

Tennis Metrics.

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ABSTRACT

"Tennis Metrics" is a system which uses video to analyse and collate data on players, the court and the relationship between the two. The system automatically sends and gathers 24 pieces of data per second- including stroke angles, distance run and running speed among many others. This article outlines and introduces readers to the system that has powerful potential for multiple types of analyses relating to tennis.

Key words: Tactics, strategy, analysis, software.

Received: 10 September 2011

Accepted: 28 November 2011

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INTRODUCTION

Our intuition is fundamental to coaching, but despite this invaluable tool, we never stop to think about how much information that a tennis match actually provides. The distance run during a point, a game, a set or a match, the speed of the sprints, the distances to the lines or the back fence, the net, or the side fence, the opponent, etc. Indirectly, all this information is related to the 'tempo' and time within a match and when harnessed can provide us with valuable information that can in turn inform our coaching.

In order to analyse a match using this system, all that is needed is a film made with a standard video camera, set in a fixed point behind the court. Once filmed, the recorded match can be loaded into the "Tennis Metrics" programme. This is when the system calculates and draws the lines that will automatically measure the requested items and will start sending data reports. (Figure 1).



Figure 1. Data visualization in "Tennis Metrics".

As with most statistical analysis, the evaluation does not end with the reception of the data, it is necessary to interpret the

information and make the necessary recommendations about what is observed.

By way of example, we will show some of the data from "Tennis Metrics".

NADAL SPRINTS	FEDERER SPRINTS
7.053917844	7.303977878
7.727461778	8.812776917
9.118889512	7.209121385
10.02668024	7.277399239
7.788063934	7.864547467
8.308923621	8.359976818
Average of 6 sprints at random	Average of 6 sprints at random
8.337322821	7.804633284

Table 1. Comparison of the sprints of Nadal and Federer.

Table 1 previously shows some of the sprints of Nadal and Federer (taken at random). The information is expressed in meters per second.

Table 2 shows the meters run by outstanding players in the 14 year old category of the COSAT tour (South American Junior Tour). The figures were taken from one service game and one returning game. Note that these particular averages do not represent full match, just one game.

	PLAYER 1	PLAYER 2	
Serving	23.88	70.3147	Returning
Returning	55.8972	20.5146	Serving
	79.7772	90.8293	

Table 2. Summary of the meters run by two players of the 14 year old category.

The data indicate that when Player 2 was serving, he ran 36.70 % of the meters that his opponent ran. When he was receiving, his serving opponent ran 33.96% of the meters that he ran.

The above data are just two examples of the items that "Tennis Metrics" can measure.

WHY "TENNIS METRICS"?

At first glance, it can be overwhelming and surprising to see the players followed by a number of lines, distance calculations and speed related information, but many of those who express surprise say: "Well, fine, this is incredible... but what is all this for?".

The origins of "Tennis Metrics" as with many tools, came from the developers needs- a necessity for information that could help develop players- and so was envisaged the idea over 20 years ago. Initially, most of the details that "Tennis Metrics" measures today were measured in a very simple and improvised "home-made" system in order to get the estimated data surrounding aspects such as court positioning, running lengths and so on, as they imperceptibly occur behind the scenes of a tennis match seen with the naked eye.

These improvised methods included tying ropes around the ankles of the two opponents to understand if the distance between them was generally consistent, and if the rope went loose, who won more points or what happened when they returned the service?

Methods to assess player movement in the beginning included flattening the clay behind the baseline after each point to see exactly in what zone each player moved, and how their effectiveness changed when they changed the playing area, either voluntarily or because they were forced to do so by the coach.

Another technique included blowing a whistle whereby at that precise time, the players would remain instantly static, so their playing positions could be analyzed.

Each one of these techniques, which were limited and still are to this day, "crashed" against two constraints:

- For obvious reasons, estimates from official competitions were not possible.

- Gathering data from the opponent was more difficult, in comparison with the coach's own player.

Luckily, and on a tennis court, engineers who specialized in non traditional software came together with coaches to create "Tennis Metrics".

WHAT IS "TENNIS METRICS" FOR?

Table 3 presents some criteria and some questions that if answered provide useful data.

CRITERION	QUESTIONS
Distance run	How many meters does a player run during a point? How many meters does a player run during the whole match? How many meters had the player and his opponent run before they met? Would this information make me change my strategy for a match?
Speed	At what speed does a player move in different directions? At what speed does the opponent move in different directions? Does a player move faster and better in some direction? Does the opponent move faster and better in some direction? Would this information make me change my strategy for a match?
Reach	Are there players who reach all the balls and run less meters? The players who reach all the balls, are they the fastest? Do they run a similar number of meters in the games in which they serve and the games in which they return? Would this information make me change my strategy for a match?
Trajectory towards the ball	If a player changes the route to the ball, can he save many meters in a point or not? If a player changes the route to the ball, can he save many meters in a match or not? If a player changes the route to the ball, can he save many meters in a tournament or not? Would this previous information make me change my strategic, tactical and physical plan?
Position	What is the position of a player in relation to the probable striking angle? What is the position of the opponent in relation to the probable striking angle? What is the position of the best ranked players in the world in relation to the probable striking angle? Would this information make me change my strategy for a match? Would this previous information make me change my strategic, tactical and physical plan?
Distance on court	What is the average distance in meters from a player to his opponent, in which he wins more points? What is the average distance in meters from a player to his opponent, in which he loses more points? What is the average distance to the centre of the baseline and the net in which a player wins more points? What is the average distance to the centre of the baseline and the net in which the opponent loses more points? Are these parameters valid for different opponents? What are the parameters for the top players in the world ranking? Would this information make me change my strategy for a match? Would this previous information make me change my strategic, tactical and physical plan?
Distance between players	What is the average distance in meters from a player to his opponent, when returning the first service? What is the average distance in meters from a player to his opponent, when returning the second service? At what distance is a player more effective when returning both services? At what distance from the opponent player do the best players in the world

Table 3. Analysis opportunities with Tennis Metrics.

FINAL CONSIDERATIONS

Having a response to all these questions and to some others, would undoubtedly lead us to have to change not only game tactics and strategy but also the plan of our work as coaches and trainers because we would all have new information with data from the competition setting.



"Tennis Metrics" has begun making the first analyses and gleaning preliminary information to compile a database with the behaviour of different players from different categories and levels.

"Tennis Metrics" might bring about a change, not only as regards the new data from our own players but also as to the comprehensive analysis of the opponent. Technology goes

forward, and so, it must help us to improve tennis on a daily basis. That is the task we are involved in.

REFERENCIAS

The Tennis and Science group created "Tennis Metrics"; its members are Marcelo Albamonte, Guillermo Lescano and Carlos Morales.

RECOMMENDED ITF TENNIS ACADEMY CONTENT (CLICK BELOW)



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