



Player Analysis Technology Approval report

Eyes On PRO

Test code: PAT-24-030

Serial no: n/a

Software versions:

User interface: v1.29.8

Video processing: v0.1.221

Issue date: 20 March 2024

Objective: To test and evaluate Eyes On PRO Player Analysis Technology according to Rule 31 of the 2024 Rules of Tennis.

Result: Approved



SUMMARY

The Eyes On PRO system (the “System”) is a camera-based ball and player tracking system used to provide line calls, match stats and training games. An optional fifth camera can also be installed at the baseline to provide video feedback of the match. A kiosk located to the side of the court contains the power and processing unit for the cameras as well as speakers to communicate real-time line calls. Players can interact with the system via a touch screen interface located at the top of the kiosk.

Players must log in or register as a guest to use the System. Once complete, five modes are available for selection. Coaching information, such as match statistics stroke speeds and ball bounce locations are available to view on the kiosk at any time, however, restrictions can be imposed via password to block match statistics during competitive play. Players can access all match statistics and camera replays post-match via their online profile.

Restrictions on the access by a player to Eyes On PRO components during periods when coaching is not and is allowed are as follows:

COMPONENT	NO COACHING	COACHING
Cameras	Permitted	Permitted
Kiosk	Password-protected view only	Permitted
Speakers	Permitted	Permitted
Auxiliary device (e.g. smartphone)	Not permitted	Permitted

NOTE Approval does not attempt to, nor does it in fact, establish the accuracy or reliability of data or fidelity of its transmission, including (but not limited to) the provision of ‘in/ ‘out’ decisions for the purposes of line-calling.

MAIN COMPONENTS

The main components of the system are described in table 1 and depicted in figure 1.

COMPONENT	FUNCTION(S)
Cameras	Capture images of play
Kiosk	Selection of game modes and system interaction
Speakers	Communicate 'out' calls
Eyes On cloud server	Process, store, and transmit data
Eyes On app	Communicate data
Auxiliary device (e.g. smartphone)	Communicate data

Table 1. Description of the components of the Eyes On system.



Figure 1. Components of the Eyes On system (from left to right): Standard court set up displaying cameras and kiosk; kiosk unit; auxiliary device (tablet) displaying the Eyes On app. Not to scale.

DATA CAPTURE AND PROCESSING

The System consists of four cameras mounted around the perimeter of the court on existing infrastructure or purpose-built mounts. An optional additional camera can be mounted behind the baseline to provide match footage. The cameras are connected via cables to the kiosk unit located courtside. The kiosk is the control centre of the System with inbuilt server for saving and processing the camera images as well as providing the interface (via touchscreen) and feedback (via speakers) for the players.

The kiosk server uses the location of the ball, player and court lines to calculate ball and player trajectory data. The data calculated includes:

- Ball speed
- Ball spin
- Shot type (e.g. forehand, backhand)
- 'in' or 'out' call
- Net clearance of each shot
- Height of ball impact
- 3D trajectory of the ball
- 2D visualisation of bounce mark
- Aggregated stats (e.g. average shot speed)
- Visualised aggregated hit and bounce marks
- Player court coverage
- Automated video highlights

Players must log into their account or sign in as a guest user on the kiosk to use the System. A series of game modes are then available for the players to select.

There are six operating modes available to players using the Eyes On system:

1. Practice
2. Match
3. Challenges
4. Drills
5. Serves
6. Lessons

Each mode has unique features allowing features such as of matchplay, scoring, training drills, leaderboards, and player statistics. Once a session is in progress, players must use the kiosk to change ends. Alternatively, an umpire can control the system via an umpire tablet.

For times when no coaching is allowed, the system can be switched to competition mode which restricts the system to only show information that is permitted (Figure 2). The system can only be switched back to practice mode with use of a PIN. Other features such as the ability to alter the score, can also be placed behind PIN protection.

If a player chooses to end the session, data capture is stopped. Aggregated data can then be viewed on the kiosk or via their Eyes On account on an auxiliary device.

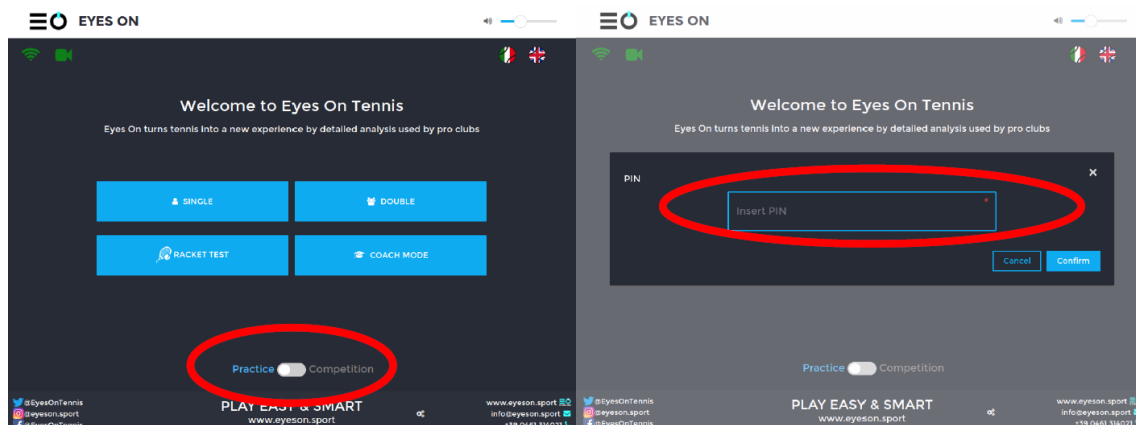


Figure 2. Toggle to switch between practice and competition modes and PIN protection pop-up box.

COMMENTS

Start/stopping data capture is player driven. No external internet connection is required to operate the Eyes On system as the processing of data is done on-site. No assistance from human operators is required to run the system, except to inform the system that the players have switched sides.

If the System is not connected to a network, session data will not be transmitted to the cloud and will not be accessible remotely post-session.

All device configurations and playing modes can be edited by an administrator account with access to the management console on the Eyes On website.

DATA COMMUNICATION

Real time statistics are available to view on the Eyes On kiosk or on an auxiliary device (e.g. smartphone) using the Eyes On app. Information includes:

1. Aggregated shot statistics - Detailed analysis including average speeds and shot counts.
2. Activity duration - The length of time spent on each activity, such as matches, training sessions, or drills.
3. Match analysis - In-depth review of match play.
4. Event based video navigation - Ability to jump to specific video segments, such as points with forehand errors or volley winners.
5. Automated highlights - Curated clips showcasing key moments of the session.
6. Serve and return charts and stats - Visual and statistical breakdown of serve and return performances.
7. Heat maps - Graphical representations showing player movement and ball landing positions.

Additionally, players can download and replay videos of sessions recorded using the Eyes On app.

The device will call shots 'in'/'out'. This information is communicated to players via the speakers in the Eyes On kiosk. There is an option on the kiosk to challenge any of the shots recorded, which shows a close-up 3D visualisation of the ball hitting the court.

Players automatically share data with their opponent (if the opponent is also logged in).

COMMENTS

No coaching information is presented on the device.

Coaching information is available through the Eyes On app. Therefore, players must not have access to devices that may have the app installed, such as smartphones or tablets, when coaching is prohibited.

Players automatically share data with their opponent (if logged in). Consequently, a player can have access to data on their opponent at times when play is suspended, e.g. during a rain delay.

ADDITIONAL INFORMATION

Client:

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Date received: 9th August 2023

Report prepared by: David Cole

Report authorised by: Jamie Capel-Davies

Revision number: 0

Please note:

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