

7th SEATUC
SYMPOSIUM
4-6 MARCH 2013
INSTITUT TEKNOLOGI BANDUNG
INDONESIA



LIST OF SPEAKERS

7th SEATUC SYMPOSIUM 2013

Institut Teknologi Bandung, Indonesia, 5-6 March 2013

LIST OF PRESENTERS

OS1: ENERGY, ENVIRONMENT & EARTH SYSTEM SCIENCE		
1	OS1-3	Rikiya Inoguchi Shibaura Institute of Technology
2	OS1-4	Kazuhisa Ito Shibaura Institute of Technology
3	OS1-5	Bui Xuan Thanh Ho Chi Minh City University of Technology
4	OS1-6	-
5	OS1-7	-
6	OS1-8	M. Nor Said Universiti Teknologi Malaysia
7	OS1-9	Nela Anjani L Institut Teknologi Bandung
8	OS1-10	Sarah Ayunita Institut Teknologi Bandung
9	OS1-11	Eidelweijns A. Putri Institut Teknologi Bandung
10	OS1-14	Farid Nasir Ani Universiti Teknologi Malaysia
11	OS1-15	Shahpur Khangholi Universiti Teknologi Malaysia
12	OS1-16	Tan Sie Ting Universiti Teknologi Malaysia
13	OS1-17	Dwina Roosmini Institut Teknologi Bandung
14	OS1-18	Pham Minh Duyen Ho Chi Minh City University of Technology
15	OS1-19	Wirianto, Eko Institut Teknologi Bandung

OS2: INFORMATION & COMMUNICATION TECHNOLOGY		
1	OS2-2	Hoang Van Hiep Shibaura Institute of Technology
2	OS2-3	Nur Syafikah b. Samsudin Shibaura Institute of Technology
3	OS2-4	Yusuke Ohta Shibaura Institute of Technology
4	OS2-5	Toshiki Taniguchi Shibaura Institute of Technology
5	OS2-6	Shuhei Murayama Shibaura Institute of Technology
6	OS2-7	Hiroyuki Ebihara Shibaura Institute of Technology
7	OS2-8	Yoshihiro Niitsu Shibaura Institute of Technology
8	OS2-9	Nguyen Hoang Hai Hanoi University of Science and Technology
9	OS2-10	Quoc-Hung Nguyen Hanoi University of Science and Technology
10	OS2-11	Phan T.H. Nguyen Ho Chi Minh City University of Technology
11	OS2-12	Nguyen Dai Hai Hanoi University of Science and Technology
12	OS2-13	Hoang Viet Tran Hanoi University of Science and Technology

OBJECT DETECTION AND CLASSIFICATION FOR ADVERTISING SERVICE BASED ON IMAGE CONTENT

Quoc- Hung Nguyen¹, Thi Thanh - Hai Tran¹, Thi-Lan Le¹, Quang - Hoan Nguyen²
(¹) International Research Institute MICA, HUST - CNRS/UMI 2954 - Grenoble
INP Hanoi University of Science and Technology
(²) Hưng Yên University of Technology and Education

ABSTRACT

Recently, Google uses its Internet search technology to serve advertisements based on website content. However, the website content is normally textual content. Since a picture (image) is worth a thousand of words. In our work, we want to exploit image content for advertising service and propose a new advertising service based on image content. The content of image will be automatically analyzed using computer vision techniques: objects in images are firstly detected and then classified in predefined classes following a famous framework proposed by Viola and Jones [1] using Haar-like feature and Cascaded Adaboost Classifier. Experiments show that our system can run in real-time and obtains a very promising performance (82.2% in term of classification precision on the challenge database).

OBJECT DETECTION AND CLASSIFICATION FOR ADVERTISING SERVICE BASED ON IMAGE CONTENT

Quoc- Hung Nguyen¹, Thi Thanh - Hai Tran¹, Thi-Lan Le¹, Quang - Hoan Nguyen²

(¹) International Research Institute MICA, HUST - CNRS/UMI 2954 - Grenoble

INP Hanoi University of Science and Technology

(²) Hưng Yên University of Technology and Education

ABSTRACT

Recently, Google uses its Internet search technology to serve advertisements based on website content. However, the website content is normally textual content. Since a picture (image) is worth a thousand of words. In our work, we want to exploit image content for advertising service and propose a new advertising service based on image content. The content of image will be automatically analyzed using computer vision techniques: objects in images are firstly detected and then classified in predefined classes following a famous framework proposed by Viola and Jones [1] using Haar-like feature and Cascaded Adaboost Classifier. Experiments show that our system can run in real-time and obtains a very promising performance (82.2% in term of classification precision on the challenge database).

1. INTRODUCTION

Many years ago, Google has developed text based advertising services. AdWord is a great success of Google and is one of its main sources of revenue. Naturally Ad Word tries to insert the string into the position where it is considered to be appropriate in the Web page. The website content is normally textual content. The clients who want to make the ads in the Internet must pay for Google and Google will share profits for the linked Web pages.

Nowadays, data is not simply textual but it is multimedia data with very huge quantity and variant natures (e.g. text, graphic, audio and video). With similar thoughts of Google AdWord, we believe that making image content based ads is even more interesting idea than text based ads. In fact, as a picture (image) is worth a thousand of words, the users often take attention first on images before reading or even ignoring text content from a webpage.

In this paper, we propose to develop an ads service based on image content. The biggest difficulty of the system is to automatically analyze and understand image content in order to generate appropriate ads.

Analyzing an image and understanding its content is a challenge work and still remains a very active topic in the computer vision field. The difficulty is due to the very big number of objects and scenes existing in the world. In addition, with each type of objects, there are a lot of variances taken at different conditions of lighting, viewpoint, etc. that make the performance of the detection and recognition algorithms poor. Beside, one of important requirement of an ads system in the Internet is that it needs to work in real-time.

In our work, we propose to analyze images by detecting and recognizing objects inside and generating ads in function of recognized objects. Our main contributions of this paper are:

- An interesting idea for making ads in the Internet based on image content.
- A solution for image analyzing using Haarlike feature for object representation and Cascaded Adaboost Classifier for object recognition
- A prototype demonstrating the feasibility of the system in the real situation.

The paper is organized as follows. Section 2 gives an overview of the system for ads services based on image content and details the module for object detection and classification. Section 3 presents experimental results and application. Section 4 concludes and gives some ideas for future works.

2. OVERVIEW OF DETECTION AND CLASSIFICATION FOR ADVERTISING SERVICE BASED ON IMAGE CONTENT

2.1. Overview

The system for advertising service based on image content that we propose in this paper is illustrated in the Figure 1.

gives the precision for each object class and average precision.

Table 1 : Experimental results

N0	Object Classes	Precision P = TP/(TP+FP)
1	Planes	0.97
2	Watches	0.98
3	Shoes	0.34
4	Flowers	0.90
5	Glasses	0.91
6	Laptops	0.62
7	Humans	0.91
8	Cars	1
9	Ships	1
10	Motorcycles	0.56
	Average	0.82

This algorithm runs at 15fps on a PC core i5 4G RAM. Figure 7 shows some results of object classification. We see that our system can give more than one response for an image (for example image of watch and flower). In most cases, object are correctly detected and classified (watch, flower, glasses) but there are also some false alarms (for example in image of water lily flower, we detect also human and or motorcycles). The reason for false alarms is at a certain scale, these image regions are similar to positive samples of some object classes.

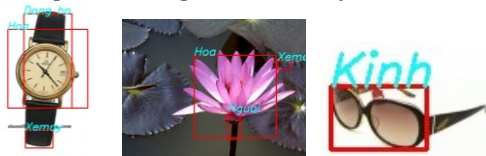


Figure 7 : Several recognition results

3.4 Ads service based on image content

We have integrated our object recognition engine into the whole system (using web service technique as presented in section 2.3) and build a demo for ads service based on image content. This demo is put in the webpage quangcaoanh.com (see Figure 8).

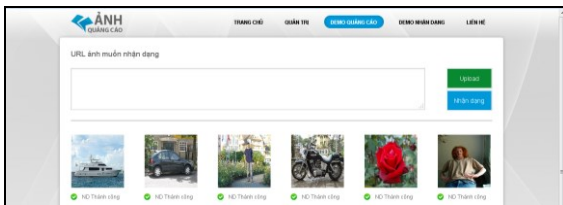


Figure 8 : Images in quangcaoanh.com website

From this webpage, the user can click to see an image of interest. The URL of this image will be sent to the object recognition module and the ad string will be displayed. The Figure 9 shows an example of object recognition result and ads string generated. This object class is recognized and the corresponding ads string is inserted as a part of image.



Figure 9 : Object recognized in image and the ads string is generated at the end of images

4. CONCLUSIONS

In this paper, we have presented our framework for ads service based on image content. The content of image is analyzed by using object recognition method based on Haar descriptor and Adaboost classifier. The experimental results have shown the feasibility of this framework. However, current framework is able to recognize only 10 object class. In the future, we will extend this work to be able to detect more object classes.

ACKNOWLEDGMENT

This work is supported by the project “*Visually impaired people assistance using multimodal technologies*”, funded by the VLIR’s Own Initiative’s Programme, under the grant reference **VLIR-UOS ZEIN2012RIP19**

REFERENCES

- [1] Viola, P. and M.J. Jones, *Robust Real-Time Face Detection*. International Journal of Computer Vision, 2004: p. 137–154
- [2] Everingham, M. and A. Zisserman, *The Pascal Visual Object Classes Challenge 2006 (VOC2006) Results*. 2006.
- [3] Rainer Lienhart and Jochen Maydt. *An Extended Set of Haar-like Features for Rapid Object Detection*. Submitted to ICIP2002.
- [4] Everingham, M., L. V. Gool, et al. (2009). “*The PASCAL Visual Object Classes (VOC) Challenge*.” International Journal of Computer Vision



Quoc-Hung Nguyen received the Master degrees in computer science from Thai Nguyen University of information and communication technology in 2010. He is currently a PhD student of Hanoi University of Science and Technology. His research interests includes methods for acquiring, processing, analyzing in order to understand images. E-mail: Quoc-Hung.Nguyen@mica.edu.vn



Thi Thanh-Hai Tran graduated in Information Technology from Hanoi University of Science and Technology. She is currently lecturer/researcher at Computer Vision group, International centre MICA, Hanoi University of Science and Technology. Her main research interests are visual object recognition, video understanding, and human-robot interaction. E-mail: Thanh-Hai.Tran@mica.edu.vn



Thi-Lan Le graduated in Information Technology from Hanoi University of Science and Technology. She is currently lecturer/researcher at Computer Vision group, International centre MICA, Hanoi University of Science and Technology. Her main research interests are in content-based indexing and retrieval, video understanding, human-robot interaction. E-mail: Thi-Lan.Le@mica.edu.vn



Quang-Hoan Nguyen received the University degree the former Soviet Union (1973) Former head of the IT department and TT Internet and Library Academy of Telecommunications Technology (1998-2010). Chairman of Planning and Investment and Deputy Tr. IT department DHSPKT Hung Yen from 2010-Present. His research interests includes methods for Artificial intelligence (especially artificial neural networks), Computer Hardware, Modern control and system stability. E-mail: quanghoanptit@yahoo.com.vn

ISSN 2186-7631



South East Asian Technical University Consortium
(SEATUC)
Shibaura Institute of Technology
3-7-5 Toyosu, Koto-ku, Tokyo 135-8548 Japan