

Automated Commentaries for Simulated Soccer

Character Design for Soccer Commentary **Byrne**

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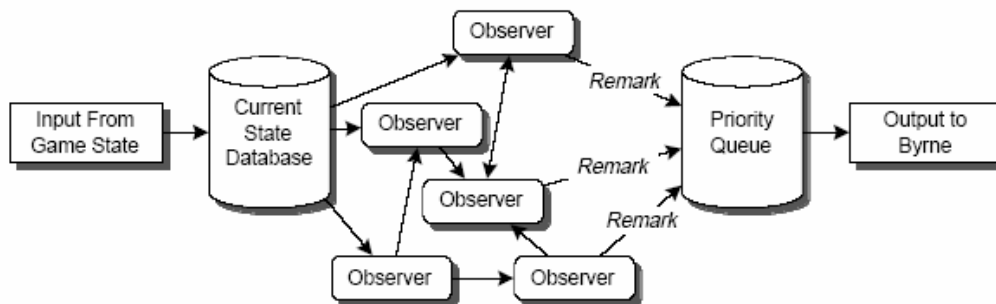
1. Introduction

This project involved the development of a talking head system which can generate entertaining, believable commentary on Robocup Simulator leagues and games complete with facial expressions and affective speech (close to real time). The project participants were interested in the relationship between consistency, believability, expression and perceived personality of the commentators.

The main process of converting monitor messages to Byrne is as follows:

1. generates appropriate text
2. transforms that into natural affective speech
3. controls facial expressions

The module that listens to the server is know as the 'input' module. The input is filtered through engine(s) called 'observers' that make abstract conclusions about the state of the game such as ball ownership, noticing goals, statistics etc. Observers depend on other observers observations to make their own. Each observer eventually makes a remark. The flowchart below summarizes this.



The Priority Queue is also an interesting concept for us as we have come to realise the speed difference there will be between different components of the system. Below is the system used to pick the most appropriate message under time and state pressures.

Byrne's input module produces remarks much faster than Byrne is capable of saying them. To compensate for this, the input module feeds its remarks into a priority queue. Each remark has a *birthday* (the time when it was entered into the queue), a *deadline* (a time beyond which it is "old news"), and a *priority*. When Byrne requests a new fact to say, the queue returns one using a simple priority-scheduling algorithm. First, any fact in the queue whose deadline has past is deleted from the queue. Then the queue picks the fact **F** with the highest priority, and secondarily (to break ties) the earliest birthday. Finally, every fact with a birthday earlier than **F** is deleted from the queue. **F** is removed from the queue and returned to Byrne to comment on.

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The emotion generation is structured in the following manner:

1. Type – the type of emotion (happiness, sadness etc...)
2. Intensity – on a scale of 1..10, 10 being a strong emotion
3. Target – some emotion can have a target, eg anger towards an object or person
4. Cause – what triggered that emotion
5. Decay function – emotions decay over a given timeframe

Here is the structure of an emotion:

(type:sadness, intensity:10, target:nil, cause:(scored team:a time:125)
decay:1/t)

The intensity of this emotion would go down each second for ten seconds, then when it goes below one on the eleventh second, the emotional structure would be deleted from the emotion pool.
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Each emotion has its preconditions that can be met for that emotion to trigger.
For example:

Preconditions:

(supports team: ?team)

(scores team: ?team)

Emotional structures to add:

(type: happiness intensity: 8 target: nil cause: (scores team: ?team) decay: 1/t)

Emotional structures to delete:

none

This rule indicates that, if the team that the commentator supports scores, a happiness structure should be added to the emotion pool.
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2. Pros

- A well structured system to identify patterns in the match.
- The use of mark-up languages to structure the text and speech.

3. Cons

- What happens to the queuing system when there is a goal scored? Surely you would want all commentating to be stopped so that all focus can be made on such an event.

4. Ideas for our project

- The priority queue discussed here is a starting point to the way we may queue our comments.
- An interrupt mechanism will need to be present to stop the current comment and replace it in case of a high priority incident such as a goal.

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- A timeout mechanism will need to be present to determine the period of time a comment is valid for, allowing comments to be dropped from the priority queue if not used and no longer relevant.
- After discussion, the group favour the use of text templates for our system as a means of producing phrases to be passed to the speech engine. These could be complete templates i.e. “goal kick”, or templates that require a variable to complete the phrase i.e. “tackle by red 5” – red 5 being the variable. The templates will need to be categorized allowing selection by type, such as tackles, fouls, shots on goal... etc.
- The use of each template must be recorded to ensure rotation of comments, thus preventing certain comments being used more than others (within reason).
- Once the text template system has been successfully implemented, a later development inspired by Byrne could be to add a mark-up language to the text, allowing more expressive speech by varying the speed and pitch of comments.