Quintic Software Tutorial 8c

Intelligent Digitisation

v29

Contents Page

Intelligent tracking is available in Quintic Biomechanics for use with up to a 3 point model and specific templates for gait, equine gait, cycling and putting.

Models of up to 2 points are available in Quintic Coaching for use with intelligent tracking.

1. Setup

Open the video file that you wish to digitise.

Before starting intelligent tracking, ensure that the file has been correctly calibrated and a suitable intelligent tracking frame template is available. Please refer to Tutorial 8a for instructions on video calibration.

Name	Date modified	Type	Size
Cycling - Back View Template	14/11/2016 15:41	QRM File	1 KB
Cycling - Front View Template	14/11/2016 15:41	QRM File	1 KB
Cycling - Side View Template	14/11/2016 15:42	QRM File	1 KB
Equine - Fore Leg Template	14/11/2016 15:42	QRM File	1 KB
Equine - Hind Leg Template	14/11/2016 15:42	QRM File	1 KB
Gait - Alpha Beta Template	26/01/2017 09:46	QRM File	1 KB
Gait - Back View Template	14/11/2016 15:42	QRM File	1 KB
Gait - Front View Template	14/11/2016 15:43	QRM File	1 KB
Gait - Side View Template	14/11/2016 15:43	QRM File	1 KB
Golf - Putting Template	14/11/2016 15:43	QRM File	2 KB
Intelligent - 1 Point	08/02/2017 12:12	QRM File	1 KB
Intelligent - 2 Point	08/02/2017 12:12	QRM File	1 KB
Intelligent - 3 Point	08/02/2017 12:12	QRM File	1 KB

Intelligent tracking frame templates are specific to the intelligent tracking application and are supplied with Quintic v29. Custom frame templates created for automatic tracking are not compatible with intelligent tracking.
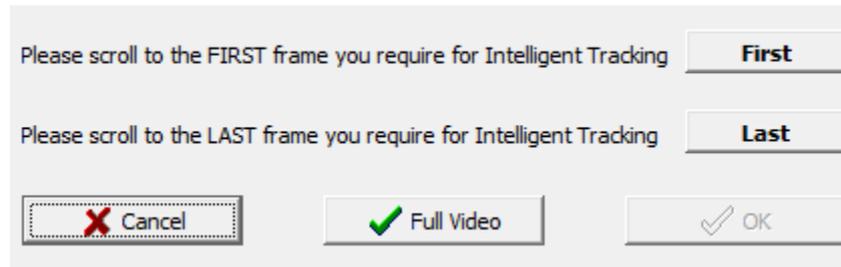
In Quintic open the "Digitisation" tab and then select "Intelligent Tracking of a New Trace".

Select "yes" if asked to overwrite the existing digitisation trace. Next, a window will ask you to select a suitable frame template for digitisation. Navigate to "Intelligent Tracking Templates" in a "Templates" folder and select the relevant template.

A window will appear in front of the Quintic intelligent tracking window, asking you to select a range of frames to digitise. Scroll through the video to the first frame you wish to digitise and click "FIRST". The frame number (eg. 230) will replace the wording of the button. Repeat this for the final frame you wish to digitise. Then click "Ok".

(Alternatively, click "Full Video" if all markers are visible at the start of the video and you wish to digitise the whole video.)

Frame Range: First and Last Frame Identification

Please scroll to the FIRST frame you require for Intelligent Tracking   **First**

Please scroll to the LAST frame you require for Intelligent Tracking   **Last**

✗ Cancel   ✓ Full Video   ✓ OK

The pop-up screen will disappear and allow you to select the markers of the template.

2. **Marker Identification**

Blockers – 12 blockers are available to the user (6 Square, 6 Circle).

Marker Radius – The minimum and maximum marker radius in pixels the software uses to locate/re-locate missing markers.

Show/Hide Marker info – turns on and off the marker labels on the video.

Undo – Undo the last blocker or search area placed on the video.

Search Area – provides an initial area for the software to search when automatically locating markers.

- **Blockers** – The blockers can be used to block out distracting features of the video such as, lights, or reflective objects that may be confused for markers. Blockers stop the software from looking in the highlighted area when a marker is missing. However, they do not obscure markers that are being tracked by the software. Tracked markers can pass through blocked areas without affecting the final digitised trace.

- **Search Area** – The search area directs the software where to look during auto detect markers. If a search area is not drawn the software will use the whole image.
- **Marker Radius** – The marker radius range allows you to alter the minimum and maximum marker pixel radius that Quintic is searching for. This is required when the marker falls outside of the normal range of marker sizes (eg. golf ball when putting). The radius range is determined by the markers detected. The range will adjust after auto marker detect, depending on most likely changes in the size of the marker due to distance from the camera.

If required apply the blocker and search area tools and click "AUTO DETECT MARKER". A pop-up window will ask you if the markers found are correct relative to the template selected. The adjusted pixel radius range is displayed at the bottom of the window.

Circle Blocker hiding a round object that may be confused for a marker.

Square Blocker hiding a reflective object that may be confused for a marker.

Initial Search area.

If you are happy that the template is correct, select "Yes" to begin intelligent tracking.

If the markers are located incorrectly, select "No" and you will be asked to manually identify the markers. The marker radius range may need to be adjusted, depending on the marker used and distance from the marker.

As the cursor moves across the screen, the zoom window displays a larger version of the area under the cursor. Use this to pinpoint the exact locations of the template markers.

This must be done in the correct order and as accurately as possible. As the point is assigned to a landmark, the next point will automatically be selected and ready to be assigned. If the symbol next to the point description is yellow this indicates the marker needs to be identified.
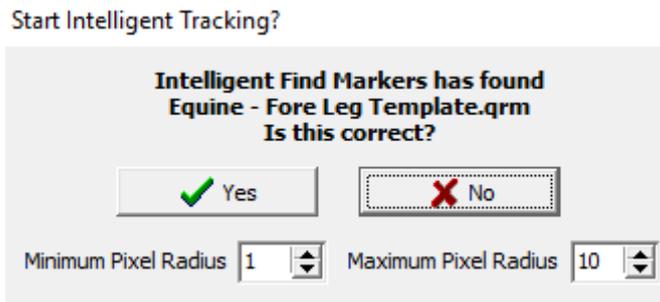
Once the markers have been manually identified, the same "Start Intelligent Tracking?" pop-up window will appear asking whether you are sure the markers have been located correctly. Select "Yes" and tracking will begin automatically.

Unlike Automatic or Manual tracking, intelligent tracking is able to find the optimum digitisation speed throughout the process. Digitisation can be paused or stopped at any point.

Stopping digitisation will end the trace at that frame, and you will not be able to resume the process.

3. Lost Markers

During digitisation a marker can be "lost"; obstructed by equipment or limbs, or leave the Area of Interest (AOI). With intelligent tracking Quintic is able to recognise the marker when it reappears from behind the obstruction.

Once the tracking has started, you do not have to do anything until the video has played through.

4. Reviewing the Digitisation Trace

Once tracking has finished, a pop-up screen will appear with three options before it saves the trace data.
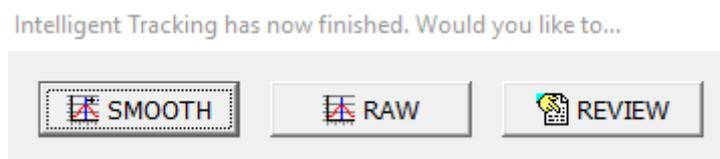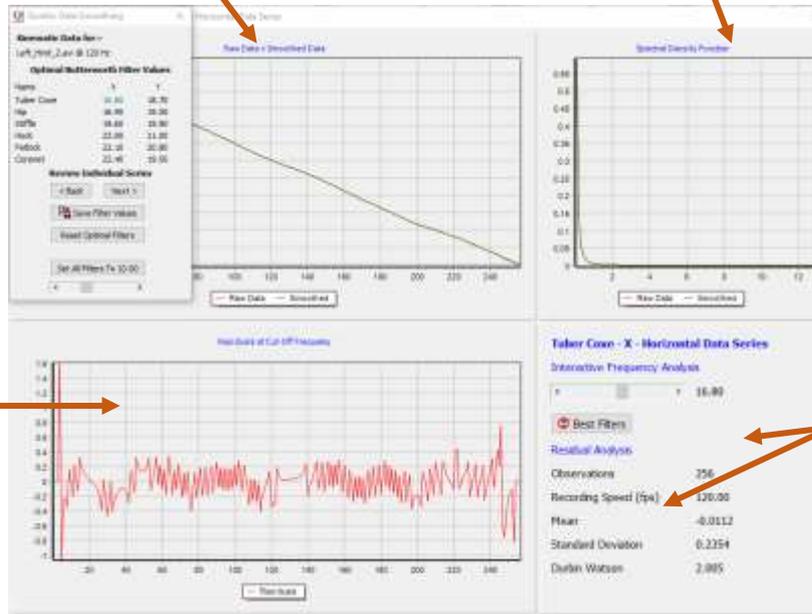

Smooth – Saves the smoothed data of the trace with the optimal Butterworth filters, without review of the trace.

To change or add filters at a later date, click "Digitisation" on the Main window and select "Load an Existing Trace" and then "Data Smoothing of Current Trace". This will bring up filtering options (refer to relevant part of text).

Raw Data vs Smoothed Data – The graph displays how closely the raw data compares to the smoothed data.

Spectral Density Function – Describes the variance of a signal or time series with frequency. The signal is usually a wave. The spectral density of a wave, when multiplied by an appropriate factor, will give the power carried by the wave per unit of frequency.

Residuals at Cut off Frequency – The graph displays the difference between the raw and smoothed data. Good values should oscillate around 0. If predominantly positive or negative values are produced an incorrect filter value has been used.

Interactive Frequency Analysis – This function. (Scrollbar) allows the user to alter the filtering placed on the raw data. "Best Filters"

You can reset all the optimal filters at any point, by selecting "Reset optimal filters" on the "Quintic Data Filtering" window.

Raw – Directly saves the raw data of the trace without editing.

To change or add filters at a later date, click "Digitisation" on the Main window and select "Load an Existing Trace" and then "Data Smoothing of Current Trace". This will bring up filtering options (refer to relevant part of text).

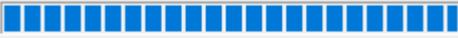**Review** – Opens the review screen allowing you to edit the digitised points before the trace is finalised:

Edit – If, the trace has been confused or incorrectly interpolated, individual marker points can be edited post-digitisation.

Select "Edit" and a magnified crosshairs and marker template window will appear.

Edit Marker - Wither

Equine - Fore Leg

Frames Tracked: 259 - 622/622 (100%)

Marker	Point	Description	Colour
(green)	1	Wither	3 (red)
(red)	2	Shoulder	3 (green)
(red)	3	Elbow	3 (yellow)
(red)	4	Knee	2 (blue)
(red)	5	Fetlock	3 (magenta)
(red)	6	Coronet	3 (cyan)

The progress bar shows 100% of frames have been digitised.

The green box denotes the selected marker.

Select the marker where the marker has been confused or incorrectly traced, by clicking on the appropriate box.

Choose the correct point marker (Wither) for this frame. A message will appear asking whether this is the correct position of the marker. Ensure that the marker is correctly positioned and select "Yes".

Information ✕

Do you wish to accept the coordinates for Wither at frame number 602 ?

Yes   No
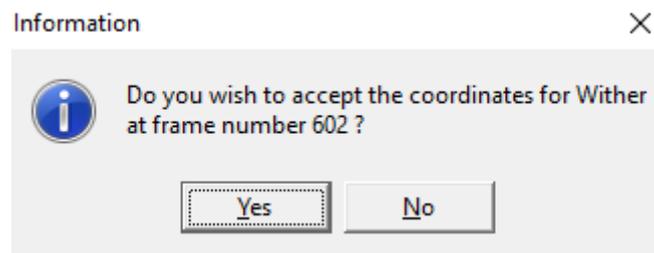
Recalibrate – Select Re-Calibrate and a pop-up window will ask you if you wish to overwrite the calibration of the file. Click "Yes".

Another screen will appear with instructions. Click "OK".

Re-calibration only works with detectable markers, so you will need to know the length between two of the points on the template. Scroll to a suitable frame, where these two markers are visible and select each in turn (eg. Wither and Shoulder).

The markers will be highlighted using a large pink "X". Enter the distance of the two markers and select "Accept".

Quintic will overwrite the original calibration file, using this new known distance.

Filters – A pop-up window will appear asking if you would like to apply Butterworth filters. Click "Yes".

Click "Next" to review the filters applied to each X and Y co-ordinate of the digitised trace.

Quintic automatically applies the "Optimal" filters required for the data. However, this can be altered for each marker if necessary.