Computerized treatment of manuscripts

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Researchers at the UAB Computer Vision Centre working on the automatic recognition of manuscript documents have designed a new system that is more efficient and reliable than currently existing ones.

The BSM (acronym for "Blurred Shape Model") has been designed to work with ancient, damaged or difficult to read manuscripts, handwritten scores and architectural drawings. It represents at the same time an effective human machine interface in automatically reproducing documents while they are being written or drawn.

Researchers based their work on the biological process of the human mind and its ability to see and interpret all types of images (recognition of shapes, structures, dimensions, etc.) to create description and classification models of handwritten symbols. However, this computerised system differs from others since it can detect variations, elastic deformations and uneven distortions that can appear when manually reproducing any type of symbol (letters, signs, drawings, etc.). Another advantage is the possibility to work in real time, only a few seconds after the document has been introduced into the computer.

The BSM differs from other existing systems which follow the same process when deciphering different types of symbols, since a standard process makes it more difficult to recognise the symbols after they have been introduced. In contrast, the methodology developed by the Computer Vision Centre can be adapted to each of the areas it is applied to. To be able to analyse and recognise symbols, the system divides image regions into sub regions - with the help of a grid - and saves the

information from each grid square, while registering even the smallest of differences (e.g. between p and b). Depending on the shape introduced, the system undergoes a process to distinguish the shape and also any possible deformations (the letter P for example would be registered as being rounder or having a shorter or longer stem, etc.). It then stores this information and classifies it automatically.

Researchers decided to test the efficiency of the system by experimenting with two application areas. They created a database of musical notes and a database of architectural symbols. The first was created from a collection of modern and ancient musical scores (from the 18th and 19th centuries) from the archives of the Barcelona Seminary, which included a total of 2,128 examples of three types of musical notes drawn by 24 different people. The second database included 2,762 examples of handwritten architectural symbols belonging to 14 different groups. Each group contained approximately 200 types of symbols drawn by 13 different people.

In order to compare the performance and reliability of the BSM, the same data was introduced into other similar systems. The BSM was capable of recognising musical notes with an exactness of over 98% and architectural symbols with an exactness of 90%.

Researchers at the Computer Vision Centre who developed the BSM were awarded the first prize in the third edition of the Iberian Conference on Pattern Recognition and Image Analysis (IbPRIA) which took place last June.

Source: Universitat Autonoma de Barcelona