Chapter 29
On Visual Information Retrieval Using Multiresolution Techniques for Web Usage Mining Applications

Prashant Srivastava
University of Allahabad, India

Ashish Khare
University of Allahabad, India

ABSTRACT

The proliferation of huge amount of information has made it essential to develop systems that organize and index them for easy access. The advent of World Wide Web has provided immense opportunity to the people across the world to access and share information for different uses ranging from personal to professional. Various web mining techniques are applied to retrieve useful information as well as improvement of existing techniques of mining to search and retrieve useful information from the web. With the growth in the number of devices producing various forms of information, the amount of information is increasing exponentially. Also, these huge amount of information are being shared in the world through various means. Hence, it has become necessary to organize information in such a manner so that access to them is easy and feasible. As the amount of information is increasing rapidly, efficient indexing of information for easy access is becoming quite challenging. Hence, there is a need to search for solutions to solve this problem. The field of information retrieval attempts to solve this problem. Information retrieval is concerned with storage, organization, indexing, and retrieval of information. Information retrieval techniques incorporate several aspects of information to achieve the target of efficient indexing. Since there are several forms of information, their characteristics vary a lot from each other. Image is one such popular form of information which is shared the most among the people around the world. Also, with the presence of numerous image capturing devices, acquisition of image is no longer a difficult task. People enjoy capturing and sharing images through social network. Although image is a complex structure, it

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is easily understood by people across the world. Also, it has become a popular means of information sharing among people. This chapter discusses information retrieval techniques for image data. Visual Information Retrieval or Content-Based Image Retrieval (CBIR) accepts query in the form of image or image features instead of text. It is concerned with searching and retrieval of images similar to the query given in the form of images. Most of the visual information retrieval techniques are based on processing single resolution of an image. But processing of single resolution of image is not sufficient for efficient retrieval as image is a complex structure and contains varying level of details. Hence, there is a need of multiresolution processing of images. Today, it is very difficult to keep track of number of research papers based on multiresolution analysis as it is widely used for various image-based applications. Also, there are a number of multiresolution techniques available to achieve this. Multiresolution processing has one big advantage that features that are left undetected at one level get detected at another level which is not the case with single resolution analysis. We demonstrate this fact with the help of an experiment using Discrete Wavelet Transform along with the discussion of various multiresolution techniques for visual information retrieval. The experiment helps in explaining the important properties of multiresolution analysis and also provides future scope of research in this field.

INTRODUCTION

We live in the age of information where information is available in various forms such as text, image, audio, and video. Information has been an integral part of our lives. Accurate information is the need of the day for important planning and decision making. Whether manual or machine generated, information plays an important role in our lives and is required for each and every work of our daily lives. There are numerous sources of producing these forms of information. Due to the increase in the number of devices producing these forms of information, it has become practically difficult to manage large volumes of information manually. Hence, there is a need to design such systems which are useful in organization of such forms of information. Such systems are needed so that it is easier for us to get the relevant information whenever and wherever we desire. In other words, we can say that we need some information retrieval systems to search for relevant information in large database. The term information retrieval refers to the arrangement, storage, indexing of useful information in the form of large database (Yates & Neto, 2011). Information retrieval systems facilitate the users to access useful and relevant information from large database. The introduction of World Wide Web (WWW) made the field of information retrieval more interesting. Huge amount of information about every field is available on WWW. After the invention of WWW, large amount of data started getting submitted by all the users of the web around the world. The universal platform has provided users to share data with other users without much constraint. A document submitted by a user gets linked with other documents and is shared among other users. This further increases the amount of information on the web. WWW has given the opportunity to the users to access and share huge amount of information. Add to this, the social networking sites have become one of the largest platforms of data sharing. This has attracted attention of millions of users who are keen on accessing and sharing information. All these platforms have proved to be a big centre of data repository where huge amount of information, of any kind, is available. However, presence of huge amount of information has certain disadvantages. Large number of documents get