BODY–SCANFIT® System

Leonardo FRANCESCHI
CAD MODELLING ERGONOMICS srl*, Firenze (FI), Italy

Abstract

Body–Scanfit®: The first 3D portable full body scanner system. From the real to the digital world in just 4 seconds.

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1. Introduction, about us

Cad Modelling ERGONOMICS srl was set up as industrial modelling company in 1968, strong of its founder Silvio Quattrocolo experience. Today it is the Italaian best known company for creating real anthropometric body models, leader for technologies, consultancies and solutions for the Textil and apparel Industry.

One of our primary role product is Body-ScanFit®, patented system composed of a revolutionary and unique portable body-scanner, validated by ENEA. The system permits to scan any humanbody in few seconds, and classify it in the proper Morphological Family (also reproduced in Formax®) to transmit data to the product pipeline.

2. BODY-SCANFIT®

2.1 The system

Body-Scanfit® is Cad Modelling Ergonomic's PC-based Korux Body Scanner System. It allows no contact acquisition of body measurements. With Body-Scanfit® you can easily move from one location to another since one of its main features is the fact that It is portable, quick and easy to use.
The data acquisition is really fast and easy, once the 4 second scanning is over, the measured data are processed within an integrated framework: the output includes both point clouds and polygon meshes (STL) obtained by advanced data processing routines.
The scanning systems are extremly easy to hand and versatile. Moreover, the configuration parameters allow 3D measurements optimized for the human body and its parts
Aligments of point clouds are carried out by procedures based on photogrammetric techniques or controlling the scanner/object motions through integrated devices.
Body-Scanfit® system has many useful features, it has a versatile capturing procedure that enables a very fast data collection (geometrical data for CAD modelling). The entire process is safe for the human body, the subject can even keep his eyes open during the scanning procedures. It has high resolution and a flexible optical configuration. The system is able to make a comparison between ph.geometries
And nominal data. During the procedure it provides a Virtual prototype and all the related data become input for digital storing. The software is able to rapidly replicate body parts spotting them with different colours.
One of Body-Scanfit® points of strength is the fact that the all system is portable since it is composed by a software, a know-how and Korux portable body scanner, it fits easily inside a standard size suite case and can be carried from a point to another of the company, from a flagship store or shop to another or wherever there is the need of quick data collection. Cad Modelling Ergonomics organized the trolley so that all the components are carefully stored and safely pace to prevent problems during the transportation.
Since one of the main probem for the access of body-scanners inside the textile and apparel world was the high specialization needed to run the machine, Cad Modelling Ergonomics started to think of a system and not only a device that could be used by unntrained personnel, this is why Body-Scanfit® is very simple to use and is user friendly. It is very easy to set up the system, the operator just needs a space of 3,5 m x 3,5 m and a PC to manage the software according to your needs.

* www.cadmodelling.it

Once the acquisition columns and the rest of the device are setted, it takes only 10 minutes, you can operate calibration in about 10 seconds. At this point the innocuos scanning can begin and after just for seconds the data will be acquired, stored in a database and elaborated by a software to create a Virtual 3D model and to extract measures.
Just cold data are almost a useless tool, this is why there are several path that a user can walk, for sure there is the need of an important theoretical base to work with. This system was developed in accordance to one specific theory: The Theory of Conformations

2.2 Theory of Conformations

In 1978, Silvio Quattrocolo, CAD Modelling Ergonomics founder, created the Theory of Conformations. Starting from the idea that humans are characterized by body shapes and not by geometrical measures based on an non existing mathematical relation between them.

When Mr Quattrocolo was still studying to become a tailor and a designer, he realized that the fit given to clothes was not respecting the real anatomies of individuals. Clothing Industries were producing for unreal anatomies. There was a lack of culture in the Industry

Mr Quattrocolo also knew that: "*to create garments he needed a perfect knowledge of the volumes and of the body the garments would have to fit*"**.**

He was convinced that it couldn't exist a mathematical ratio between individuals. It had to be an analitical relation To ensure the idea and have confirmation he needed to collect empirical data to learn from statistics creating a virtuous cycle, Quattrocolo started to achieve data from several parts of the world.

So it is thanks to a huge amount of anthropometric data collected throughout the world in many years, that he was able to set up the "Theory of Conformations":

He realized that every man or woman could be classified in a Morphological Family having a set of anthropometric measures in common.

He was able to identify 6 main Families for men and 9 main Families for women.

This is why Silvio Quattrocolo abandoned the concept of sizes, cut, extra long, small etc. and started to think of clothes through Conformations…going against the fashion industry that is still designing a serial garment for a man that was not born in series.

Fig.1 "Theory of Conformations" Men body-shapes

So we need to re-think the fashion system, adopting the idea of morphological families, improving the theory and its applications with the best suitable technology that will evolve opening new research paths, Cad Modelling Ergonomics Body-Scanfit® is a system based on a theory and on a body scanner that will evolve through the years enabling our system to be always more accurate and needable.

2.3 Made to measure

One of the software that can be combined with Body-Scanfit® is TC2, it allows the user to extract several customizable measures in just a few seconds, by managing this data it is possible to archive Made-to-Measures tasks. TC2 software permits you to check any body measurement, automatically it will give you over 90 measurements, but there is the opportunity to customize the measurements list according to the needs at any time, different colours will spot different parts of the scanned body recognizing its main features.

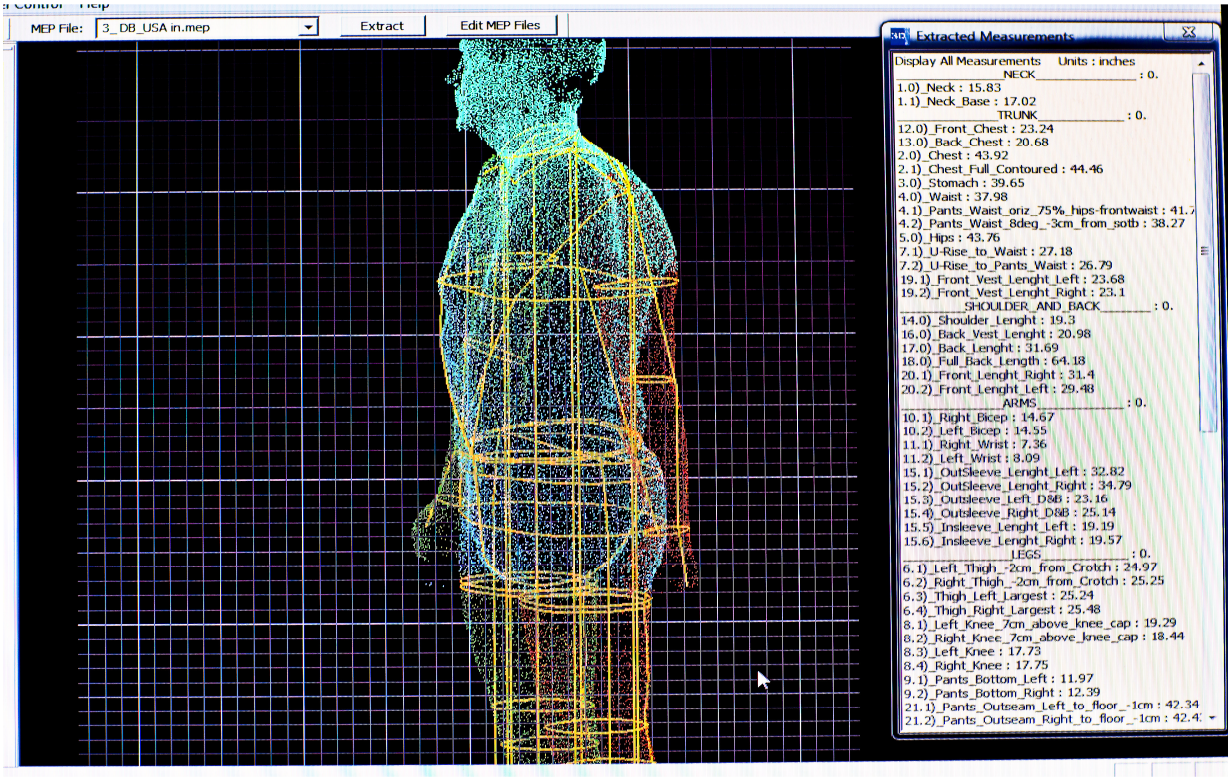

Fig. 2. TC2 software Screenshot

2.4 Fx-Fit and Mass customization

FX-Fit is the software designed for Mass customization, thanks to this software you will be able to: recognize the subject's morphological family out of those spotted and always updated by Cad Modelling Ergonomics staff . Fx-Fit allows the user to combine analysis of the top and of the bottom part of the human body body having this way a further level of analysis. Once this analysis is correctly done the system will couple the body with a Formax®.

Knowing that Body-Scanfit® is Cad Modelling Ergonomics anthropometric classification system based on Korux,the unique portable 3D body scanner that combines with different software, Fx-Fit is…a software really easy to use once you set up the scanner, and it is one of the most complete software for mass customization that can add quality and value to any business finding the right body shape of the scanned subject in a brief time.

Combining linear measures spotted by TC2 with the volumes extracted by Korux body scanner, Fx-Fit is able to guarantee right and fast practical solutions.

Using really complex algorithms Fx-Fit software identifies a certain body shape and conformation, it is already a lot, but Fx-Fit functions go far behind this, indieed the next level consists in spotting and calculating the possible grading of the volumes in possible sizes.There are different sizes for a same conformation

There is also another further level: Fx-Fit identifies a certain body shape for the top, and one for the bottom part showing the concrete Formax® solution.

Fx-Fit It is the only software in the world able to provide this kind of solutions:

- FX-Fit is a unique software that helps producers of mass customized products in their job.
- The software classifies any body processed into a specific body shape category highlighting the proper fitting needs to respect in order to customize existing models.

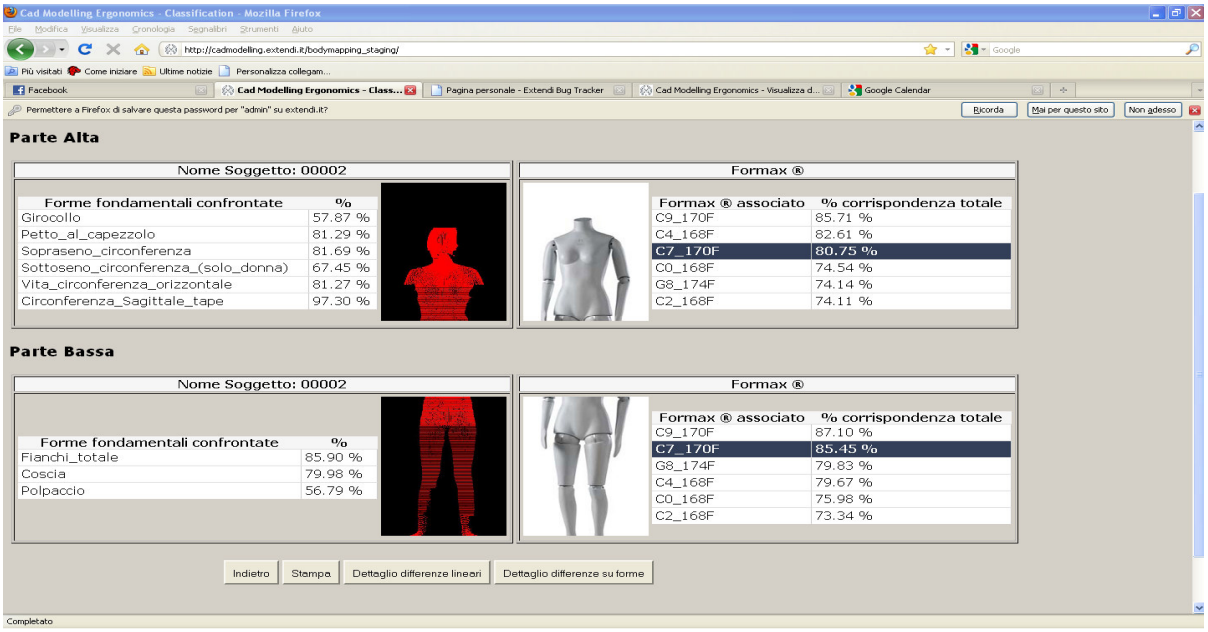

Fig. 3. Fx-Fit software screenshot

2.5 FORMAX®

At this point there is a right question to ask: what is a Formax®? The answer might seem complicated but taking the time to think about it is just something that is under our eyes, is something “real”, very closet o reality. A Formax® is an anthropometric mannequin representing the real shapes and bodyshapes of the population according to the Theory of Conformations

A Formax® is a perfect tool for quality control, fitting and ergonomic tasks

Actually the application field of Body-Scanfit® grows from the Theory of Conformations and it enables specialists of different business around the world to have a customizable product that evolves through the years. Every single scan enriches Cad Modelling Ergonomics database, every single scan makes a Formax® closer to the real man it reproduces

The second right question might be: why could somebody need a Formax®?

If we talk about the clothing and apparel field that is a simple answer. The unsold garment stock is a huge problem for the Fashion Industry. It is not a matter of design or of retail strategy and a lot of money get wasted!

Fig. 4. The Formax® family

If we are talking about another sector we can say that…Well, a Formax® is indicated for many business fields and professional figures, we might talk about a Professor, a Doctor, an Engineer or a quality tester, no matter what is the sector if somebody needs to shape anything over real body sizes, this is for sure an irreplaceable quality tool even tank to the variety of its application fields:

- Collections development
- Pattern design
- Quality control and Fit-Tests
- Fit standardization
- Proportion verification
- Styling and drape
- Ergonomic tests even in extreme conditions and contest

So a Formax®, real body-Shapes for a real market, is some how the staring point and the finishing line of our body scanning system. The FORMAX® family si the fundamental solution that helps modellers in defining the right volumes for garments and not only this.

Many companies have chosen to use Formax® for their quality, ergonomic tests and product prototyping among different business, underlining that the know how on wich it stands is the right base to built technologies systems on.

2.6 Re-thinking body scanner

Formax® represents the starting point and the finishing line on the application field of Cad Modelling ERGONOMICS Body-Scanfit® body scanning system since it is continuously upgraded and based on the Theory of conformations and not only on an hardware technology that is an implementable tool. Body-Scanfit® is a system that can not get obsolete since is based on a solid theory and on the empirical observation of reality.

Formax® and Body-Scanfit® assure to the users the development of garments with the best fit standards, able to meet customer satisfaction and the producer needs. In fact a good fit avoids unsold stocks and supports brand loyalty.

In Italy, body scanner referring to public security in airports had problems fitting the security and men's needst. Too long scanning times, privacy violation, high costs, health problems, while in the Apparel and textile field, with a technology slightly different there is space for the body scanning technology by-passing the entering problems that bodyscanners had before the launch of Body-Scanfit®. The system has the right dimensions, the right portable low cost technology and innocuou lasers, but over all it has the right theory that can fill the lack of culture of the fashion and textile world.

In the month of September during Kind&Jugend in Colonia, a lot of designers and engineers showed their interest in our body scanning system and in our Formax® mannequins for ergonomics and tests purposes, Body-Scanfit® is a system that can improve its self and knows no limit to the application field being able to adapt its self to the new needs and contests that the market will bring.

References

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