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Foreword

Wassalamu'alaikum Wr. Wb.

On behalf of the Organizing Committee of the 1st International Industrial Informatics Seminar 9 (IIS09), it is a great pleasure for me to welcome you to visit our uniquely designed campus of Sunan Kalijaga State Islamic University Yogyakarta for attending this seminar. Around 130 selected papers will be presented throughout the seminar. I am sure you will find this seminar as an excellent forum for fruitful discussion that will provide us with interesting program and enjoyable activities.

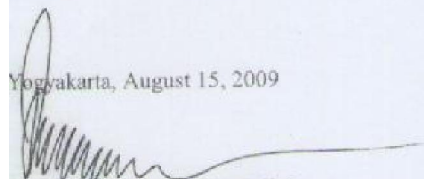
The IIS09 will include one plenary session and a number of theme-based tracks. The seminar will be divided into 2 sessions. We wish you can find the one that most suit to your interest. We also hope that participants from overseas and Indonesia can have a good atmosphere for information sharing to foster a better research network among others.

The seminar would have not been possible without the contributions and hard works from all of you, especially our keynote and invited speakers, the authors, reviewers, chair persons, advisory committee, as well as our Technical Program and Organizing Committee. May I take this opportunity to express my sincere appreciation to all of them.

I do hope that all of you would find this seminar interesting, stimulating, beneficial and enjoyable. Although it will only be a one day seminar, I wish you could spend some times to explore and enjoy our historical city of Yogyakarta, the education and tourism destination city in Indonesia.

Wassalamu'alaikum Wr. Wb.

Yogyakarta, August 15, 2009



Prof. Dr. H. M. Amin Abdullah
Rector of Sunan Kalijaga State Islamic University

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ANALYSIS PATTERN RECOGNITION METHODS TO IMAGE PROCESSING

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Abstract - Pattern Recognition is a discipline of learning how to classify the object to some class or category and identify inclination of data. Pattern Recognition at this time has been learned in the developed and the methods. Various methods has developed in the pattern recognition to find a pattern in the data information that indicates a certain activity in the pattern recognition is to map the data in a particular concept that has been defined previously. Information obtained with the process data that sometimes the form of image. Methods in pattern recognition such as data image that has been developed. Analysis of the pattern recognition method of data image such as this go on to develop, learn and understand so that can be used in the retrieval of information in the form of data image to help make certain the data input.

Keywords: Image processing, Pattern Recognition.

1. Introduction

At some later period of this computer has been applied in various fields of life. The application of computers has helped to turn data into information. Information obtained is used to help in doing certain jobs. The introduction is part of the activities in order to find the information. Introduction to the science of patterns is to learn how to classify objects in the class to identify some preference data. Data can be image. Methods in pattern recognition such as data image that has been developed through research was done by researchers. The system has pattern components: sensor, Preprocessing, features selection, prediction and model selection. Introduction of the five system components in the pattern preprocessing in pattern with the introduction of image data is done with image processing. Introduction to pattern detection needs to be done, clustering, classification and identification. Data sources are the most commonly used form of image. This form of image data through the preprocessing stage is done with the image processing stages. Many methods have been developed to do the activities with the introduction of a pattern in the form of data image. Development of methods to generate information from data have to be able to make a prediction for a particular condition.

2. Pattern Recognition

2.1 Pattern recognition definition

Introduction to the pattern defined in a variety of opinions, for example:

- o "The assignment of a physical object or event to one of several pre-Specified categories" widower and Hart
- o "A problem of Estimating density functions in a high-dimensional space and Dividing the space into the regions of categories or classes" Fukunaga
- o "Given some examples of complex signals and the correct decisions for them, make decisions automatically for a future stream of examples" Ripley (Basuki,2007).

In general the pattern is the introduction of the definition of a map feature, as a dominant object (which is expressed in a subset of the numbers) to an appropriate class. This process to mapping the inference, either explicitly in statistics (such as the Bayesian rules) and no explicit decision by a network (such as nerve network logic or blind imitation). Introduction to the pattern already applied in various fields, such as the Vision machine, sorting mail at the post office with recognize address destination, translate speech into any posts, health diagnosis, and others.

Introduction to patterns in medicine has been able to help make a diagnosis, for example disease detection signals from the EEG, EKG eye image, mammografi or X-rays to diagnose cancer. However, final diagnosis still made by doctors, beginning with the screening tool is very helpful if the number of patients very much and the number of specialists is very limited.

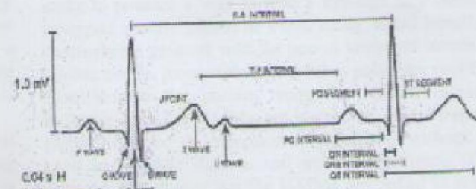


Figure 5.3 Introduction to pattern analysis for medical through computer

2.2 System Componen Pattern Recognition

Parts of pattern recognition system: sensor, preprocessing mechanism, the mechanism features selection

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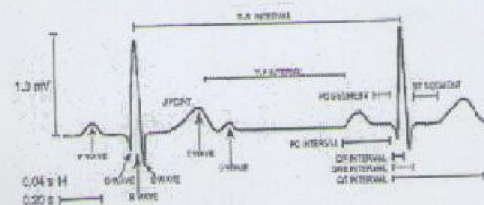
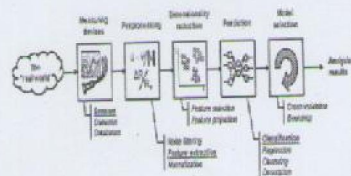


Figure 5.3 Introduction to pattern analysis for medical through computer

2.2 System Componen Pattern Recognition

Parts of pattern recognition system: sensor, preprocessing mechanism, the mechanism features selection

(manual / automatic), classify algorithm and a set of training examples that have been classified. System block diagram of a pattern can be described as



follows:

Image pattern component system introduction

- Sensor: function to capture an object from the real world into electrical signals (and in the next number in the digital process) .
- Preprocessing functions to show the information signal and the signal in the rear.
- Feature selection: take a certain amount of the components of the signals that represent the nature of the main signal, while reducing the dimensions of the signal into a set of fewer but representative.
- Algorithm divide: assignment of features to make the appropriate set of classes of training .

The brief introduction of some application pattern as follows:

- Processing / segmentation Citra
- Computer Vision
- Introduction to the conversation
- Introduction to handwriting (OCR)
- seismic Analysis
- Identification of investigation
- Inspection of industrial
- Financial forecasting
- Diagnosis health
- ECG signal analysis

From the statement above then the image processing is one of the applications in the introduction pattern.

3. Image Processing

Image is two-dimensional representation of information that is created or made with a view or an image or experience .Image is a two-dimensional images generated from two-dimensional analog image continuous into the picture discrete through sampling. Analog image is divided into N rows and M columns to become so discrete image. Contradiction between the line and a column called pixels. Examples are image / discrete point on the line n and column m is called the pixel [n, m].

Image processing is a branch of the science of informatics in the process of manipulating existing images into the image using a particular technique or algorithm.

Rendering is the process of image processing and image analysis that involves a lot of visual perception. This process has the characteristics of data input and output in the image.

3.1 Image Processing Operations

Operations are conducted in many various image processing, but the general image processing operations can be classified into several types as follows:

1. Image enhancement quality
This type of operation aimed to improve its image in a way to manipulate the image parameters. This operation is specific characteristics that special in image. For example : improvements to the object edge, sharp, etc.
2. Image restoration
This operation aims to eliminate defects in the image. Destination image restoration is almost the same as the reparation operation image. The difference, at the image restoration image degradation causes unknown. For example, deletion or omission noise dusk.
3. Image compression
This type of operation so that the image can be represented in the form of a more compact so that it requires less memory. Important issues that must be observed in image compression is the image that still must be already have a good quality image.
4. Segmentation image
This type of operation aims to break an image into segments with a certain criteria. This type of operation associated with the introduction of the pattern closely.
5. Image Analysis
This type of operation measure quantity scale of the image to produce description Image processing techniques to extraction specific characteristics that help in the identification of the object. Segmentation process sometimes required for the desired object localization from around them. For example: detection edge object, or the Boundary extraction.
6. Image Reconstruction
This type of operation aims to re-establish the image of an object from multiple projection results. Operating the image reconstruction is used in many medical fields.

Lovell (2003), Hidden Markov Models for Spatio-Temporal Pattern Recognition and Image Segmentation, has developed a system for real time video gesture recognition based on the letters of the alphabet traced in space in front of a video camera. The motivation of this study to produce a way to type a message in a camera-equipped mobile phone or PDA using video installing cumbersome gestures with the pen or keyboard interface. HMMs are an immensely powerful to solve the problem Classification and pattern recognition. Some research indicates that the HMMs are powerful. Hmm training algorithm based on comparisons simulation without the need to translate data in real-word performance. This research also shows that the HMMs are linked to active contours as used for the image. By unifying several pattern recognition and computer vision techniques can

be useful insight into the design more effective algorithms.

Veldhuis (2004), in his research describes the design, implementation and evaluation of a user-verification system for a smart gun, which is based on grip-pattern recognition. An interface has been developed to acquire pressure images from the sensor. The values of the pixels in the pressure-pattern images are used as inputs for a verification algorithm, which is currently implemented in software on a PC. The verification algorithm is based on a likelihood ratio classifier for Gaussian probability densities. Results the research are promising and clearly indicate that the grip pattern contains sufficient information that can be used for verification. However, it is also true that not enough data were available to reliably estimate the lower EERs and that the current values for the EERs are not precise enough to make a well-founded statement about the performance of the system. To achieve this, more data are needed from a greater population and with more scans subject. Probably another important aspect, that determines the outcome's precision, is the (lack of) shooting experience of the subjects.

It appeared that the more experienced subjects (who had handled the gun more often and over a longer period) always had perfect verification results. To approximate realistic situations, the data should be collected from experienced subjects at a shooting range.

Singh (1996) proposes a fuzzy pattern recognition technique which identifies data patterns using possibility Distributions documents and a fuzzy algorithm which is implemented. Technique that is based on the possibility theory result obtained using this sensor manufacturing data are encouraging: the fuzzy technique outperforms non-fuzzy techniques convincingly. The results for comparison with non-fuzzy techniques include the shell-sort and quick-sort with binary search. The fuzzy technique identifies the correct pattern in the sensor database with nearly 99% accuracy. The results highlight the role of new technologies for making fuzzy knowledge-based systems more attractive in areas where they are currently limited by speed considerations. In the research propose the concept of a fuzzy search technique. This technique is related to the concept of possibility in fuzzy logic measurements as opposed to other much applied probabilistic approaches. This research does not only reduce the size of data in the knowledge base but also a significant speed up the all search time. The proposed technique is comparatively resistant to the effects of incomplete and imprecise data, and therefore is an efficient tool for managing uncertainty in knowledge-based systems.

Tarr in the research is actually a complex problem - so much so that the visual areas responsible for this process occupy up to one-half of our cortex. Fundamental to our perception is the Transformation of the array light that falls on our retinae into coherent surfaces and objects. How this is done is still a matter of some debate, but

results from psychophysical, neuropsychological, and physiological studies point towards a remarkably adaptive system that supports a wide range of recognition tasks.

This research identify objects under a wide array of conditions that confound even the most powerful computer vision systems. For example, they can recognize objects at many different categorical levels.

While such results are intriguing, many aspects of view-based models are underspecified. For instance, there is as yet no clear definition of what features are used to represent each view of an object. Although many theorists have used simplified features (such as vertices in linear image Specified Coordinates), they are quick to point out that view-based models are unlikely to rely on such features

Wang have developed **Feature Extraction For Integrated Pattern recognition systems** , In the research they investigates the performance of both MCE and SVM. training algorithm and SVM in vowel recognition. A generalized structure is proposed to enhance the performances of both MCE and SVM algorithms. His paper is organized as follows: introduces the framework of MCE training algorithm and SVM, proposes a generalized structure to enhance the performance of MCE and SVM, shows the results of recognition experiments on TIMIT database.

Thus SVM classifiers are complex and inefficient. The problems with both MCE and SVM are caused by the initial feature space used. These problems can be solved by a two-layer structured pattern classification system.

Daniela Crivianu-Gaita, Prostate Ultra Sound Images Processing in this research propose to present a software package for the handling and management of prostate transabdominal ultrasound images. The software package can be used to detect men's prostate in transabdominal ultrasound images, to build a 3D model for the detected object, to represent the 3D model obtained, to calculate prostate's volume and to classify the prostate transabdominal ultrasound images acquired. The software system can be used in hospitals which do not have either CAT scanners or NMR/MRI equipment (the majority of Romanian hospitals). It provides these hospitals with a tool enabling a more accurate diagnosis, which in turn improves the efficiency of the hospital, saves money, and has a profound psychological benefit on the well-being of the patient. At the research has developed and implemented two methods for the 3D reconstruction of the prostate.

The first method allows detect the contour of the prostate using an original algorithm. The prostate is then extracted from the image by a region-growing The 3D representation of the prostate can be rotated by the user, being possible to show the asymmetrical regions of the prostate, dedicated to this field of automatic classification of images, there are several approaches. It is possible to select several training areas from identifiable malignant tissue in the data set.

Bayesian Image Processing method present a very general forward modeling for the observations and a very general probabilistic modeling of images through a hidden Markov modeling (HMM) which can be used as the main basis for many image processing problems such as: 1) simple or multi channel image restoration, 2) simple or joint image segmentation, 3) multi-sensor data and image fusion and 4) Principal Component Analysis (PCA), Factor Analysis (FA), this research showed that many image processing problems can be presented as inverse problems by modeling the relation of the observed image to the unknown desired features explicitly. Then, presented a very general forward modeling for the observations and a very general probabilistic modeling of images through a hidden Markov modeling (HMM) which can be used as the main basis for many image processing problems we presented detailed forward models, prior and posterior probability law expressions for the implementation of MCMC algorithms for a few of those.

Qiu on research on title Visual Colour Image Processing propose a colour image processing method by combining modern signal processing technique with knowledge about the properties of the human colour vision system. Colour signals are processed differently according to their visual importance. The emphasis of the technique is on the preservation of total visual quality of the image and simultaneously taking into account computational efficiency. A specific colour image enhancement technique, termed Hybrid Vector Median Filtering (HVMF) is presented. Computer simulations have been performed to demonstrate that the new approach is technically sound and results are comparable to or better than traditional methods. Motivated by the properties of human colour vision system and modern digital signal processing techniques, we have argued that a sensible approach to colour image processing is to combine the two by treating the colour signals according to their visual importance.

Tolson(2001) investigates the use of machine learning for image analysis and pattern recognition. Examples are shown using such a system in image content analysis and making diagnoses and prognoses in the field of healthcare. Given a data set of images with known classifications, a system can predict the classification of new images. Example, in the field of healthcare, given a data set of fine needle aspirate (FNA) images of breast masses that are each classified as benign or malignant, a new FNA of a breast mass can be classified as benign or malignant. There are at least two parts to any such system. The first part is an algorithm for creating a feature vector (also known as a data point) given an image. A feature vector consists of several numbers that are measured or calculated from the image. These features are then used by the second part of the system, a machine learning algorithm images. Note that since there are more than two classification types, the parameter j is not used in the algorithm and ROC curves are not used for analysis. As the parameter k varies through all the

odd numbers from one to fifteen, the overall percentage of correct classification

Wojnarski (2006), presents also a new method for objective and quantitative comparison of clustering algorithms, based on the notions of entropy and mutual information Neurons comprising NSC may be viewed as a society of autonomous individuals, proceeding along the same simple algorithm, based on four principles: of locality, greediness, balance and competition. The same principles govern large groups of entities in economy, sociology, biology and physics. Advantages of NSC are demonstrated in experiment with visual data

Makatchev (1998) present an algorithm for image segmentation with irregular pyramids. Instead of starting with the original pixel grid, we first apply some adaptive Voronoi tessellation to the image. This provides the advantage that the number of cells in the bottom level of the pyramid is already reduced as compared to the number of pixels of the original image. Furthermore the Voronoi diagram is a powerful tool for shape description and image compression

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Gadat(2007) introduce a new model addressing feature selection from a large dictionary of variables that can be computed from a signal or an image. Features are extracted according to an efficiency criterion, on the basis of specified classification or recognition tasks. This model estimating a probability distribution P on the complete dictionary, which distributes its mass over the more efficient, or informative, components. They implement a stochastic gradient descent algorithm, using the probability as a state variable and optimizing a multi-task goodness of fit criterion for classifiers based on variable randomly chosen according to P . Then generate classifiers from the optimal distribution of weights learned on the training set. The method is first tested on several pattern recognition problems including face detection, handwritten digit recognition, spam classification and micro-array analysis. They then compare approach with other step-wise algorithms like random forests or recursive feature elimination.

4. Discussion

Many of the research in the field of pattern recognition and image processing have been developed by some researchers. All methods and techniques that have developed in order to find a method or technique that can help in the processing of information in the form of image data to identify with a certain pattern. All

each, and the application must also comply with the conditions and goals of the form of image data processing so that patterns can be identified. This is meant to get information the desired result of processing data.

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