

Chapter 19

Automated Event Recognition for Football Commentary Generation

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ABSTRACT

The enjoyment of many games can be enhanced by in-game commentaries. In this paper, the authors focus on the automatic generation of commentaries for football games, using Championship Manager as a case study. The basis of this approach is a real-time mapping of game states to commentary concepts, such as “dangerous situation for team A”. While in some cases it is feasible to provide such a mapping by hand-coding, in some cases it is not straight-forward because the meaning of the concepts cannot be easily formalized. In these cases, the authors propose to use inductive learning techniques that learn such a mapping from annotated game traces.

INTRODUCTION

Watching game action on the screen can be made more exciting by providing additional commentary with the pictures. This is the case for many game genres. For example, in-game battle reports that comment on the current situation in real-time strategy games and highlight especially heroic

actions by individual troops clearly can enrich the game experience and make it more immersive.

Even though passionate commentary is a desirable game feature, generating automated commentary is a significant technical challenge. In the football domain, ROCCO (Voelz et al., 1998) and MIKE (Tanaka-Ishii et al., 1998a) are two attempts to generate live commentary from game simulator data. Although ROCCO and MIKE are different in terms of system structure,

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both solutions classify the events by matching them against hand-crafted propositional models (patterns) (Andr , 1994). Therefore, the accuracy of classification solely relies on the correctness and completeness of the predefined conditions, and may be degraded dramatically when handling more complex occurrences, according to Gosling (1995). For instance, the existing solutions occasionally misclassify a player’s kick action as a shot at goal when he merely intends to pass the ball to the teammate who is nearer to the goal. Furthermore, most models of events are so complicated that they consist of many rules, for example, ROCCO uses 8 rules to define the ball-transfer event (Voelz et al., 1998). Thus, the generation of reliable models by hand is rather inefficient and may even be infeasible for a large number of more complex events.

In this paper, we present our work on automatically generating commentary rules using inductive learning techniques. Specifically, we focus on in-game real-time commentary for simulated football games within Championship Manager, a highly popular title developed by Beautiful Games Studios (Eidos). In this game, the player steps into the role of a football team manager, purchasing and selling players, as well as overseeing their training progress. The football matches themselves are simulated based on player statistics. The player only watches the simulation and cannot interfere.

To generate the commentary, we first collected commentary concepts, such as “dangerous attack” from football news reports and other sources. We then attempted to manually implement direct mappings from game state to the set of commentary concepts (i.e., an *event recognition* mechanism). While for some concepts we were able to do so, for other concepts it turned out to be infeasible. Instead, we used an inductive learner to map hand-annotated game states selected from trace data, to generate the mapping function (classifier).

In this paper, we discuss our approach and present the empirical results on a few case studies, which show the successful application of machine

learning to commentary concept generation. While our research has been focused on football and Championship Manager, the methods can be easily transferred to other games, as long as game trace data is readily available.

The paper is structured as follows. We first present the Championship Manager game, and the structure of the game traces. We then discuss our general approach, followed by examples of hand-coded commentary mappings and inductively learned mappings. We finish the paper with a summary and an outlook to future work.

CHAMPIONSHIP MANAGER

This section briefly summarizes our experimental domain, the Championship Manager game (CM¹) 2008, presenting both the trace data specification and the game log simulation aspects.

Within CM, football matches are simulated. Similar to a real football match, there are four officials operating on the field and two teams competing to get the ball into the opposing goal. Each team comprises a maximum of eleven players; but the substitution is unlimited during the play.

The data extracted from each simulated football match is saved in a text file (Figure 1) that specifies the respective *spatial information* and *action description* of moving objects (i.e., *players*, *officials*, and *ball*). The pitch coordinate has its origin at the centre mark, the x axis runs across the pitch from top to bottom, the y axis points up to the sky, and the z axis runs from left goal to right goal. Therefore, for every *sample period* (stated in the file’s header part), the moving object’s *position* is indicated in a three-dimensional space² as a decimal fraction with a sign. In addition, the player’s *facing angle* is recorded and measured in degrees, which starts from the z axis and clockwise increases in the xz plane.

The samples capturing the above spatial information are recorded regularly at discrete time points from the start of the match until its end. In

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