

Sports Games

- Reference:

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Introduction

- Unlike most other games, which take place in a world the player knows little about, sports games emulate a world the player knows a lot about!
- For aficionados, the game must be reasonably accurate depiction of the real thing, and they will see any deviation as a flaw.

Rules

- The rules of the game are the rules of the sport being simulated.
- You might need to relax these rules in some areas (e.g., faults, fouls, judgment errors) because the player is using a handheld device to manipulate an athlete onscreen instead of playing on the field himself. It's much more difficult to judge when his avatar is about to bump into someone, cross into a forbidden zone, and so so.
- A few games allow the player to set the level of "refereeing" to forgiving or strict, depending on which way he likes to play.

Competition Modes

- Sports games allow many modes of competition:
 - single-player
 - competitive
 - cooperative
 - teams (assuming platform support enough input devices)
- People love to play sports games competitively and if several people play together, they like to do it in teams as well.
- Because many real sports are played by teams of people, they naturally offer opportunities for multi-player action.
- It is also a good idea to allow the computer to play itself; people like to watch sports on TV after all.
- Allowing the computer to play itself is also useful for simulated matches.

Victory and Loss Conditions

- The victory and loss conditions are the same as in the real sport.
- However, many sports played in leagues or by seasons can be simulated in a variety of game modes:

season mode. player selects a single team (or athlete, for individual sports such as skiing) and plays a series of matches throughout a season, trying to make it into the championships

exhibition mode. a single match that has no long-term consequences

sudden death. a variant of exhibition mode, players play a match only until the first score is made; good for quick games, but luck plays a much greater role in determining the outcome

round robin. players play each other's team a fixed number of times (sometimes just once)

tournament mode. single-elimination tournament, any player who loses any match is dropped (requires number of players to be a power of two)

franchise mode. player controls a team over the course of several seasons, trying to build its strength through the years often includes mechanisms for hiring athletes and trading them among teams; for games such as tennis, in which most athletes play alone, the equivalent mode is called **career mode**

Setting

- The setting is the normal venue for the sport (usually a stadium or an arena).
- You should present the stadium/arena/etc. accurately.
- Players enjoy being able to recognize the architecture details of their favorite stadiums.
- Different baseball fields are famous for having different effects on gameplay.
- Some sports, such as skiing, have venues that vary enormously and require a great deal of practice to learn.
- Outdoor fields are also subject to changes in the weather
 - rain hampers traction on a grass field
 - snow makes it worse still
 - wind affects the flight of balls and the accuracy with which they can be thrown
- The crowd also contributes significantly to the setting (volume goes up in tense moments, chants, vendors, etc.).

Interaction Mode

- In a one-on-one sports game such as tennis, a player controls an avatar in a straightforward manner.
- But in team sports, the player's control usually switches automatically from one athlete to another as the focus of play changes.
- In basketball games, for example, control normally switches to the athlete who has the ball.
- If the player's team is on defense, most games let the player choose which athlete to control and to switch quickly from one to another as conditions change.

Perspective

- In a one-on-one game: choose a spot where you have a clear view of both athletes and where their movements and activities will map neatly onto the machine's input device.
- Generally, you shouldn't do sports games in the first person: a lot of fun of watching a sport is seeing the athletes exercise their skills! This would be hard to see in 1st person (e.g., tennis).
- Team games are more tricky: focus of attention moves from place to place with most soccerlike games. You can try using an end view or side view from an elevated position for such games.

User Interface Design

- The user interface may change on a second-by-second basis, depending on conditions in the match itself!
- American football is a particularly complex example: on each play, the player on offense:
 - selects the formation and play to be run
 - signals and makes adjustments at the line of scrimmage takes the snap and either hands off the ball, passes it, or runs with it himself
 - if he passes it, control switches to the athlete for whom the pass is intended, and a whole series of new options for running, jumping,, diving, and dodging defenders comes into play
- Each of these different states requires that certain moves or choices be assigned to buttons on the controller, and these assignments change rapidly as play progresses.
- Whenever possible, make sure that similar actions in different modes are assigned to similar buttons; for example, if you have a “jump” action in both offensive and defensive modes, assign it to the same button in both cases.

User Interface

- In team games, the player will normally be controlling one athlete at a time.
- This is usually indicated by displaying a circle or star under the athlete's feet.
- Many games also draw symbols on the field to help the player overcome the lack of depth perception.
 - Example: in baseball, you might get a circle indicating where a ball will land.
- When a player is on defense, include a button to automatically change control to the most appropriate defending athlete (in soccerlike games, this is usually the one nearest to the ball); another useful pair of buttons allows the player to cycle control forward and backward through all the athletes on the team.

Player Roles

- In a team sport, the player's focus usually follows the action, rather than being tied to a single individual.
- The player's role shifts rapidly, especially if some athletes play specialized positions such as a catcher or goalie.

coach. The coach selects starting players for the team, sets offensive and defensive strategies, and makes player substitutions during the match. The player usually switches to the coach role during timeouts or other pauses in the action.

general manager. The general manager is responsible for hiring and firing decisions and trying to recruit the best players within the limitations of the budget (some games are only about this aspect, and are called **manager games**).

Physics for Sports Games

- During play, the game is running a physics engine that determines the behavior of moving bodies in the match.
- It is a common error to think that the physics in a sports game should be as realistic as possible
 1. the player is not actually running around on the playing field herself; she has neither the the immediate experience of being on the field nor the precise control over her movements that a real athlete does
 2. the player is not a professional athlete; with a 95 miles per hour baseball pitch, the length of time that ball is within reach of the bat is about 0.04 seconds!
- So, the physics is fudged to make the game playable; we slow the pitch so that the player has a reasonable chance of hitting it, and we artificially adjust the position of the bat so that it intersects the path of the ball.
- Even in highly realistic games, the objective is to provide an enjoyable experience, not a mathematical simulation of nature.

Rating the Athletes

- The rating system provides the raw data that the physics engine needs to simulate the behavior of the athletes accurately.
- Researching the athletes' performance and setting the ratings for them is a task that can take many months.
- In most team games, athletes have one set of ratings common to all of them, plus specialized ratings that apply only to athletes playing a particular position.

Common Ratings Examples

- speed
- agility (measure of the athlete's ability to change directions while moving)
- weight (affects collisions for example)
- acceleration
- jumping
- endurance
- injury resistance

Specialized Ratings Examples

- passing strength (distance that QB can throw the ball)
- passing accuracy (QB)
- dexterity (QB) - affects chances of dropping the snap or fumbling a handoff
- awareness

(QB refers to the quarterback in American football.)

Athlete AI

- Athletes should behave like real players, and that means deliberate, intelligent action.
- In team games, each athlete is working with the others on the team to accomplish particular goals.
- The position the athlete plays dictates behavior to some extent, but within those boundaries, the athlete still has to respond intelligently to a number of possible events.
- The AI should take into account team goals and individual goals and make athletes behave appropriately in support of those goals.

Injuries

- Because injuries occur somewhat randomly, a realistic simulation of injuries would likely frustrate players.
- A lot of games limit injuries to cases in which there has been a collision of some kind, usually between two athletes.
- To determine whether an injury has occurred, you should include such factors as the relative speed of the two athletes, their weights, their respective susceptibilities to injury, and a random factor.
- Some positions, such as the pitcher in baseball, are so stressful that they can result in injuries without a collision, especially the longer the pitcher stays in the game.
- You can compute the probability of an injury on every pitch and raise it slightly with each one.
- You can also decide which part of the body sustained the injury and the length of time for which it will disable the athlete. Study reports of injuries and recovery times for the sport you are simulating. If your game tracks athletes over a period of time, you will have to consider the cumulative effect of injury and recovery times on their careers.

Arcade Mode vs Simulation Mode

- Arcade mode makes the game more exciting at the expense of realism.
- Example:
 - in baseball, an athlete is doing well if he has a .333 batting average
 - some players might find that a little dull
 - switching to arcade mode could let the player get a hit 50% of the time or more it skews the play toward lots of action and relatively few strikeouts or walks
- If you want your game to have both arcade and simulation modes, start with the serious simulation first and then design the "fudges" that make it arcade like.
- Serious simulations are much more difficult to tune, and it's important to get them right first.

Simulating Matches Automatically

- Sports games that can play an entire season for a whole league of teams often provide a means of simulating matches automatically.
- In simulated match, we would like the scores to accurately reflect the relative strengths of the teams.
- We can generate results for matches that the player doesn't play in several ways:
 - computer vs computer with graphics - slow
 - computer vs computer without graphics - faster
 - faking it (roll dice to generate game scores, the dice are loaded somewhat so that good teams get high scores and bad ones get lower ones). Make sure scores are reasonable for the sport! However, this method doesn't generate any other statistics besides the scores themselves (e.g., performance data for each individual player).

Audio Commentary

- There is a **play-by-play man** and a **color commentator**.
- The color commentator gives insights about strategy and tactics, background material, comments on more dramatic moments in the game, etc.
- There is a a third voice: the **stadium announcer**.
- To identify events to comment on in your game, try watching TV to see what happens.
- Find patterns in the play-by-play man.
- See what the color commentator says (e.g., “She’s having a terrible time with those double faults”) but avoid repetition of comments (e.g., even if she continues to have trouble with double faults)!
- Some events are easy to detect (e.g., strikeout).
- Other events are not easy to detect (e.g., a dropped pass in American football that the player really should have caught).

Instant Replay

- You will need to record what happens, but you probably don't want to remember too much.
 - in baseball, you should remember everything since the most recent pitch
 - in continuously flowing games like basketball, you might want to establish an artificial time limit

Camera Difficulties

- In most games the action is one location.
- But in baseball and cricket, the action takes place in two places at once (where the ball is and also where the runners are).
- To solve this, most baseball games implement a picture-in-picture solution: the camera follows the ball, but a small diagram of the baseball diamond in one corner of the screen shows the positions of the runners.
- The player controlling the fielders watches the main screen; the player controlling the runners watches the diagram (and also looks at the main screen to see if the ball is coming).

Home-Field Advantage

- Should games have it?
- There is much debate on this.
- Perhaps not a good idea, since we would like players to feel like they are playing a fair game.