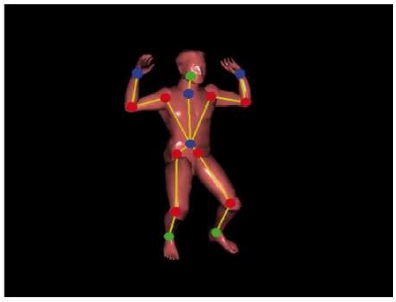
Simi Reality Motion Systems release their new Simi Motion 2012 System 8.5!

Simi is now releasing their new Simi Motion version 8.5.338 2012 after intensive development. The most important addition is the integration of a **new markerless tracking method based on silhouettes**. In addition, new calibration methods have been included to correct lens distortion and a dynamic calibration is now also available to improve the accuracy and flexibility of the system. New solutions for marker based tracking are also part of this version. Please see the following for more information and details.

Markerless Tracking based on Sillhouettes

Simi has invested several years together with German research institutes to implement the first version of new markerless tracking based on silhouettes. At Simi we have always counted on the strength of image based motion capture. We believe that visual information aids analysts and subjects in the interpretation of data and therefore delivers much more than infrared systems can, not only by providing a real picture; something which is highly relevant in applied biomechanics, but also for computing data! The new markerless tracking module based on silhouettes adds another possibility to get motion capture data out of the real world, **automatically and without using any anatomical landmarks**!

The silhouette of the actor is tracked



The model has 16 joints and 41 degrees of freedom

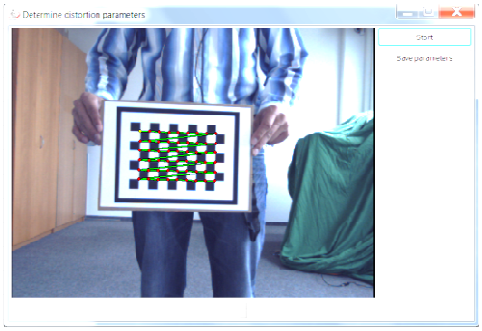
This is the next step in motion capture technology, enhancing the Simi Motion system by including new revolutionary markerless motion capture. Now motion capture can be used in new set-ups. In studies the number of trials can be increased through no marker placement necessary. Also the individual failure through placing markers is no longer there. Please see the attached documents for further information on this technology.

In comparison to any other company we offer both marker based and markerless tracking in one system. You can use Simi Motion for markerless silhouette tracking but the option to attach markers to certain joints or rotation axes is still available should you want to compute marker based tracking. This gives full flexibility and investment security for this new technology in this all in one system.

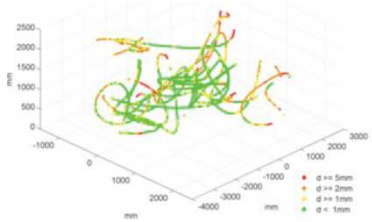
First Universities are starting to adopt this technology to explore possibilities of reducing marker placement time and marker placement error. This can result in much higher number of subjects in their studies and less failure caused by human error.

New Calibration Methods

New calibration methods have been added to Simi Motion. This is relevant not only for our new customers but also for existing customers wishing to upgrade their system.



Distortion correction: Simi has integrated a chessboard calibration to correct the lens distortion of any camera/lens model. This is especially important for wide angle lenses, for example when using the cameras in small areas or labs. In many labs lenses of about 4mm are used which cause picture distortion. By correcting this simply by showing a chessboard in the camera view, the accuracy of the calculated data improves significantly. The algorithm has been written specifically by Simi, as publically available solutions could not meet the needs of an industrial system like Simi of being fast and easy to use. This new calibration possibility will help you to obtain more accurate data from any camera. One of the biggest German automotive companies for example uses this method when recording foot movement on the gas pedal. Six cameras are used in a small area of the lower part of the car. The need for highly accurate data in this biomechanical simulation makes this new calibration method essential in their work.



Wand (dynamic) calibration: Traditionally video systems have been calibrated with the use of a cube which is placed in the picture (DLT). Simi are now implementing the first automatic Wand calibration in video systems. By using a stick which has markers at specific points and just moving this around in the area which is to be calibrated, the system automatically calibrates the room. The dynamic calibration stick is tracked and assigned completely automatically by Simi image processing technology. This allows much faster, comfortable and flexible calibrations.

Note: For industrial applications, a calibration with a Faro Arm has also been integrated.

Integration of New Camera Broadband Technology (i.e. 300fps@4MP)

The technology of industrial cameras is a field where rapid development occurs through camera manufacturers. New chips and camera models allow the constant development of higher frame rates and resolutions with dropping prices. For the latest cameras, new broadband technologies like CameraLink are available. There are several high performance cameras on the market using this technology with reasonable prices, but there is a lack of good capturing software for such cameras. As one of Simi's core strategies is the use of synchronized industrial cameras and it was therefore logical for us to develop a complete new recording tool for high performance industrial cameras. This allows images from 8 cameras at 180fps and 4MP resolution to be captured synchronously and recorded to one PC. The video is recorded in full resolution. Recording can take place onto the RAM or directly with real-time compression onto the hard disk! Not only is this technology valuable for lab use but also for large sports halls where daily activities in a huge area need to be filmed and analysed. This is for example done at the new CSSB centre in Berlin where complete games and trainings are recorded for analysis in high resolution.

The models we concentrate on in our hardware systems are 100fps@0.3MP, 50fps@2MP, 120fps@0.3MP, 100fps@2MP, 200fps@1MP, 180fps@4MP, 500fps@1.3MP. Individual configurations are however always possible.

Integration of New External Devices

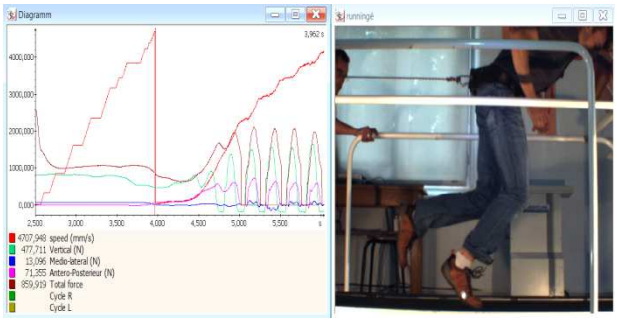
One of the strengths of Simi Motion is the flexible and accurate synchronization and acquisition of external devices. This allows integration of available measurement devices into the Simi system. For Simi Motion 8.5 we have refactored some pre-existing functions and integrated new external devices. To know which devices can be integrated in general or to find out if your specific device can be integrated please send an email to sales@simi.com

- Simi Motion 8.5 includes integration of the new Force Link force plates. Force link plates are competitively priced in comparison to many other force plate manufacturers.
- The foot pressure module for displaying foot pressure parameters in Simi Motion synchronously with the videos and kinematic data has been redesigned supporting all major manufacturers like Tekscan, Novel, Zebris and others in their most up to date versions.
- For the Kistler force plates there is a Kistler manufactured data translation box available. This box is now also integrated in Simi Motion and can be used together with Simi Motion to synchronously capture high speed cameras and Kistler force plates for motion analysis.
- Data import functions were added for Flight scope data in Golf analysis. The 3D curve and parameters of the golf ball can now be shown in Simi Motion together with the motion analysis data.
- New import options have also been written for the Zebris EMG to read synchronized data from Zebris EMGs.

- New Trigger and synchronization with GaitRite Systems. The Neurological University Hospital in Würzburg uses this for example.

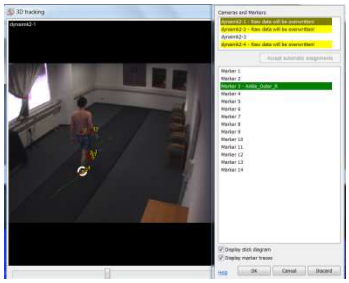
Synchronization of Any Imported Data without Hardware Trigger

Especially in sports facilities like Olympic training centres, several specific measurement devices are often available. These are generally custom made and specific to a certain training method or sport. EMGs or force plates are also common. These customers have the need to review the recorded sensor data with videos they captured, but very often do not have possibility to synchronize their device by hardware trigger. In Simi Motion 8.5 we have developed a simple method to synchronize data manually within the user interface. The method is very straightforward: you can zoom into the data, search for an event (i.e touching time) and then shift all data by mouse drag. This makes it very simple and intuitive to combine any measurement data with high speed videos, if you lack hardware trigger which is recommended. The Olympic training centre of Bavaria for example uses this function to combine sensor data from their hand force measurement device in rudering or bob racing with high speed videos. The Lab of the University St Etienne uses this as well to combine their custom made instrumented treadmill with high speed videos and kinematic data with ease.



New Marker Tracking Possibilities

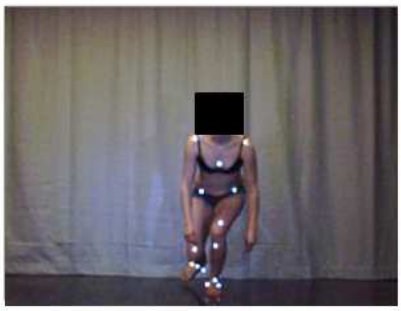
The automatic tracking module has been further improved. It is now possible to mask the tracking area with multiple areas of interest. The processing of tracking and post processing has also been made much faster. Furthermore, the coloured LED markers from Aktisys can now be tracked in Simi Motion as well, using colour recognition for marker assignment and distinction. Further improvements in marker assignment are in progress which will include much reduced assignment work through better automatic model based processing.



Practicability and Report Improvements

Improvements have also been made concerning the practicability of the software and presentation of results. To better manage a bunch of trials in one project, camera groups have been added. This way multiple trials can be managed with greater ease with calibrations, calculations and reports in one project.

Videos can now also be artificially brightened in analysis. If videos have been recorded under dark conditions because of marker tracking or any other reason, they can be brightened artificially in Simi Motion to present a more aesthetic video for analysis. This is especially important for presenting results. Animated stick figures based upon captured data are also shown in reports that can be delivered to professionals, customers or patients. Top Athletes training centre in Salzburg for example uses this possibility to generate reports of 3D leg axes stability for their high class athletes, trainers and therapists. See one example picture of their report below



Neutral

Parameter	Dif.	Ref*/Ist	Diagramm
Beckenschiefstand	-3.5	0.0 -3.5	
Beckenverwringung	3.8	0.9 0.3	
Schulterschiefstand	0.5	-0.2 0.3	
Schulterrotation	0.9	-3.0 -2.1	
Fußachse li.	-6.3	-2.4 3.9	
Knie (valgus/varus) li.	-2.1	1.5 3.6	
Knie (ex/flex) li.	10.9	-6.7 -17.6	

Hocke

Parameter	Dif.	Ref**/Ist	Diagramm
Rumpfseitwärtsneigung [cm]	-2.3	1.2 -1.1	
Beckenschiefstand	6.1	-3.5 2.6	
Beckenverwringung	-4.4	4.7 0.3	
Schulterschiefstand	-3.7	0.3 -3.4	
Schulterrotation	-1.4	-2.1 -3.5	
Fußachse li.	1.2	3.9 5.1	
Knie (valgus/varus) li.	12.9	3.6 16.5	
Knie (ex/flex) li.	-51.1	-17.6 -68.7	

New Software Protection System

A new software protection method has been implemented. This allows parallel installations of different versions, better network functionality and means that installation CDs are no longer required.

Other Improvements

- New Phase Detection Method by University of Kassel: A new method based on the work of University Kassel has now been integrated to Simi Motion for standard phase cutting detection.

- Data calculation: Calculation parameters can now be set individually for each data row (number of cameras used, which cameras, minimum amount of cameras)

NEW Website!

Soon our new Website will be online! Check Simi.com regularly in the next months. We hope you will like it!

We look forward to talking to and meeting you all!

For any questions about the new version and possibilities please contact sales@simi.com

Best wishes

Philipp Ruß

Simi Reality Motion Systems