Editorial

Paintings and writings in the hands of scientists

Art experts have great difficulties in validating the work of painters and writers of their own time. For one or another reason they usually underestimate their contemporary subjects of assessment. If the experts were clairvoyant, Rembrandt and Van Gogh would have been millionaires. However, only some two, three or four centuries later the proper recognition became their due. They were unanimously crowned as the best painters; they were recalled, remembered, and honoured in retrospect and their birthdays were celebrated.

Why did this recognition come so late? Was it by the personal judgement approach of the art experts? It is hard to tell and even harder to analyse. From the world of auditing we know that personal judgements heavily depend on experience and expertise. In the world of art experts experience and expertise is a presumption for adequate operating in a world full of tangible and almost untouchable assets. However, the approach by the experts (and thus the presumption) may be ineffective and may lead to different opinions, to personal bias, and even to misleading statements.

In this time we have computers that may help us to disentangle the intricacies created by the artist and that may unveil the secrets of the greatest artists of the world. The prevailing question now is: do we wish to know why an art creation is attractive, irresistible or even almost perfect. For scientists, the answer is a definitive 'yes'.

So, pattern recognition techniques have been developed and applied to a wide variety of domains. However, so far their applications to the cultural heritage have been scarce. The main barrier was that art-historical or archaeological domains had only a modest usage of computers. Since the last decade, computers are rapidly becoming one of the standard tools for cultural-heritage researchers. Historians employ text retrieval and text mining tools, art experts examine and analyse paintings using dedicated image processing software, and archaeologists are supported by pattern recognition software to create and refine their taxonomies of pottery and other findings. Therefore this special issue of Pattern Recognition Letters is dedicated to *Pattern Recognition in Cultural Heritage*. Originally we had in mind to combine this topic with pattern recognition in Medical Applications. The success rate of the Cultural Heritage contributions led us to the decision to put emphasis on the Cultural Heritage, and to complete the issue by closing with a contribution which highlights pattern discovery in bioinformatics. It shows a way to an integral approach of many pattern recognition techniques in different areas of research. So, the special issue contains eight papers on pattern recognition in cultural heritage and one in medical applications.

Three papers focus on pattern recognition for archaeology. Bannai, Fisher, and Agathos investigate how virtual models of historical buildings can be created realistically. Kampel and Sablatnig describe their development of a rule-based system for the classification of ceramics. The contribution by Van Tonder shows how the original visual structure of ancient Japanese gardens can be reinstated using historical illustrations.

Five contributions to this special issue address the analysis of the "handwriting" of authors. The handwriting may be taken literally or metaphorically. In the latter case, "handwriting" refers to the personal style of an author as reflected in a painting or other work of art. Analysing the actual handwriting, Schomaker, Franke, and Bulacu employ codebooks of handwriting fragments to identify the author of historical documents. Kammerer, Lettner, Zolda, and Sablatnig employ pattern classification to identify the drawing tools used for medieval panel paintings. Their findings lead to the identification of the personal style of the painter. Another type of handwriting is reflected in the colour usage in paintings. Berezhnoy, Postma, and Van den Herik analyse the Van Gogh's usage of complementary colours by applying special pattern recognition techniques to his digitized oeuvre. Authentication of paintings requires the proper identification of the idiosyncratic features of a painters' handwriting. Taylor et al. have identified the fractal dimension as one of these features for the well-known dripping painter Jackson Pollock. Finally, Bergboer, Postma, and Van den Herik concentrate on the high-level features (i.e., objects) to support art experts in their authentication of paintings. Using the visual context, they show how efficient and reliable object detection from paintings may become feasible.

In the final contribution to this special issue, Kasabov presents a comparative study of personalized pattern recognition and pattern discovery in bioinformatics. Although the medical application domain is quite different from the cultural heritage domain, there are many parallels when it comes down to decision support. Computers and pattern recognition tools thrust the quality, efficiency, and reliability of cultural and medical experts considerably.

This observation has been seen in many countries all over the world. In the Netherlands the challenge was taken up by the National Organization for Scientific Research (NWO) when they started in 1999 their programme ToKeN (*Toegankelijkheid en Kennisontsluiting in Nederland*). This programme gave a major impetus to research in the Cultural Heritage and also to this Special Issue. It is worthwhile to mention that next to ToKeN a successor programme has been developed in the form of CATCH (Continuous Access To Cultural Heritage) which is more internationally oriented. We are aware of the fact that in other countries similar developments have taken place. Apparently, the field is in a state of Art-Informatics.

Finally, we would like to express our gratitude to Pattern Recognition Letters and in particular to Gabriella Sanniti di Baja for the opportunity to present recent work in the cultural heritage and medical domain to the scientific community. We sincerely hope that the contributions lead to a further incorporation of pattern recognition techniques to these domains.

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