

## Towards information retrieval on historical document collections: the role of matching procedures and special lexica

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**Abstract** Due to the large number of spelling variants found in historical texts, standard methods of Information Retrieval (IR) fail to produce satisfactory results on historical document collections. In order to improve recall for search engines, modern words used in queries have to be associated with corresponding historical variants found in the documents. In the literature, the use of (1) special matching procedures and (2) lexica for historical language have been suggested as two alternative ways to solve this problem. In the first part of the paper, we show how the construction of matching procedures and lexica may benefit from each other, leading the way to a combination of both approaches. A tool is presented where matching rules and a historical lexicon are built in an interleaved way based on corpus analysis. In the second part of the paper, we ask if matching procedures alone suffice to lift IR on historical texts to a satisfactory level. Since historical language changes over centuries, it is not simple to obtain an answer. We present experiments where the performance of matching procedures in text collections from four centuries is studied. After classifying missed vocabulary, we measure precision and recall of the matching

procedure for each period. Results indicate that for earlier periods, matching procedures alone do not lead to satisfactory results. We then describe experiments where the gain for recall obtained from historical lexica of distinct sizes is estimated.

**Keywords** Historical spelling variants · Electronic lexica · Information retrieval

### 1 Introduction

In present days, still, millions of historical books and documents are hidden in libraries, often only accessible to a small group of experts. Libraries which want to present their treasures to the public have realized that it does not suffice to create digital images. In fact, searching for interesting documents is only possible once texts are available in symbolic form. A recent study of the Australian National Library [9] found the numbers of visitors to increase by factor ten when collections provide a searchable fulltext index. Following these insights, large projects have been initialized where optical character recognition (OCR) is applied to historical documents [16,4]. Though today's OCR software has severe deficiencies on historical texts, the situation will probably improve over the next years.

Still, it would be naive to expect that problems are solved as soon as OCR works in an acceptable way. Even if historical texts are recognized in a perfectly accurate way, Information Retrieval (IR) will suffer from the effect that due to missing normalization of orthography historical documents typically are full of spelling variants. A non-expert user—who of course uses modern keywords in his queries—will miss a large amount of relevant documents in the answer set, being unaware of all the variants how words are written in historical texts.

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# Towards Information Retrieval

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