# BIOMETRICS IN A NUTSHELL

There are over 7.7 billion people on this planet and every single one of us is physically unique. Even identical twins: To the human eye, they may appear to be identical, but certain physical attributes of one twin will bear no resemblance to the other.

The word 'biometric' is made up of two parts; 'bio' is derived from the Greek words 'bios' meaning life, and 'metric', meaning a unit of length. Essentially, biometric means measurements of parts of the body.

By 2025, the biometric market sector is estimated to be worth nearly $60 billion, making it one of the fastest-growing industries in the world. Hardware manufacturers are regularly offering new devices to capture high-quality images or samples of parts of our bodies that we know to be unique. This includes iris, face, voice, vein, hand and – most known – fingerprint capture devices.

A high-precision analysis
Today, biometric fingerprint recognition is still the most commonly used method of automatically recognising individuals. But how does it work? Individuals must initially be enrolled into any biometric system if they are to be recognised later. To do so, an image of the fingerprint is taken. This image is never stored; it is only analysed in order to identify specific data points. In the case of fingerprint recognition systems, these data points are where individual fingerprint ridges dissect into two, or simply come to an end. These data points are plotted and measured in comparison to one another. The results of the measurements are converted into a string of binary data which is known as a biometric template. This template is then encrypted and stored in a database.
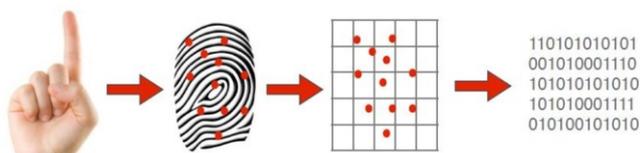
When an individual is thereupon being identified, the process is largely the same: An image is analysed and an algorithm is used to create a biometric template. This template is then compared to others in the database to see if there is a match.

There are several ways a fingerprint image can be captured. The better the fingerprint capture, the more reliable the biometric template and the more accurate the system identifies individuals from a database. Traditional fingerprint readers use optical or capacitive sensors which require an individual to place their finger on a flat sensor. Only the part of the finger that is in contact with the sensor can be analysed. The TBS 3D Terminal, an award-winning fingerprint recognition device, captures the entire fingerprint from one side of the nail to the other. This creates a biometric template with, on average, three to four times the amount of information or data points. This allows for unparalleled accuracy of identification across large databases.

Other forms of biometric recognition

All other forms of biometric recognition work in a similar way, by analysing a sample or image and identifying consistent attributes unique to that individual.

Iris recognition is the most unique form of biometric recognition. It is possible to enrol the entire population of the world into a single database and identify a single individual from the entire database. Even identical twins have unique iris patterns. Recent innovations, such as the TBD 2D Eye, have made iris recognition extremely user-friendly and cost-effective.

Hand or palm recognition is an older form of recognition which recognises individuals by their pattern of a hand or palm. This method is usually used for fairly low database sizes. The devices can be quite large and there have been few recent innovations in this technology.

Vein recognition takes advantage of the fact that the pattern of our veins remains unchanged throughout our lives. This procedure makes the vein pattern visible through light wavelengths that penetrate the skin.

Face recognition uses points of the faces such as distance between eyes, tips of ears, and points around the nose to plot a unique pattern. There are two types of face recognition, 2D and 3D. 2D recognition tends to be fairly easily spoofed, but it is relatively cheap and is used in low-security applications such as time and attendance. 3D face recognition is more expensive but uses the depth of the face to create a more robust biometric template. It can, therefore, be used in applications with much larger databases.

Voice recognition works by digitizing a profile of an individual's voice and analysing segments for dominant frequencies and tones to create a voice template. This is a less accurate form of

identification and is usually used in a 1:1 matching scenario where the biometric is just being used to verify a person's identity, as opposed to identifying them from a database.

What is the best?

It is not possible to single out one piece of hardware or a particular mode of biometric recognition as the best. What is important to understand is that you must choose the right biometric for your application. Just a few of the questions that should be considered: How many people need to use the system? What type of environment is it installed in? What degree of security do you need? Does it need to be contactless? How many sites will it be installed in?

At TBS, we aim to provide the ideal biometric solution for every application with one of the widest portfolios of solutions available on the market.

What is the future of biometrics?

The biometric market is one of the fastest-growing markets in the world. Millions of dollars are being invested in research and development every year. Privacy and security are being taken very seriously. Will facial recognition for certain applications become a thing of the past since biometric templates could be created without user consent? Will iris recognition become the standard for biometric recognition as more and more smartphone manufacturers are using it? Whatever the future may be, TBS will always bring the best-of-breed technology to our customers.

Here are some of our current solutions that have already been deployed in thousands of installations:

Recommended Solution	Key Benefits
TBS 3D Terminal	The most reliable, contactless fingerprint reader available capable of managing large databases
TBS 2D+ HD	A multi-spectral fingerprint reader capable of reliable identification in the most extreme environments
TBS 2D Terminal	Our cost-effective, optical fingerprint reader with an intuitive touchscreen user interface
TBS 2D Portable	Mobile identification and enrolment enabling identification at any location without the need for infrastructure
TBS 2D Eye	Iris recognition is contactless, hygienic and extremely reliable for use in indoor environments
TBS 3D Tailgate	Eliminate tailgating with this cost-effective sensor, fully integrated within the TBS Ecosystem

Would you like to work with us?

If you have identity dependent processes within your business and you would like to explore how a biometric system can help, please get in touch. One of our experienced engineers will be glad to help.

Contact us on +41 (0)55 533 20 00 or at tbs@tbs-biometrics.com.