

Computers in Sports

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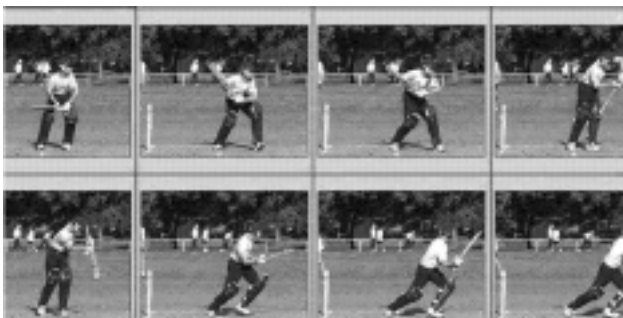
Build on a Strong Foundation You've probably heard the fable about the two men who were building houses. One built his house on sand. In less than a year, the house had collapsed. The sand could not support it. The other man built his house on rock. Because his house had a solid foundation, it lasted for many years. When you are reading, you are building on a foundation of the knowledge you already have. Take time to make certain you understand what is being covered. If you have problems with a certain section, re-read it until you understand it. This way, you will have a stronger foundation for future learning.

Introduction

Practically everybody has played sports video games on a computer. It's fun to pick a team and see how well you can play against a "virtual" rival. However, the uses for computers in sports go far beyond video games.

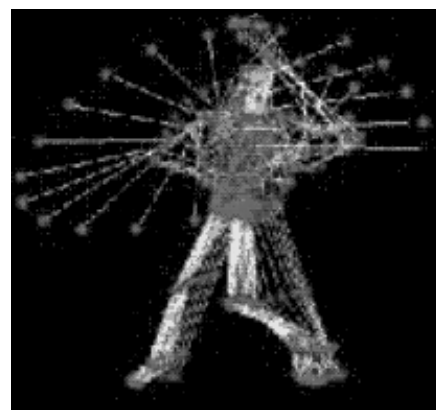
Analyzing Movement

If you ask a softball pitcher how she throws a fastball, she may not be able to tell you. She may say it's just "instinct." It's something that comes naturally to her. The fact is that there are ways to help pitchers become better pitchers and batters become better hitters. And computers are important in making this happen. Baseball players from the major leagues down to city and school teams can now have their batting and pitching analyzed.



Videotapes of players can be copied into the computer for analysis.

First, the player's movements are videotaped. Then, these videotaped images are transferred into a computer. Special application software analyzes the images. It measures the exact angle at which the player is holding his or her arms and legs. The speed and efficiency of each body movement is measured. This process is called **motion analysis**. One pitch can be compared with another. This can be useful because the pitcher can see how changes in movement affect the result (such as how fast a ball travels). Some systems can even measure pitching and hitting motions during an actual game. This allows coaches to give immediate feedback to players.



Motion Analysis of a Batter

These computer applications also can be used to compare the movements of two different players. These comparisons, for

example, can help explain why different players tend to hit the ball in different directions.

There are also computer applications that help coaches keep track of exactly where each pitch crosses the plate. A radar gun can be attached to the computer to measure a pitch's speed. This information is stored in the computer so that the pitcher and coach can study it later.

While motion analysis applications are important tools, it still takes a good coach to know how to interpret the results. The coach must look at the information the application provides and then use it to help the player improve.

Keeping Stats

Everybody knows how important **statistics** (or **stats**) are in sports. How many games has your favorite fullback played this year? Which player on the Red Sox has the best batting average? The quantity of statistics used in sports is enormous. Without computers, it would be very difficult to keep these statistics up-to-date.

Not only are there team statistics, but there are also statistics on each individual player. For example, statistics on an individual baseball player might include times at bat, batting average, and number of runs batted in.

Spreadsheet applications are often used to keep track of statistics. Spreadsheet applications are computer programs that can store and manipulate numbers. For

Sortable Player Stats updated through Friday, April 18, 2003 10:29 AM EDT

Player	TEAM	POS.	G.	AB	R.	H.	2B.	3B.	HR.	RBI.	TB.	BB.	SO.	SB.	CS.	OPS	SLG	BAVE
1. D Hogganson	DET	OF	14	49	4	10	3	0	0	3	13	10	9	1	1	.339	.265	.204
2. D Young	DET	OF	13	88	2	8	1	0	0	0	8	2	13	0	0	.140	.128	.104
3. E Hanson	DET	3B	14	40	4	7	2	0	2	6	15	2	5	0	0	.233	.375	.175
4. R Santiago	DET	2B	12	38	2	10	3	0	0	4	13	3	8	0	0	.317	.342	.263
5. G Inabete	DET	SS	12	36	3	6	2	1	0	1	18	3	7	0	0	.231	.270	.167
6. C Pena	DET	1B	14	36	3	6	3	0	1	3	12	5	15	0	0	.279	.323	.167
7. D Palmer	DET	OH	11	34	1	4	0	0	0	2	4	6	12	0	0	.244	.155	.118
8. D Edge	DET	C	11	30	2	3	0	0	0	3	1	9	8	0	0	.143	.091	.058
9. S Peller	DET	SS	8	32	1	7	0	0	1	3	18	1	8	1	1	.242	.313	.218
10. G Hogganson	DET	OF	10	27	1	7	0	0	0	1	7	5	5	0	2	.375	.259	.259
11. C Pappalardo	DET	OF	8	26	1	4	0	0	0	0	4	0	3	0	0	.187	.187	.167
12. H Duckworth	DET	OF	6	22	1	1	1	0	0	2	0	7	8	0	0	.045	.091	.045
13. M Vanecko	DET	C	8	12	1	1	1	0	0	1	2	0	0	0	0	.083	.167	.083

Computers make it easy to keep track of player statistics.

example, they can find the average of a list of twenty numbers. Even Little League teams often use spreadsheet applications to keep track of player statistics.

Jumbo Sized

Going to a baseball park is almost like going to the circus. There are hotdogs, popcorn, and a scoreboard complete with a gigantic TV-like screen. New ballparks, such as the Seattle Mariners' Safeco Field, have very complex scoreboards. The Mariners' board is 56 feet tall and 190 feet wide. It includes a giant screen to add to the excitement. The best-known type of giant screen is the Sony Jumbotron. The pictures on these screens move from the players to the crowd. They show cartoons of the team's mascot. They may display the words to "Take Me Out to the Ballgame" so that everybody can join in the singing.

These scoreboards and giant screens are controlled by an entire group of computers. Each computer supplies the scoreboard with different information. One computer might keep track of statistics on particular players, while another might contain commercial advertisements.

These giant screens can even be used for educational purposes. In 2000, the University of Tennessee's athletics and physics departments joined together to create a group of 60-second videos. These videos were shown on the school's Jumbotron during home games. The purpose of the videos was to teach fans about the science of football. This was a fun way to join together sports and education.

On the Web

Do you want to know if the New York Mets have a home game on July 14? Or who the Seattle Mariners are playing next Wednesday? Just go to their Web site. Professional, college, and even some high school sports teams have their own Web sites.



The Dallas Cowboys' Web site lets you watch videos of the players.

The information available on sports teams' Web sites is amazing. Some of it includes:

- **Schedules.** Game dates and locations are available.
- **Statistics.** Up-to-the-minute information on teams and individual players is ready whenever you want it.
- **Team News.** Web sites contain coach and player interviews, information on injuries, and so forth.
- **Ticket Purchasing.** Rather than stand in line, you can purchase your tickets at home. You can even look at a diagram of the stadium to see exactly where you will be seated.
- **Online Shopping.** You can buy baseball cards, caps, jerseys, and many other items.



You can buy your favorite team's jersey online.

Computers and the Olympics

Athletes who depend on speed to win will stop at nothing to reduce their times. Some Olympic swimmers wear full-body "skinsuits" so they can glide through the water more easily. So, it shouldn't be a surprise to hear that they use computer applications to improve their speeds.

At the U.S. Olympic Training Center in Colorado, coaches use a computer application to develop perfect swimming strokes. This **simulation software** attempts to copy the way water flows around parts of the swimmer's body, such as the arms and hands. The swimmer's goal is to move through the water as smoothly as possible. Water **turbulence** can slow a swimmer down.



Software simulates the flow of water around a swimmer's hand.

The application allows the user to change the positions of the swimmer's hands and arms. The user can then see how these changes affect the amount of water turbulence. This information is used to design the best swimming stroke. Coaches can then teach swimmers to use this stroke to obtain their greatest speed.

Simulation software has also been used to design racing yachts. It can help in determining how to shape the yacht's hull so that it moves through the water with the least amount of resistance.

Computers have many other uses at the Olympics. At the 2002 Winter Games in Salt

Lake City, Utah, tiny computer chips were used to track skiers. A chip was strapped to each skier's ankle. Electronic devices were buried in the snow along the track. When a skier passed over one of the devices, his or his chip sent information to the device.

This information included the skier's location, speed, and number. This information was sent to a central computer. Judges and other Olympic officials could then look at it.



Review Questions

1. What is meant by the term *motion analysis*?
2. How was computer technology used to keep track of skiers in the 2002 Winter Olympics?
3. What kind of features do sports teams' Web sites usually have?



What Do You Think?

1. Pick a sport that was not discussed in this article. How might motion analysis be used in this sport?
2. We've discussed many ways that sports teams use Web sites to keep fans informed and interested in their teams. Can you think of additional ways these sites can serve this purpose?
3. Do you belong to a sports team? If so, do you think a Web site would be useful for your team? What kinds of information might be included on this Web site?

Glossary

motion analysis Using computers to examine the way in which a person moves and then determine ways in which this movement might be improved.

simulation software A program that attempts to use a computer to reproduce, or mimic, a real-world event.

spreadsheet application A type of computer program that can store and manipulate numbers.

statistics A collection of numbers, often created so that the numbers can be analyzed, compared, and so forth. Also call **stats**.

turbulence Hard-to-predict variation in motion, as in the movement of water.