

Chapter 3

Feature Extraction

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ABSTRACT

Accessibility problem is relevant for audiovisual information, where enormous data has to be explored and processed. Most of the solutions for this specific type of problems point towards a regular need of extracting applicable information features for a given content domain. And feature extraction process deals with two complicated tasks first deciding and then extracting. There are certain properties expected from good features-Repeatability, Distinctiveness, Locality, Quantity, Accuracy, Efficiency, and Invariance. Different feature extraction techniques are described. The chapter concentrates of taking a survey on the topic of Feature extraction and Image formation. Here both image and video are considered to have their feature extracted. In machine learning, pattern recognition and in image processing has significant contribution. The feature extraction is one of the common mechanisms involved in these two techniques. Extracting feature initiates from an initial data set of measured data and constructs derived informative values which are non redundant in nature.

BACKGROUND

Extracting, analyzing, and understanding large scientific and non-scientific database of image available manually is very complex and tedious task for human brain. This type of knowledge discovery tasks are also contains some very decisive computational activities, hence always there is a requirement of automated activities that can be operated better than human brain by computers. But externally knowledge and experience input are provided to get improvised algorithms that can be used for any critical data analysis and extraction processes. This extraction process on image and video assists us to solve some high-level critical problems such as face and image recognition, medical and biological imaging, knowledge discovery, and so on. Also feature extraction minimizes and simplifies resource requirements, and describes large set of data accurately. Hence if we expect to achieve robust, adaptive and real time processing in multimedia application, then it is oblivious to use feature extraction mechanism. Very popular application of feature extraction involves image feature extraction with very useful mechanism to extract features are Average RGB, Color moments, Local color histogram and so on. These techniques

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focus simply in extracting feature from test image given. There are many types of features present in an image and a video which can be exploited and extracted to understand the image and video segment. This procedure is followed either simplification of media that is images or videos or to extract only important parts of it. For instance, features of a video stream upon extracting and exploiting redundant and relatively unwanted clips of that video can be avoided to present the shorter version with only relatively necessary information of the given video. Videos are considered as sequential frames or simply sequence of images. In case of image formation real values are processed and fed into the calculations to make up and image of the representing real object. There are some specific features associated with image and video stream. The point is to extract those features and on exploiting them the properties of the image can be understood and later the image can be recreated back when needed. Videos also can be recreated if their features are extracted. Apparently extracted features of videos will be dynamic and different than images. Since computers are computationally robust it can extract feature from video and images and with that it is possible to detect objects at a significant rate of success. There are several features and their extraction procedures are available a survey of those procedure is stated below.

INTRODUCTION

Feature Extraction in Video Processing

Process of extracting features or informative characteristics are generally termed as feature extraction. In video processing these features are acquired from video frames which are usually independent of previous or future frames. Feature extraction is applicable for text, video data or any kind of multimedia data. Convenience in accessing dynamic multimedia data is the only reason for feature extraction.

Recent trend in video processing focuses on quality of video. The growth in development of high speed digital camera, video components took so much attention of users. The most promising application where video analysis is one of the significant areas is sports. Video processing has many applications areas in sports such as slow motion replay, pattern analysis, statistics collection, video archiving and so on. Sports video analysis is frequently used in tracking balls, players, referees, etc. Generally quality of video must be enhanced and improved before its processing. The two very basic problems are noise and segmentation problems in video frames and reduction of noise, with proper object segmentation is very important. The only way is video de-noising. The method of noise elimination from video signal is termed as video de-noising. Noise reduction takes place for each video frame. Video de-noising is divided into some specific categories spatial, temporal and spatio-temporal. Basically, concept of image de-noising is very popular. Linear models are used for image de-noising. Popular one is Gaussian filter. There are many types of noises exists such as Amplifier noise, Salt-and-pepper noise, Periodic noise. Depending on the type of video image noise reduction technique takes place such as Average filter, Median filter, Wiener filter, Rank order filter, Gaussian filter, Non- linear filter, Outlier filter. Linear and Non-linear filtering is used noise reduction generally. Linear filter is not effective with compared to non-linear filter as non-linear filter can effectively remove blur edges of images. Non-linear filters generally used in fuzzy techniques. To compute the performance of noise in a video, we use three types of noises. By adding up the various types of noise we try to clean the image source so as to get the extracted parameters of added noise. Filter initialization provide noise removal technique so that various noise can be applied and filtered simultaneously from video.

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