Part E

Applications

After having presented a large variety of tools and methods, for processing, segmenting, and analyzing the information present in document images, it is time now to look at some specific application domains, where all these tools are put together to serve specific purposes. The previous chapters have of course already covered many useful applications, so we will not go back to business documents, newspaper or journal articles, forms, maps, or engineering drawings, for instance. But we have chosen to present the reader with the specificities of five classes of documents.

▸Chapter 21 (Document Analysis in Postal Applications and Check Processing) covers a domain combining the needs for low error rates and for rapid and efficient processing of large amounts of data, on an "industrial" scale. Michel Gilloux takes us on an interesting journey into one of the very first applications of document image processing and recognition, namely, the processing of postal objects (i.e. decoding the address to automate the process of sending letters and mail to the right destination) and of bank checks.

In ▸Chap. 22 (Analysis and Recognition of Music Scores), Alicia Fornés and Gemma Sánchez introduce us to the very specific world of music musical notation is a universal language, but only decoded by the "happy few" who have learnt it. It obeys a strict syntax and has a well-known context with many constraints, which enables correct segmentation and recognition of documents which at first glance seem to be very complex for non-initiated people.

In the twenty-first century, we cannot pretend that all the documents that we handle are provided to us on paper. On the contrary, we receive, store, send, and want to process a large quantity of documents which are already in electronic format. This does not always mean that these documents "born digital" are ready for use in our applications. PDFs and web documents, especially, can also be problematic to process for information extraction, and although a number of pure image processing steps are not necessary, they still need to be analyzed and recognized, as Jianying Hu and Ying Liu explain in ▸Chap. 23 (Analysis of Documents Born Digital).

In many cases, the challenge is not so much to analyze and recognize all the information conveyed by a document, but rather to be able to quickly and efficiently

spot the most appropriate information in very large sets of scanned documents. In that case, instead of trying to analyze everything, the focus is on information retrieval. The specific way in which document analysis tools are used for that purpose is presented in ▸Chap. 24 (Image Based Retrieval and Keyword Spotting in Documents) by Chew Lim Tan, Xi Zhang, and Linlin Li.

Finally, the multimedia, digital world in which we live leads us in many cases to the question of how to detect and recognize text in images of natural scenes or video shots. This can be for indexing, retrieval, or recognition purposes. Seiichi Uchida describes the state of the art for this area in ▸Chap. 25 (Text Localization and Recognition in Images and Video).