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自然語言與語音處理研討會

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中華民國計算語言學學會

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中央研究院資訊科學研究所
中華電信研究所
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序 言

本年度的ROCLING共收到投稿數為 30 篇，每篇論文都至少經 2 位該領域的專家學者審查，最後議程委員會共接受 12 篇oral presentation論文和 13 篇poster presentation論文，包含了語音辨認與合成、機器翻譯、語音學與音韻學之分析及應用、自然語言處理之應用、工具與資源、及語音識別和理解等領域，此審查結果維持了ROCLING歷屆以來一貫的論文品質，並兼顧多層面研究人員的參與，在此非常感謝論文審查委員的把關。

今年的議程安排，除了最新的學術論文的發表外，也邀請三位語音及自然語言處理領域專家給予專題演講，包括新加坡Institute for Infoc omm Research李海洲博士、Google, Taiwan 總經理簡立峰博士與中國東北大學計算機軟件研究所朱靖波博士。此外，王駿發教授也熱心幫忙組織一個Panel Discussion Session ，關心語音及自然語言科技的未來應用與發展。非常感謝他們的幫忙。

我們同時要感謝國科會工程科技推展中心、中央研究院資訊科學研究所、中華電信研究所、資訊工業策進會、工研院資通所、無敵科技、賽微科技與致遠科技的協辦與贊助。另外，也謝謝台北科技大學電子系語音訊號處理實驗室，多媒體訊號處理實驗室，與元智大學資管系自然語言處理與文字探勘實驗室的同學們在各項事務上的協助。

最後，感激各位與會先進的積極參與和支持，使本次研討會得以順利舉行。

大會主席 廖元甫
議程主席 蔡偉和、禹良治 謹識
2011 年 9 月 8 日

Organization

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Program Overview

September 8, 2011 (Thursday) 9:10 ~ 20:00		
09:10-10:00	Registration	
10:00:10:10	Opening Ceremony	Prof. Leehter Yao Chair: Prof. Yuan-Fu Liao
10:10-11:10	Invited Talk: Machine Transliteration – Translating the Untranslatables	Speaker: Prof. Haizhou Li, Institute for Infocomm Research, Singapore Chair: Prof. Hsiao-Chun Wang
11:10-11:40	Coffee Break	
11:40-12:40	Oral Session 1: Speech Recognition and Synthesis	Chair: Prof. Chia-Ping Chen
12:40-13:30	Lunch	
13:30-14:30	ACLCLP meeting for future directions/Poster Session 1:NSC Project reports	
14:30-15:30	Invited Talk: Opportunities and Technology Challenges for Search Engines in the mobile internet	Speaker: Dr Lee-Feng Chien, General Manager, Google Chair: Prof. Hsin-Hsi Chen
15:30-16:00	Coffee Break/IJCLCLP editors meeting(資工系系辦公室會議室科技大樓 3 樓)	
16:00-17:00	Panel Discussion: Frontier of speech science and technology for real life	Panelists: 吳宗憲教授，簡立峰博士 郭志忠博士，沈家麟博士 Chair: Prof. Jhing-Fa Wang
17:00~18:00	Walking to banguet place (美麗信飯店)	
18:00-20:00	Banquet (美麗信飯店 buffet)	

September 9, 2011 (Friday) 9:30 ~ 16:20		
9:30-10:30	Invited Talk: Some Issues on Statistical Machine Translation Using Source and Target (or) Syntax	Speaker: Prof. Jingbo Zhu, Northeastern University, ShenYang, China Chair: Prof. Liang-Chih Yu
10:30-11:00	Coffee Break	
11:00-12:00	Oral Session 2: Machine Translation and Word Segmentation	Chair: Prof. Yuen-Hsien Tseng
12:00-13:00	Lunch	
13:00-14:30	Poster Session 2: Poster Papers	
14:30-15:00	Coffee Break	
15:00-16:00	Oral Session 3: Lexicon, Resources and NLP applications	Chair: Prof. June-Jei Kuo
16:00-16:20	Closing Ceremony and Best Paper Award	

Poster Session 2: Poster Papers
Time: Friday, September 9, 13:00-14:30

1. Probabilistic Modulation Spectrum Factorization for Robust Speech Recognition
   Wen-Yi Chu, Yu-Chen Kao, Berlin Chen and Jeih-Weih Hung
2. 應用語音辨識技術於鳥鳴聲辨識
   Wei-En Liao, Hsin-Chieh Lee and Wei-Ho Tsai
3. 使用分段式 GMM 及自動 GMM 挑選之語音轉換方法
   Hung-Yan Gu and Sung-Fung Tsai
4. 應用詞彙、語法與語料規則於中文手寫句辨識之校正模組
   Tao-Hsing Chang, Chia-Bin Chou, Shou-Yen Su and Chien-Liang Liu
5. Using Kohonen Maps of Chinese Morphological Families to Visualize the Interplay of Morphology and Semantics in Chinese
   Bruno Galmar
6. The Prior Knowledge Effect on the Processing of Vague Discourse in Mandarin Chinese
   Shu-Ping Gong and Kathleen Ahrens
7. On the Learning of Chinese Aspect Markers through Multimedia Program
   Tzu-Hui Hsieh, Yi-Chun Kuo, Shu-Chun Chung and Jiun-Shiung Wu
8. 中文文字蘊涵系統之特徵分析
   Wan-Chi Huang, Shih-Hung Wu, Liang-Pu Chen and Tsun Ku
9. 結合語言模型與網路知識源於列印前檢查
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10. Diagnosing Discoursal Organization in Learner Writing via Conjunctive Adverbials
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11. Compositional Operations of Mandarin Chinese Verb “da3”: A Generative Lexicon Approach
    Li-Chuan Ku
12. Typological Universals and Intrinsic Universals on the L2 Acquisition of Consonant Clusters
    Chin-Chin Tseng
13. 多語語碼轉換之未知詞擷取
    Yi-Lun Wu, Chaio-Wen Hsieh, Wei-Hsuan Lin, Chun-Yi Liu and Liang-Chih Yu

Poster Session 2: Poster Papers
Time: Friday, September 9, 13:00-14:30

1. **Probabilistic Modulation Spectrum Factorization for Robust Speech Recognition**

   Wen-Yi Chu, Yu-Chen Kao, Berlin Chen and Jeih-Weih Hung

   在自動語音辨識技術的發展上，語音強健性一直都是一門重要的研究議題。在眾多的強健性技術中，針對語音特徵參數進行強化與補償為其中之一大主要派別。其中，近年來已有為數不少的新方法，藉由更新語音特徵時間序列及其調變頻譜來提升語音特徵的強健性。本論文即是從語音特徵時間序列的調變頻譜域著手，採用機率式潛藏語意分析之概念，對調變頻譜施以機率式分解並進行成分分析、進而擷取出較重要的成分以求得更具強健性的語音特徵。本方法之所有實驗皆於國際通用的 Aurora-2 連續數字資料庫進行，相較於使用梅爾倒頻譜特徵之基礎實驗，本方法能達到 62.84%的相對錯誤降低率。此外，我們也嘗試將所提方法跟一些知名的特徵強健技術做結合；實驗顯示，相對於單一方法而言，此結合法可進一步提升辨識精確率，代表所提之新方法與許多特徵強健技術有良好的加成性。

2. **應用語音辨識技術於鳥鳴聲辨識**

   Wei-En Liao, Wei-Cheng Lin and Wei-Ho Tsai

   野外賞鳥已成為大眾休閒的新趨勢，但一般民眾常只能看見鳥或聽見鳥鳴聲，卻不知其種類為何。為了協助大眾識別鳥類，本論文探討鳥鳴聲自動辨識問題，透過語音辨識相關技術，設計鳥鳴聲辨識系統。我們分別從音色及音高兩個層面進行分析，利用梅爾刻度倒頻譜係數表示鳥鳴聲的音色特徵，並搭配高斯混合模型進行特徵的參數模型化與比對；而音高層面分析則旨圖求取鳥鳴聲所對應的音符，再利用雙連文模型捕捉音符的動態變化資訊，並據以比對未知鳥鳴聲。我們挑選出大台北地區常見的十種鳥類，並從商業 CD 及鳥類相關網站上收集鳥鳴聲資料，使系統訓練和測詴音檔分別屬不同的來源。實驗結果發現，採用音色、音高、與結合兩者的系統辨識正確率分別為 71.1%、72.1%、與 75.04%。

3. **使用分段式 GMM 及自動 GMM 挑選之語音轉換方法**

   Hung-Yan Gu and Sung-Fung Tsai

   本論文提出分段式(segmental)高斯混合模型(Gaussian mixture model, GMM)的觀念，用以改進語音轉換的效能，而為了應用該觀念於線上(on-line)進行的語音轉換處理，我們也發展了一個基於動態規劃(dynamic programming, DP)之自動GMM 挑選的演算法。此外， 為了使用單一高斯混合來對映(mapping)離散倒頻譜係數(discrete cepstrum coefficients, DCC)係數，我們也設計了一種

高斯混合選取之演算法。關於分段式GMM觀念的評估，在此我們建造了三個採取不同功能組合之語音轉換系統，然後使用三個系統所轉換出的語音去作聽測實驗，實驗的結果顯示，分段式GMM 之觀念確實可用以改進音色相似度(timbre similarity)、及語音品質(voice quality)兩方面的效能。

4. 應用詞彙、語法與語料規則於中文手寫句辨識之校正模組

Tao-Hsing Chang, Chia-Bin Chou, Shou-Yen Su and Chien-Liang Liu

離線手寫中文文字辨識有使用者書寫字跡的變異和文字書寫字體不明顯等問題，造成辨識系統難以辨識其特徵而影響正確性。本論文的研究目的是利用特定領域主題語料中呈現的詞彙、語法及語料規則提高離線手寫中文文字辨識率。本文提出了一個三階段方法來達成目標。首先、利用詞彙優先概念，從候選字中挑選語料庫中的詞彙為辨識結果。第二、查看候選字中是否出現特定的文法組合，並以該組合的候選文字為辨識結果。第三、將剩下相鄰兩個未決定的候選字集組成字串，並和事先由語料庫所產生收錄的雙字組比對，若候選字中存在雙字組則以做為辨識結果。實驗結果顯示本文所提方法可有效的提高辨識率，由單一字頻決定法的 0.45 提升至 0.85。

5. Using Kohonen Maps of Chinese Morphological Families to Visualize the Interplay of Morphology and Semantics in Chinese

Bruno Galmar

A morphological family in Chinese is the set of compound words embedding a common morpheme. Self-organizing maps (SOM) of Chinese morphological families are built. Computation of the unified-distance matrices for the SOMs allows us to perform a semantic clustering of the members of the morphological families. Such a semantic clustering shed light on the interplay between morphology and semantics in Chinese. Then, we studied how the word lists used in a lexical decision task (LDT) [1] are mapped onto the clusters of the SOMs. We showed that such a mapping is helpful to predict whether in a LDT repetitive processing of members of a morphological family would elicit a satiation - habituation - of both morphological and semantic units of the shared morpheme. In their LDT experiment, [1] found evidence for morphological satiation but not for semantic satiation. Conclusions drawn from our computational experimentations and calculations are concordant with [1] behavioral experimental results. We finally showed that our work could be helpful to linguists to prepare adequate word lists for the behavioral study of Chinese morphological families.

6. The Prior Knowledge Effect on the Processing of Vague Discourse in Mandarin Chinese

Shu-Ping Gong and Kathleen Ahrens

This study investigates whether prior knowledge affects the processing of vague discourse in Mandarin Chinese. Vague discourse refers to the texts using vague references and neutral descriptors (e.g. 東西 *dōngxī* "thing", 事情 *shìqíng* "item", and 物件 *wùjiàn* "object"), rather than naming the referred to items at the basic level. Three conditions of discourse were tested: one was vague texts preceded by congruent titles, another was texts preceded by incongruent titles and the third was texts preceded without titles. An on-line self-paced reading task was conducted. Participants were instructed to read the vague texts and rate the level of comprehensibility. The rating scores for the level of comprehensibility and the reading time of the whole texts were measured. The experimental results show that people read texts preceded by congruent titles significantly faster than those preceded by incongruent and no titles. However, the reading time of texts preceded by incongruent titles was also significantly shorter than those preceded without titles. We conclude that when people simply read vague idea at a discourse level, the appropriate information is useful for text integration. Inappropriate information, however, can be paid little attention during the text processing and do not increase too much processing load.

7. On the Learning of Chinese Aspect Markers through Multimedia Program

Tzu-Hui Hsieh, Yi-Chun Kuo, Shu-Chun Chung and Jiun-Shiung Wu

The purpose of this study is to develop a multimedia program and examine its effects on learning Chinese aspect markers le, zai, and zhe. The materials in the program were based on linguistic studies of le, zai, and zhe (Li & Thompson, 2005; Lin, 2002; Liu, 1997; Pan, 1996; Smith, 1997; Wu & Kuo, 2003; Wu, 2003, 2005, 2007; Xiao & McEnery, 2004; Yeh, 1993). We predicted that this multimedia program with animation presenting the target sentences can significantly improve Chinese as a Foreign Language (for short, CFL) learners' acquisition of these aspect markers. The participants were totally 35 CFL beginners. Nineteen of them in the experimental group received the interactive multimedia program and sixteen of them in the control group took the computer-based grammar program. The teaching experiment is a section of twenty minutes per day for 3 days. We conduct a pretest, immediate posttest, and one-month delayed posttest, and the performances between the two groups were compared using the independent T-test. Findings indicated that the experimental group showed a significant advantage over the control group both in the immediate posttest and the delayed posttest.

8. 中文文字蘊涵系統之特徵分析

Wan-Chi Huang, Shih-Hung Wu, Liang-Pu Chen and Tsun Ku

文字蘊涵(Textual Entailment)的定義是判斷兩個句子能否互相推論。推論可分為五種類型：正向、反向、雙向、矛盾、獨立。這五種類型分別代表著不同的蘊涵關係。文字蘊涵辨識(Textual Entailment Recognition)是相當困難的自然語言處理問題。由於中文文字蘊涵的文獻較缺乏，本篇論文將中文文字蘊涵辨識提出了一個流程，提供給之後想要做這個題目的人的作為一個參考。中文的文字處理相較於英文的文字處理有許多不同的難處，在本篇論文中，我們將介紹處理中文的文字處理遇到的難處以及處理的流程。我們的系統使用支援向量機(Supportvector machine, SVM)作為區分類型的演算法。使用的特徵分為兩個方向：1.文字特徵2.語意特徵。

9. 結合語言模型與網路知識源於列印前檢查

Yu-Jui Huang, Ming-Chin Yen, Guan-Huei Wu, Yao-Yi Wang and Jui-Feng Yeh

人們印製文件時常會疏忽了錯字而在印製完畢後才發現內容有拼字錯誤，在這種情況下往往需要重新印製一份，但這不僅浪費紙張、墨水、印表機的電力等等資源也需花費額外的時間導致降低了工作效率。假如我們能在列印前先發現文件內容的拼字錯誤並及時阻止印表機列印，則可解決我們前面所提及的問題產生。因此，本研究使用語言模型來進行比對之外還另外增加了網路搜尋的新功能搭配一起進行檢查，以便改善拼字錯誤造成列印資源的浪費。

10. Diagnosing Discoursal Organization in Learner Writing via Conjunctive Adverbials

Tung-Yu Kao and Li-Mei Chen

The present study aim s to investigate genre influence on the use and m isuse of conjunctive adverbials (hereafter CAs) by compiling a learner corpus annotated with discoursal information on CAs. To do so, an online interface is constructed to collect and annotate data, and an annotat ing system for identifying the use and misuse of CAs is developed. The results show that genre difference has no im pact on the use and m isuse of CAs, but that there does exist a norm distribution of textual relations perform ed by CAs, indicating a pref erence preset in hum an cognition. Statistic analysis also show s that the proposed m isuse patterns do significantly differ from one another in terms of appropriateness and necessity, ratifying the need to differentiate these misuse patterns. The results in the present study have three possible applications. Fi rst, the annotate data can serve as training data for developing technology that automatically diagnoses learner writing on the discoursal level. S econd, the founding that textual relations performed by CAs form a distribution norm can be used as a princip le to evaluate discoursal organization in learner writing. Lastly, the misuse framework not only identifies the location of misuse of CAs but also indicates direction for correction.

11. Compositional Operations of Mandarin Chinese Verb "da3": A Generative Lexicon Approach

Li-Chuan Ku

The compositional operations of Mandarin Chinese predicates are very complex. In a highly analytic language such as Mandarin Chinese, a verb can often choose from a wide range of nouns/nominal compounds as its arguments. This paper hopes to capture a different picture of such an operation through investigating authentic corpus data of Chinese verb "打" (da3, *to hit*). In this study, we'd like to show that the qualia structure and type system proposed by Pustejovsky's (1995) the *Generative Lexicon* can affect the interpretation of verb-argument composition of "da3", and to examine whether the compositional operations of "da3" varies under different senses with its own type selection preference. Our results show that, given that Wang and Huang (2010)'s similar investigation on the perceptual verb "kàn" (look at) indicates diverse mechanisms, the compositional operation patterns of "da3" are much like those proposed by Pustejovsky's (2008). In view of this, we also provide some limitation and future direction of this study in the last section.

12. Typological Universals and Intrinsic Universals on the L2 Acquisition of Consonant Clusters

Chin-Chin Tseng

This study is to examine if typological universals built upon primary languages are applicable to interlanguage data in SLA. Implicational universal is considered the classic example of a typological universal by Croft (2003). Thus, the Interlanguage Structural Conformity Hypothesis, which consists of two implicational universals proposed by Eckman (1991), were tested against data from an interlanguage. The interlanguage data reconfirms that syllable structure plays a key role in the Fricative-Stop Prinicple. However, the Fricative-Stop Principle is sensitive to the position which clusters occur in a syllable. This typological universal is only applicable to final consonant clusters only. The test results do not conform with the Resolvability Principle. The Resolvability Principle claims that if a language has a consonantal sequence of length m in either initial or final position, it also has at least one continuous subsequence of length m-1 in this same position. Taiwanese3 speakers' interlanguage data show that they can produce a consonantal sequence of 3 [spr-], but fail to produce a consonantal sequence of 2 [bl-], which violates the proposed typological universal. Thus, intrinsic universals are proposed to explain the interlanguage data in this study, i.e. the position that a consonant cluster occurs in a syllable and its articulatory components all contributed to the intrinsic universals.

13. 多語語碼轉換之未知詞擷取

Yi-Lun Wu, Chaio-Wen Hsieh, Wei-Hsuan Lin, Chun-Yi Liu and Liang-Chih Yu

在多語環境下，一段語句可能發生由一種語言轉換到另一種語言的現象，也就是說，語句由兩種或兩種以上的語言所組成，此即為語碼轉換(code-switching)現象。以我國語言使用的情況來說，國語夾雜台客英短語的現象在日常生活中已相當普遍，這些語言混用現象也造成了語言處理上的重大挑戰。有鑑於此，本論文收集中英、國台及國客夾雜之文字語料，並分析以國語為主要語言之中英、國台及國客夾雜現象，接著提出以交互資訊(mutual information)與熵(entropy)為基礎之未知詞擷取演算法，自動從多語夾雜語料中找出未知詞。實驗結果顯示本論文所提出的方法可藉由過濾無關的新詞提升未知詞擷取之精確度。


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