

The Photo Database Management System using Digital Image Processing

Busarin Eamthanakul, and Mahasak Ketcham

Abstract—This research is a development of an image database management system by using a principle of image processing. Usually, the system can manage any images according to their attributes as the first letter of an image name, image's file directory, date of photo, image file size, brand and type of camera, and the name of file directory. These are used for a title also an attribute from image processing such as page amount and color tone. These attributes are provided automatically by the program. Moreover, there are other attributes appending by the user. For example, a person in an image, an event, keyword, a note or remark, and the tags in each image. Furthermore, this research can help to manage for sending an image by making a file torrent from BitTorrent programs. As a result, a management of the system works efficiently.

Keywords—RGB, Image Enhancement, Photo Classification.

I. INTRODUCTION

NOWADAYS, we use a digital camera to photograph in any occasions e.g. on the vacation. Many images from taking a picture are necessary to keep in well organized for more interesting to take a look and easier to find. It will take a long time to categorize as well as putting in the wrong directory if there are so many images. In addition, we suppose to have an effective method to send an image to others such as your friends.

An automatically categorization and separation of any images in many groups help to arrange images faster and easier. As well, a file torrent creation for file transfer could help to send file quickly also unlimited for the file size.

This research is about a program to help for managing an image. It can organizing arrange and separate many images in many groups by their attributes. Moreover, the program can create a file torrent for file transfer by automatically finding an attribute also adding more attributes by the user.

Busarin Eamthanakul is with the Department of Information Technology, Faculty of Science and Technology, Suan Sunandha Rajabhat University, Bangkok, Thailand (e-mail: busarin.ea@ssru.ac.th).

Mahasak Ketcham, was Department of Information Technology Management, Faculty of Information Technology, King Mongkut's University of Technology North Bangkok, Bangkok 10800, Thailand (e-mail: maoquee@hotmail.com).

II. THEORY AND RELATED WORKS

A. Basic Principle about Image Processing

An image processing is a transformation of a data in an image from analog signal to digital signal. The purpose is for processing by a computer in digital form as well as reducing some problems in an image such as a noise reduction.

In transforming to digital signal, a system will calculate a received image by the methods of Sampling and Quantization and send an image data in digital form. After that, a computer will restore that data in a memory unit of an array form. The value in each box of array represents an attribute of the image in a form of dot or pixel. Also, a position of each box in an array refers to a position of a pixel in the image.

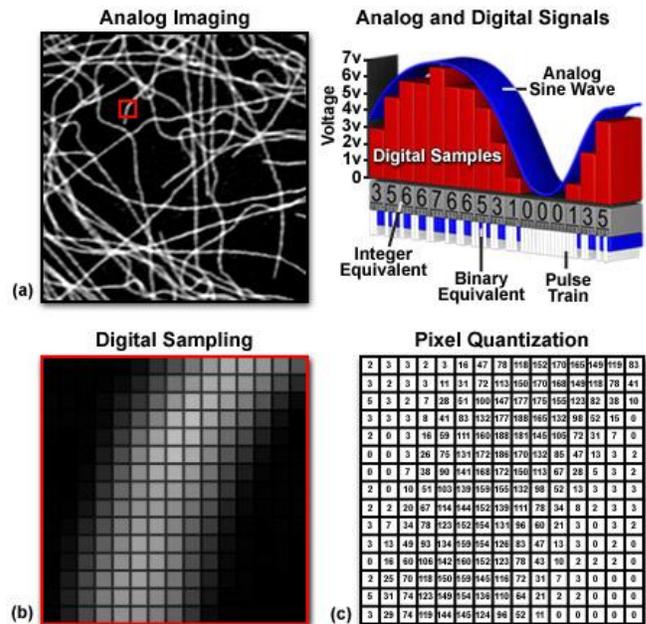


Fig. 1 Image Transformation from Analog to Digital

A digital image from transformation will restore in a matrix form. As well, the image restoration will be different by a color system of that image. There are four kinds of image categorized by that restoration.

1. Binary Image or Black & White Image: This kind of image uses a memory only 1 bit per 1 pixel. There are only two color values as zero or black and one or white.

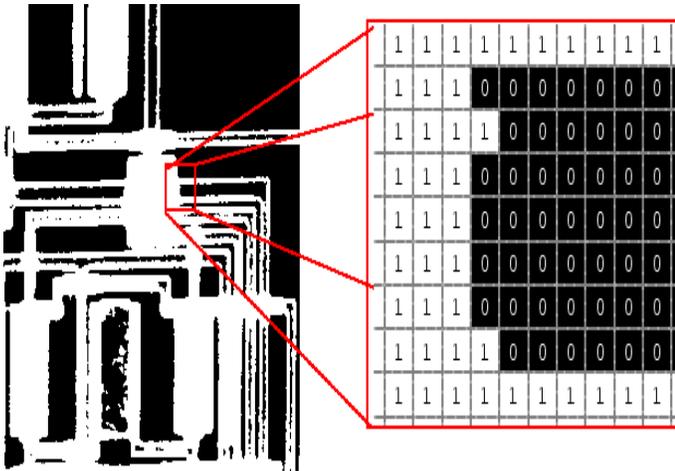


Fig. 2 Example of Binary Image

2. Grayscale Image: This kind of image is restored in a form of 2-dimensions array in some ranges. Also, the color level will depend on a bit size for restoration.

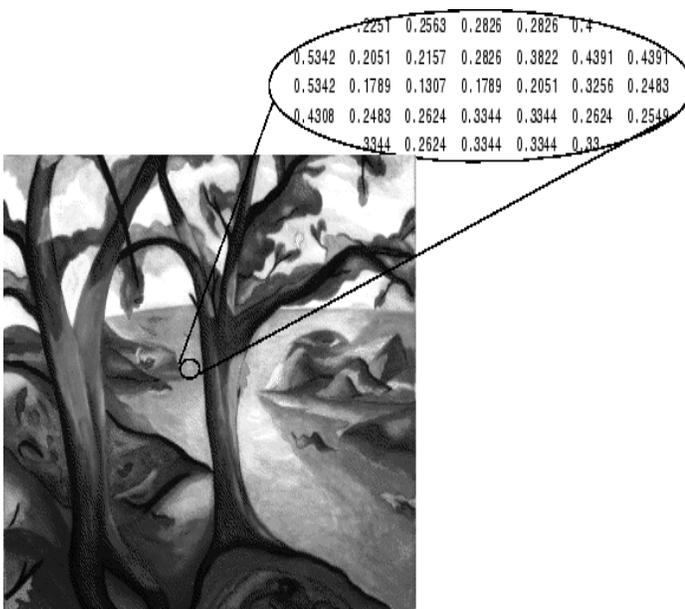


Fig. 3 Example of Grayscale Image

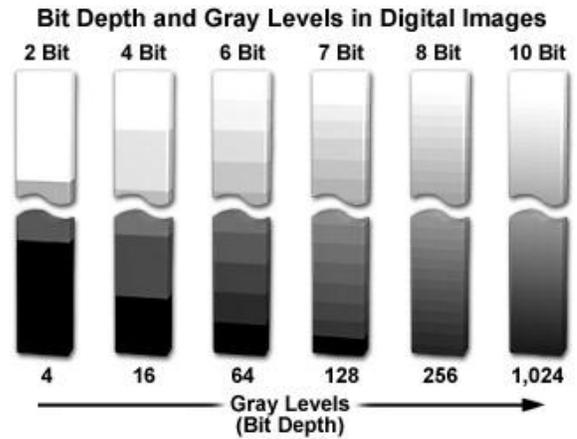


Fig. 4 Grayscale Level in Digital Image

3. RGB Image or Truicolor Image: This kind of image is restored in a form of 3-dimensions array as $m \times n \times 3$. Accordingly, m is a length, n is a width. And the last dimension represents Red Color, Green Color, and Blue Color in separated.

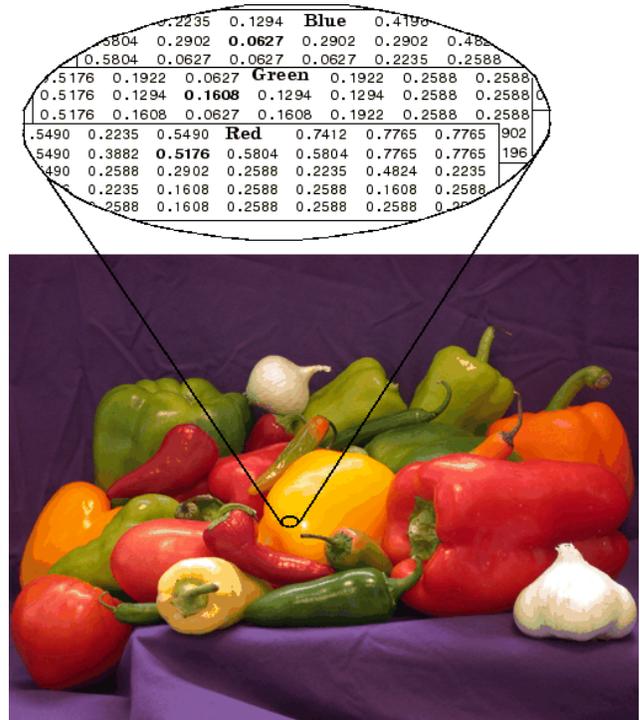


Fig. 5 Example of RGB Image

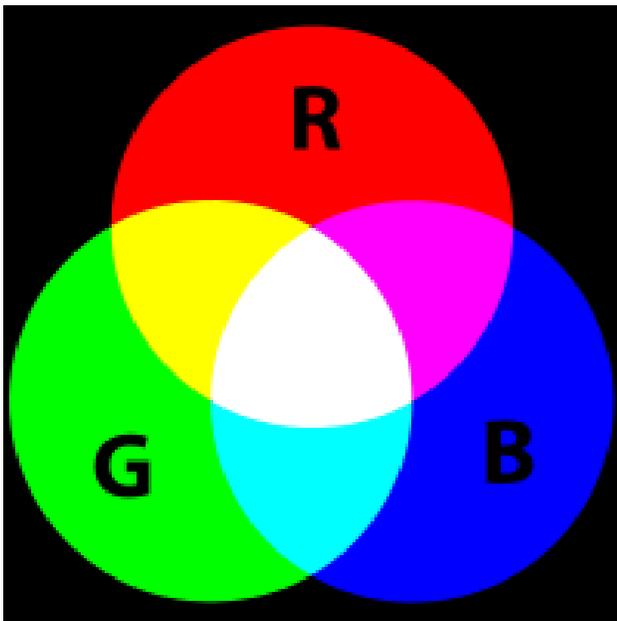


Fig. 6 RGB Color Wheel

4. Indexed Image: This kind of image is restored in an indexed form. As well, in each box off array will restore a color position in that indexed.

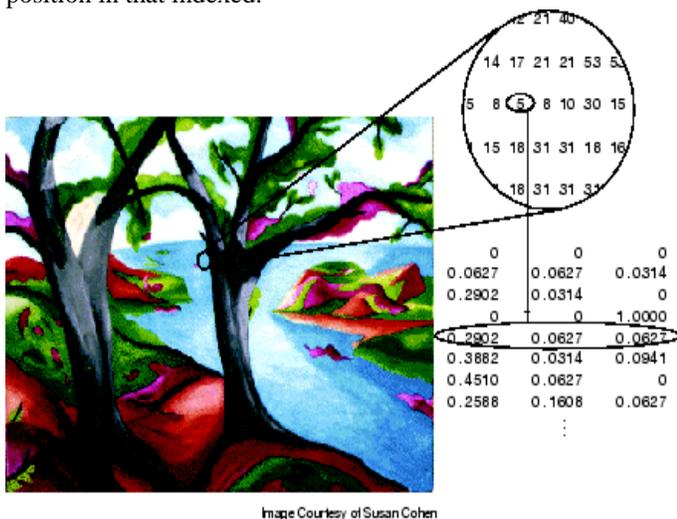


Fig. 7 Example of Indexed Image

B. Database System

- The data arrangement in a database system is better than storage in a data file. As a reason, a database system has more important ideas than a data file. There are seven points of view for that reason.
- The database system decreases a data redundancy problem. Same data set in a form of data file may be occurring in much storage because of many users to use that same data set. After using a database system, there will be less data redundancy. Many users who use the same data set will take from the same storage of

database instead of getting from their own data files having the same data. Then, it is more economic to restore data also less repetition of that data.

- The database system preserves data accuracy because there is only on database in the system. In case of having same data set in many storages of a database, a data inside must be the same. If there are any corrections in the data, the same data set in each storage must be corrected in the same way too. The operation will be done automatically by a database management system.
- The database system protects and secures a data fluently. This protection and security will allow only users who refer to that data to access for using a database. It is called privacy as well as a security of data. Then, the users who have privacies will define their privacies before. When using that data, the users will see the data that is stored in a database in different forms designed by the users.
- The database system can be a data sharing. Since, a database system is a place to store all the data. So, each user can access to all data. Otherwise, the users can be used only their own data.
- The database system has a data independency. When the users would like to change their data or adapt for their programming, they can make a new set of data to use but not effect to a database system. As a reason, an adapted data will not effect to a main structure of data storage. It means that a usage of database system will have independence between data storage and adaptation.
- The database system can expand easily. Furthermore, a user can add more data very simply because of data independency. So, it will not affect to an original data.
- The database system can implement data retrieval in timeless and standardized. If a data implementation does not use a database, each programmer will have their own data files also their own methods of data retrieval. Then, it will be not so efficient and standardized in case of data error by their own programs. In contrast, data retrieval in a database will have only one set of program also one administrator for the system. In consequence, it is firmly more effective and more standard too.

C. System Development Life Cycle

A system development life cycle (SDLC) is a process for programming implementation to use in a systematic way. There are seven steps for the development.

- Step 1 – Problem Definition
- Step 2 – Analysis
- Step 3 – Design
- Step 4 – Development
- Step 5 – Testing
- Step 6 – Installation
- Step 7 – Maintenance

III. REPRESENTATION METHOD

A user restores the images in the specific file. Next, a programmer categorizes these images and organizes to each file. After that, a programmer creates a file torrent to another user for transferring the images by a bit torrent programming.

The photo classification implements as a user interface with a user, categorizes the images by the regulations of a user, finds an image in the specific file, calculates the attributes of an image to a database, receives an appended attribute with a data tag, organizes the images by creating separated files and making a copy from each image, and transfers an image data or a file for making a torrent file with a storage for a file torrent to a part of file torrent creation.

The photos to execute in the program are needed to keep in the specific file or separated file of the file. Also, that specific file can be changed by a function of image categorization.

A database stores an image data that is received by the system or added by the user for an image categorization function to implement.

A torrent file maker creates a file torrent also input a folder of images for transfer with a URL of a tracker server. Furthermore, tracker is a server that helps to communicate in the same level (peer-to-peer). It uses a bit torrent protocol client to communicate with a tracker for beginning to put into a client. In addition, it still continues to communicate with a tracker bit by bit for the next peer-to-peer communication. However, after receiving data in the same level, a peer-to-peer communication can implement without a tracker.

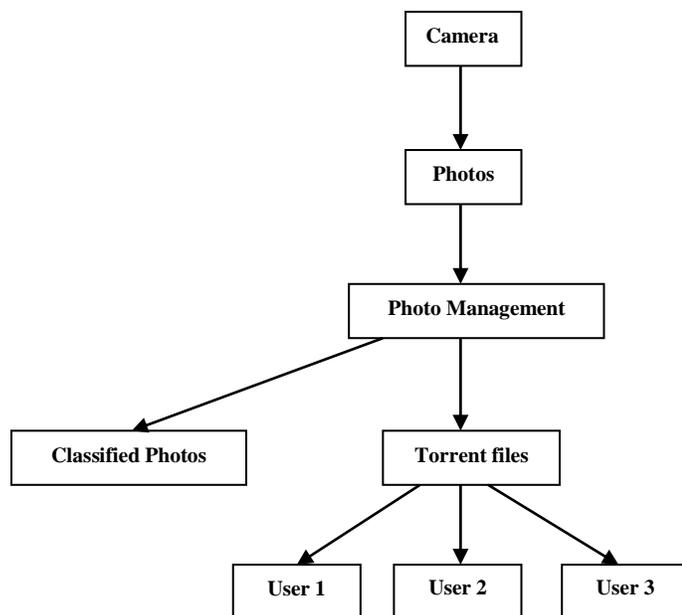


Fig. 8 Overview of Programming

IV. EXPERIMENT RESULT

In a system testing stage, a user will put an image into a specific storage file and run the program after that. While running the program, there are some function testing about an

image categorization by the image attributes, an image grouping in the same shade of color, a filter usage, a torrent file creation, an image interface representation, an implementation of the image attributes (view/add/correct/delete), an image saving, and an image finding in a file or separated file.

The system testing will prove an implementation in each function that is correct or not. Also, a photograph is used as an image to consider. As a result, an image categorization by the image attributes can implement in accurate. A number of face attribute still has some mistakes. As well, a color tone attribute is not efficient enough because almost images are in a black shade.

V. CONCLUSION

From a research and development in a system of an image database management by using an image processing, the system categorizes the images by their attributes. These attributes are the first letter of an image name, a date of photograph, a file size, a file type, an image size, a camera brand, a camera type, a file name that is used as a topic, and the attributes as results from an image processing. In addition, there are other attributes that are appended by the user. These attributes are a person in an image, an event in the image, a keyword, a remark, and a tag of image.

Moreover, a system also helps to manage for an image transferring. It can create a file torrent for file transfer by a bit torrent programming. And in the future, a system could be expanding by using a thread principle to prove the new images. Then, a program will implement faster and use the functions to improve a quality of the system.

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REFERENCES

- [1] P. Therawat and K. Ekaphan, "System Analysis and Design". Bangkok: Success Media, 2009, 258 pages.
- [2] C. Praphaporn, "Basic C Programming Manual". Nonthaburi: Info Press, 2002, 324 pages.
- [3] K. Ratchanee, "Modern Computer System Analysis and Design (new edition)". Bangkok: KarnSuksah, 2002, 312 pages.
- [4] S. Watcharaporn, "Basic Computer System and Modern Programming Technique". Bangkok: Thaicharearn Karpimp, 2003, 413 pages.
- [5] S. Watcharaporn, "Basic Computer System and Programming Technique". Bangkok: Chulalongkorn University Publisher, 2010, 343 pages.
- [6] C. Viroj and Y. Suphansah, "Basic Knowledge about Computer and Information Technology". Bangkok: Provision, 2009, 288 pages.
- [7] J. Sakaowrat, "Information System Analysis and Design (2nd edition)". Bangkok: Kasaeartsart University Publisher, 2008, 267 pages.
- [8] C. Somphoch, "Basic Computer Programming in C". Bangkok: SE-ED Ucation, 2010, 264 pages.
- [9] S. Asadaphorn, "Object Oriented Analysis and Design". Bangkok: KTP Comp and Consult, 2011, 312 pages.
- [10] A. Opars, "System Analysis and Design (new edition)". Bangkok: SE-ED Ucation, 2005, 413 pages.