Coordination Policies for Tabletop Gaming

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ABSTRACT

This paper explores how social interaction can be preserved in multitouch tabletop video games, when the turn-based gameplay of board games is relaxed in favor of a real time experience. In this paper we will present two games which we have built for the tabletop, as well as a classification of real-time coordination policies for board games and preliminary results from informal experience with users.

KEYWORDS: Computer games, tabletop games, interactive surfaces.

INDEX TERMS: H.5.2 [Information Interfaces and Presentation]: User Interfaces - *input devices and strategies*

1 INTRODUCTION

Multitouch digital tabletop surfaces present the opportunity to design video games featuring novel styles of interaction. Similarly to traditional board and card games, tabletop games are played on a horizontal surface by small collocated groups, and players interact with the game by physically manipulating objects. With the release of Apple's iPad, multitouch displays are gaining mainstream attention, and being hailed as the perfect platform for digital versions of traditional board games [10]. Recent technologies such as the Microsoft Surface and the SMART Table allow us to move even closer to traditional tabletop play.

Board and card games are popular. For example, the Monopoly board game sells several million copies a year [1]. These games are social [2],[3],[6], played by a small group of players sitting around a table, where players can see and interact with each other. A new wave of cooperative board games has a strong element of group coordination, as players must work together and discuss strategy in order to succeed. Tabletops effectively support this type of interaction, as seen in other existing tabletop applications that support collocated collaborative tasks [7].

Board games are almost exclusively limited to some form of turn taking, in which only one player acts at a time. This can lead to significant downtime for players awaiting their turn. Turn-taking is often the only practical coordination policy for games, as more liberal policies might overly burden players with complex calculations to determine who is allowed to do what at a given time. Digital tabletops can use a computer to perform and enforce these calculations, opening the opportunity to design games with the streamlined gameplay and real-time coordination policies of video games, while preserving the sociality of board and card games. However, the transition from turn-based to real-time gameplay, risks speeding up the game to a point where social interaction is lost.

In this paper, we explore how games can be designed for digital tabletop surfaces to combine the social aspects of board and card games with the streamlined real-time gameplay of video games. We describe two games which we have built, and present preliminary informal observations from users playing these games. We also present a classification of real-time coordination policies for board games.

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2 RELATED WORK

Many games have now been developed for digital surfaces. A few examples are the following: Mandryk et al. [3] have shown how hybrid board/video games can enhance sociality by combining the tactile and tangible gameplay of traditional board games with the streamlined gameplay of computer-based games. *WeatherGods* [6] is a tabletop game designed to combine the advantages of both board games and tabletop technology. The game can use two different versions of tangible playing pieces: iconic or symbolic. *SIDES* [7] is a cooperative tabletop puzzle game, which uses board game design elements. It is designed to help adolescents with Asperger Syndrome to use effective group work skills. The *TViews* Table Role-Playing Game [8] and *SurfaceScapes* [9] are traditional tabletop role playing games implemented for touch surfaces. Both use tangible playing pieces as well as a tangible object to invoke a menu when placed.

The games RTChess [5] and Real-Time Chess [4] implement alternative real-time coordination policies for Chess. RTChess is a distributed game in which two teams of players play a standard game of Chess. Unlike standard chess, any player may move any piece at any time, and games are completed within tens of seconds. This is an example of how the transition to a real-time coordination policy can dramatically change gameplay. Certainly, in a ten second game, there is little opportunity for social interaction. In the tabletop game Real-Time Chess, up to four players move chess pieces around a Chess-like board. When a piece is moved, it cannot be moved again until some time has passed. This puts a time-based restriction on when players may make certain moves, slowing the pace of the game.

3 EARLY RESULTS

The goal of our research is to explore how players interact with each other while playing cooperative board games, and how this changes when the game is played on a digital tabletop surface. Specifically we are interested in how social interaction and group coordination are altered when the rigid turn-based coordination policies of traditional board games are relaxed in favor of a real-time experience.

We have implemented two games for the tabletop. The first is a straight port of the two-player board game Checkers. The second is an implementation of the popular cooperative board game Pandemic. The following are preliminary results, including observations collected from informal experience with users, as well as a classification of alternative real-time coordination policies for cooperative board games.

3.1 Coordination Policies

A game's coordination policy restricts when players may take actions. We have observed that coordination policies fall into two categories: time-based restrictions and restrictions based on player actions. The two extreme coordination policies are turn-based and

free-for-all. In turn-based, only one player may take actions at a time; at the end of the current player's turn, the next player is allowed to play. In free-for-all, any player may take any action at any time and the actions are performed immediately.

3.1.1 Restrictions Based on Player Actions

We have identified two coordination policies where a players' ability to perform actions depends on the actions of other players. These are turn-taking (already described) and *barrier synchronization.* In barrier synchronization, each player is assigned a set of action points. Performing actions consumes these points. Once all players have consumed their action points, each player is granted a new set of points. Barrier synchronization allows players to take actions concurrently, but matches the overall pace of the game to that of the slowest player.

3.1.2 Time-Based Restrictions

Time-based restrictions pace the game by restricting how frequently players can perform actions. Two variants are *timed actions* and *trickle points.* In both approaches, players may take actions concurrently.

Under *timed actions,* actions take time to complete. For example, if a player moves a piece between distant points on the table, the movement may take 10 seconds to complete. Animation can be used to show the state of the action.

With *trickle points,* actions take place instantaneously as long as the player has action points available. Action points are periodically assigned to players over time. Players can bank action points, allowing a flurry of activity.

Figure 1. Pandemic Gameplay

3.2 Observations

Through informal user observations of our Checkers and Pandemic games, we have found the following playability issues with tabletop implementations of board games. Our current implementations provide only turn-based coordination. Experience with other policies represents future work.

Players expected the coordination state to be explicitly shown in the digital versions of the games. For example, testers of the Checkers game complained that the game did not show whose turn it was. This indicates that the digital format changed players' expectations – people have played Checkers as a board game for hundreds of years without requiring a turn indicator.

One advantage of digital games is that they can prohibit illegal actions; however, such automated enforcement of rules must be done carefully. Our games (initially) did not give feedback when players attempted to take actions which were not allowed. This led to players being unsure whether the game had registered the action. A particularly confusing case was Checkers enforcing the rule that players must take a piece if it is possible to do so. Most testers were unaware of this rule, and were confused as to why they were unable to make an alternative move.

In the Pandemic board game, random actions are taken following each player's move. These are carried out by a player by drawing a card. In the digital version of the game, players occasionally missed these actions, leading to confusion. Automated actions therefore must be clearly visible to players.

In general, these pitfalls suggest three design rules: anticipate that moving to a digital form will raise player's expectations; make it clear what players are allowed to do when game rules are being enforced; and ensure that automated actions are transparent.

4 Future Work

We have implemented the turn-based version of Pandemic. We will be implementing the other coordination policies. We will perform a study exploring how well these different real-time versions of Pandemic incorporate both the streamlined gameplay of video games and the social advantages of board games.

5 Conclusion

We have presented our research with the goal of exploring how the turn-based gameplay of board games can be relaxed in favor of real-time gameplay, in such a way that the social advantages of the original games are preserved. We have presented a classification of coordination policies for board games, as well as preliminary findings which reveal some of the issues with the transition from a board game to a tabletop video game.

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