COMP504 Final Project
Road Runner

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Abstract

This document proposes *Road Runner*: a map based two-team, multi-player game that encourages communication between members of a team via a chatroom platform. Further, we discuss some future extensions of the game.

1 Introduction

In this project we are required to design a multi-player game that has two main features: a. players in the game should make use of a provided chat-room platform, b. the game must involve usage of a geographical map of the world. In addition, any good game description comes with the inherent requirement of being challenging for players [1] [2]. Hence, a game should be difficult enough not to have an obvious winning strategy. In addition, almost all games have various levels of difficulties [1] [2]. To this end, we propose *Road Runner*, a two-team, multi-player game that accomplishes the aforementioned requirements.

The rest of this document is arranged as follows. We describe the simplest version of the game in Section 2. Next, we discuss extensions of the game for raising the Difficulty level in Section 3. Lastly, we conclude with listing down the salient features of our game in Section 4.

2 Game Description

In this section we describe Difficulty Level 0 of our game. This will cover the groundwork necessary for the game. Extensions to the game will be add-ons or slight modifications of this basic skeleton.

2.1 Player Organization

This is a two-team game. In most generality, it can also be extended to an n-team game for any $n \geq 2$. However, we consider the 2-team variant, as we believe the n-player variant is no more interesting than the 2-team variant. Henceforth, we discuss our game w.r.t. the 2-team variant.

Our game requires that there are equal number of players in each team. We will demonstrate in Section 2.4 that the game has an obvious winning strategy when there is a single player per team. However, the game becomes exponentially harder when there are 2 or more players per team.

Players in a team can communicate with each other via the provided chat-room platform. Clearly, no communication is necessary if there is a single player in each team. Players cannot communicate across teams, and cannot snoop into the chat-room of the other team.

Teams are fixed in the beginning of any play. No player can join or leave a team while the game is running.

2.2 Game initiation and objective

Once team are set, the game randomly assigns each player a different country on the map i.e. no two players are assigned to the same location on the geographical map. Next, the game declares a common *destination*

country.

The objective for each team is to ensure that all its players reach the destination, abiding by the game rules described in Section 2.3. The first team to re-allocate all its members to the destination wins.

2.3 Game Rules

This is a turn-based game i.e each team alternately plays. The first team to play is chosen randomly by the game. This is standard practice in most turn-based games.

In each turn, a team can re-allocate only one of its players. The following constraints are exercised on re-allocation of players:

1. At no point in the game two players (between and across teams) can be present at the same location. The destination is the sole exception to this rule.

2. In a single turn, each player can only move to another country s.t. either the country shares a border with the players' current location, or these countries are separated by a water body (an ocean or sea, we do not consider rivers).

Players of a team are required to communicate with each other via the chat-room platform. In each round they need to arrive at a consensus on which player to move, and on where to move the player. These decisions are governed by the team players via discussions in the chat-room only, and the game does not interfere at all. To prevent very long decision sessions, we put a bound on the time that each team can spend in a single turn. In case teams fail to play in that interval, the team looses its chance to play in that round.

Every players has access to the complete map, and geographical locations of all other players in the game. This enables players to make an informed decision in each round.

2.4 Strategies

When there is a single player in each team, clearly the player with the least number of countries/water bodies in between will win the game, and hence it becomes predictable and uninteresting.

However, with multiple players in each round the game becomes much more interesting as teams can resort to various strategies depending on the initial configuration and the dynamic information of current locations of players all over the map. We describe some strategies below:

1. Teams may play *greedily*, i.e. in each round a team may try to progress their players closer to the destination. Teams may resort to this strategy if they assess a clear advantage in terms of locations.

2. Teams may play *attackingly* by resorting to block players of the other team. This can occur when the competition is close, and blocking a player of the other team may either be advantageous to the blocking team, or of disadvantage to the blocked team.

3. Teams may play *defensively* when they are try to respond to the other teams actions conservatively.

4. Teams may decide to deploy various players in various roles, depending on their locations.

5. etc...

The point to note is that the strategy of any team at any point of time depends on the current configuration of players across the globe. Hence, this game requires quick and smart strategizing on the toes. This encourages team-work, and hence communication among players.

2.5 Our Implementation

In our implementation, we will only implement Difficulty Level 0 as a proof of concept. However, we describe some possible extensions for raising the difficulty level in Section 3.

3 Game extension for greater Difficulty level

Here we enumerate some possible extensions to increase the difficulty level of our game. These extensions can be added as higher levels of the game. Note, this list is intended to be indicative of the games flexibility for extensions, and is by no means exhaustive. We will be happy to accommodate more suggestions for extension of the game.

1. Putting a restriction in the distance that can be traveled in each round. Alternately, introducing a cost function that is proportional to the distance traveled per round, and changing the game objective to reaching the destination faster and with lesser cost.
2. Allowing teams to block prevent one player from the other team in each round.
3. Restricting visibility of players. Each player can see its neighboring counties. Hence, communication among members will also involve exchanging information from their neighborhood.
4. Adding sudden unexpected geographical blocks. Some countries may deny entry of new members for while due to internal riots/ attacks/ poor whether conditions etc.
5. and many more...

4 Game Highlights

In this section we briefly summarize the highlights of the game

1. This game is interesting only when there are multiple players on each team.
2. The underlying geographical map plays an integral part of the game. Hence we are making good use of the provided NASA GIS.
3. There is no clear winning strategy in the game. Hence it is not predictable.
4. The game is dynamic in nature, and requires situational collective strategy making skills. Hence, this game ensures constant communication among players. This way we also ensure that the chat-room plays an integral part in the game.
5. The game can easily be extended to higher levels of difficulties.

References

[1] Carleton, "What makes a good game?." `http://serc.carleton.edu/introgeo/games/goodgame.html`.

[2] Games Journal, "What makes a good game?." `http://www.thegamesjournal.com/articles/WhatMakesaGame.shtml`.