever-increasing graphics and realistic simulations [2].

Research

Research Question
To determine if small-scale exertion in a sports video game can fix the three drawbacks stated above: limited expertise development, differentiation and fatigue.

Methodology
We ran a four week long Jelly Polo league with four consistent teams of three. Each team played three games a week and each game was 20 minutes long. We kept track of each player's statistics (e.g., goals, shots, assists, saves, etc.), gave likert scale questionnaires and performed interviews with each team at the end of the study.

Implementation
Jelly Polo was built with Processing using the proControll library for the controllers. We used the same desktop PC and the same Logitech Dual Shock controllers for each game session.

Results
Through both qualitative and quantitative data analysis, we found that with small-scale exertion, the three drawbacks were fixed. Expertise development was made in running and passing; differentiation was made in the players' abilities and the way each player played; and fatigue was found to be a big factor in the outcome of a game. All these were found in both the qualitative and quantitative data in some way [2].

Conclusion

Overall, we found that by using small-scale exertion in a sports video game, we can make sports games truly competitive and sport-like. Players are given the ability to train and get better at simple skills like running and passing, they also found niches in which they could play (e.g., a goalie as opposed to an offensive player), and team strategy became a huge part of the gameplay because of fatigue. Fatigue changed the way players played throughout the course of a game because the small-scale exertion kept them from moving at top speed throughout the entire game. Players had to consciously strategize against the fatiguing aspects [2].

There were many unique situations that we found with Jelly Polo that cannot be seen in any other current video game. It is truly a unique experience and we hope players and developers alike will embrace what we have learned and use it to their own benefits.

References
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