Chapter 18

Text, Images, and Video Analytics for Fog Computing

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ABSTRACT

Today, images and image sequences (videos) make up about 80% of all corporate and public unstructured big data. As growth of unstructured data increases, analytical systems must assimilate and interpret images and videos as well as they interpret structured data such as text and numbers. An image is a set of signals sensed by the human eye and processed by the visual cortex in the brain creating a vivid experience of a scene that is instantly associated with concepts and objects previously perceived and recorded in one’s memory. To a computer, images are either a raster image or a vector image. Simply put, raster images are a sequence of pixels with discreet numerical values for color; vector images are a set of color-annotated polygons. To perform analytics on images or videos, the geometric encoding must be transformed into constructs depicting physical features, objects and movement represented by the image or video. This chapter explores text, images, and video analytics in fog computing.

INTRODUCTION

Image analysis (also known as “computer vision”) is the ability of computers to recognize attributes within an image. Image analysis methods extract information from an image by using automatic or semiautomatic techniques termed: scene analysis, image description, image understanding, pattern recognition, computer/machine vision etc. Image analysis differs from other types of image processing methods, such as enhancement or restoration in that the final result of image analysis procedures is a numerical output rather than a picture. The steps for image analysis are Preprocessing, Segmentation,
Feature extraction, Classification and interpretation. Image analytics can also identify faces within photos to determine sentiment, gender, age, and more. It can recognize multiple elements within a photo at the same time, including logos, faces, activities, objects, and scenes. It is the automatic algorithmic extraction and logical analysis of information found in image data using digital image processing techniques. The use of bar codes and QR codes are simple examples, but interesting examples are as complex as facial recognition and position and movement analysis. These constructs can then be logically analyzed by a computer (Er. Anjna, Er.Rajandeep Kaur, et al.,(2007).

Text analytics or text mining is the process of determining and collecting high-quality information from unstructured text such as a mass of Twitter posts, a collection of scientific papers, or restaurant reviews, depending on the focus of the organization conducting the analysis. Text analytics can be performed manually, but it is an inefficient process as expressed in Dr.V.Sankaranarayanan,(2010) et al., Therefore, text analytics software has been created that uses text mining and natural language processing algorithms to find meaning in huge amounts of text. Text analytics is the way to unlock the meaning from all of this unstructured text. Video is a major issue when considering big data. Videos and images contribute to 80% of unstructured data. Now days, CCTV cameras are the one form of digital information and surveillance. All these information is stored and processed for further use, but video contains lots of information and is generally large in size. Apart from videos, surveillance cameras generate a lot of information in seconds. Even a small Digital camera capturing an image stores millions of pixel information in mille seconds.

TEXT ANALYTICS

In the middle of 1980’s the text mining was evolved but it was not well developed due to lack of sophisticated technology. Later the technology developed and along with it, the text mining was also developed. In text analytics Most of all information or data is available in textual form in databases. From these contexts, manual Analytics or effective extraction of important information are not possible. For that it is relevant to provide some automatic tools for analyzing large textual data. Text analytics or text mining refers process of deriving important information from text data. It will use to extract meaningful data from the text in Dilpreet Kaur, (May- 2014) et al., Text analytics widely use in government, research, and business needs. Data simply tells that what people did but text analytics tell you why. The text analytics is also called as “text mining” and is a way that has the unstructured data. From unstructured or semi structured text data all information will retrieve. From all textual data it will extract important information. After extracting information it will be categorized.

Working in Text Mining

The text mining has many processes or working methods and all these are combined to obtain the results that are nothing but the working of text mining. The stages involved in it are shown in Figure 1.

Information Retrieval System

The initial step in text mining is to search the body of documents and this happens in the information retrieval systems. Information retrieval is regarded as an extension to document retrieval where the docu-