

Overview of the Fifth NTCIR Workshop

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Abstract

This paper outlines the fifth NTCIR Workshop, which is the latest in a series. It briefly describes the background, tasks, participants, and test collections of the workshop. The purpose of this paper is to serve as an introduction to the research described in detail in the rest of the proceedings of the fifth NTCIR Workshop.

Keywords: evaluation, information access, information retrieval, question answering, test collections, cross-lingual information retrieval, patent retrieval, Web retrieval, cross-lingual question answering, test collections.

1. Introduction

The NTCIR Workshop [1] is a series of evaluation workshops designed to enhance research in information access (IA) technologies including information retrieval (IR), cross-lingual information retrieval (CLIR), question answering, automatic text summarization, text mining and so on by providing large-scale test collections and a forum for researchers..

The aims of the NTCIR project are:

1. to encourage research in information access technologies by providing large-scale test collections that are reusable for experiments;
2. to provide a forum for research groups interested in cross-system comparisons and exchanging research ideas in an informal atmosphere; and
3. to investigate methodologies and metrics for evaluation of information access technologies and methods for constructing large-scale reusable test collections.

The main goal of the NTCIR project is to provide infrastructure for large-scale evaluations of IA technologies. The importance of such infrastructure in IA research has been widely recognized. Fundamental text processing procedures for IA, such as indexing includes language-dependent procedures. The NTCIR project therefore started in late 1997 with

emphasis on, but not limited to, Japanese or other East Asian languages, and its series of workshops has attracted international participation.

In NTCIR, a workshop is held about once every one and a half years. Because we respect the interaction between participants, we consider the whole process from initial document release to the final meeting to be the “workshop”. Each workshop selects several research areas called “tasks”, or a “challenges” for the more challenging tasks. Each task has been organized by the researchers of the domain and a task may consist of more than one subtask.

1.1 Information Access

The term “information access” (IA) refers the whole process from when a user realizes his/her information needs, through the activity of searching for and finding relevant documents, and then utilizing information in them. We have looked at IA technologies to help users utilize the information in large-scale document collections. IR, summarization and question answering are part of a “family”, aiming at the same target, although each of them has been investigated by rather different communities.

1.2 Focus of NTCIR

From the beginning of the project, we have looked at both traditional laboratory-type IR system testing and the evaluation of challenging technologies, as shown in Figure 1. For the former, we placed emphasis on text retrieval and CLIR with Japanese or other Asian languages and testing on various document genres.

Focus of NTCIR

Lab-type IR Test

Asian Languages/cross-language
Variety of Genre
Parallel/comparable Corpus

New Challenges

Intersection of IR + NLP
To make information in the documents more usable for users!
Realistic eval/user task

Forum for Researchers

Idea Exchange
Discussion/Investigation on
Evaluation methods/metrics

Figure 1. Focus of NTCIR Workshops

Table 1. Tasks of the NTCIR Workshops

	Period	Tasks	Subtasks	Test collections			
1	Nov. 1998- Sept. 1999	Ad Hoc IR	J-JE	NTCIR-1			
		CLIR	J-E				
		Term Extraction	Term Extraction/ Role Analysis				
2	June 2000- March 2001	Chinese Text Retrieval	Chinese IR: C-C CLIR: E-C	CIRB010			
		Japanese&English IR	Monolingual IR: J-J, E-E CLIR: J-E, E-J, J-JE, E-JE	NTCIR-1, -2			
			Text Summarization	Intrinsic - Extraction/Free generated Extrinsic - IR task-based	NTCIR-2Summ		
		3	Oct. 2001- Oct. 2002	CLIR	Single Language IR:C-C,K-K,J-J Bilingual CLIR:x-J,x-C, x-K Multilingual CLIR:x-CJE	NTCIR-3CLIR	
Patent	Cross Genre w/ or w/o CLIR CCKE-J [Optional] Aliament, RST Analysis of Claims				NTCIR-3 PATENT		
	Question Answering				Subtask-1: Five Possible Answers Subtask-2: One Set of All the Answers Subtask-3: Series of Questions	NTCIR-3QA	
Text Summarization				Single Document Summarization Multi-document Summarization	NTCIR-3 SUMM		
				Web Retrieval	Survey Retrieval Target Retrieval [Optional] Speech-Driven	NTCIR-3 WEB	
4	CLIR				Single Language IR:C-C,K-K,J-J Bilingual CLIR:x-J,x-C, x-K Pivoted Bilingual CLIR Multilingual CLIR:x-CKJE	NTCIR-4CLIR	
					Patent	"Invalidity Search"= Search Patents by a Patent [Feasibility] Automatic Patent Map Creation	NTCIR-4 PATENT
				Question Answering		Subtask-1: Five Possible Answers Subtask-2: One Set of All the Answers Subtask-3: Series of Questions	NTCIR-4 QA
					Text Summarization	Multi-document Summarization	NTCIR-4 SUMM
	Web Retrieval				Informational Retrieval Navigational Retrieval [Pilot] Geographical Information [Pilot] (Search Results) Topical Classification	NW100G-01, NTCIR-4 WEB	
				5	CLIR	Single Language IR:C-C,K-K,J-J Bilingual CLIR:x-J,x-C, x-K Multilingual CLIR:x-CKJE	NTCIR-5CLIR
						CLQA	Subtask on JE documents: JE, EJ, CE Subtask on C documents: CC, EC
		PATENT	Document Retrieval Passage Retrieval Classification				NTCIR-4PATENT, NTCIR-5PATENT
	Question Answering		Series of Questions (Information Access Dialog)		NW1000G-04, NTCIR-5WEB		
	WEB	Navigational Retrieval Subtask Query Term Expansion Subtask					

n-m: n=query language, m=document language(s), J:Japanese, E:English, C:Chinese, K:Korean, x:any of CJKE

For the challenging issues, the target is to shift from document retrieval to technologies that utilize “information” in documents, and investigation of methodologies and metrics for more realistic and reliable evaluation. For the latter, we have paid attention to users’ information-seeking tasks in the experiment design because they are deeply related to the appropriate types of documents, topics of the users’ search requests and relevance judgment criteria even in the laboratory-type testing of the systems. These two directions have been supported by a forum of researchers who are interested in cross-system comparison and by their discussions.

2. The Fifth NTCIR Workshop

2.1 Tasks

For the *Fifth NTCIR Workshop* (NTCIR-5) [2], the process started from the call-for-task-participation in September 2004 and the meeting is held on 6-9 December 2005 [3], at National Institute of Informatics (NII) in Tokyo.

It is sponsored by the Research Center for Information Resources at NII (RCIR/NII) and Japan’s MEXT Grant-in-Aid for Scientific Research on Informatics (#13224087).

The *NTCIR-5* selected five areas of research as “tasks”:

1. Cross-Lingual Information Retrieval Task (*CLIR*),
2. Cross-Lingual Question Answering (*CLQA*)
3. Patent Retrieval Task (*PATENT*)¹,
4. Question Answering Challenge (*QAC*),
- and
5. WEB Task (*WEB*).

A pilot workshop Multimodal Summarization for Trend Information (*MuST*) is organized but the results of each participating group will be presented in a separate workshop in March 2006².

As shown in **Table 1** and **Figure 2**, at the *NTCIR-5*, *CLQA* is a new task and it is a natural extension of *CLIR* and *QAC*.

CLIR, *PATENT*, *QAC* and *WEB* basically continued with minor changes in task design to remedy the major problems found in the fourth workshop. *QAC* and *WEB* focused on one of the subtasks among 3-4 subtasks set at *NTCIR-4*. All the tasks used new document collections and increased the size of the test collections.

¹ Question Answering Challenge and Patent Retrieval tasks are partially supported by NII Joint Research Grant (Type-B) as well.

² *MuST* is supported by a Joint Research Grant of Nippon Telegraph and Telephone, Corp. and the University of Tokyo, and NII Joint Research Grant (Type-B).

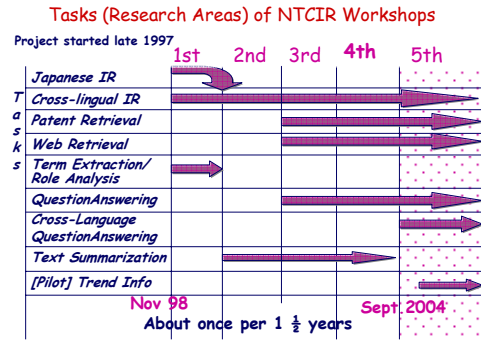


Figure 2. Tasks at NTCIR Workshops

2.2 Participants

Table 2 is a list of the active participating research groups in the *NTCIR-5*. A hundred and two groups registered including *MuST*, and sixty-four groups from fifteen different countries and areas submitted the results of one of the above mentioned five tasks, and thirteen are remained as active participants for *MuST*.

As shown in **Figures 3** and **4**, the number of participants has gradually increased. Different tasks attracted different research groups. Many international participants enrolled in *CLIR* and *CLQA*. The *PATNET* task attracted participants from company research laboratories and “veteran” *NTCIR* participants. Classification Subtask of the *PATENT* attracted researchers on text categorization or machine learning, which is rather new to *NTCIR*.

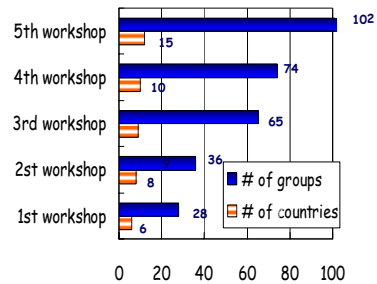


Figure 3. Number of Participating Groups

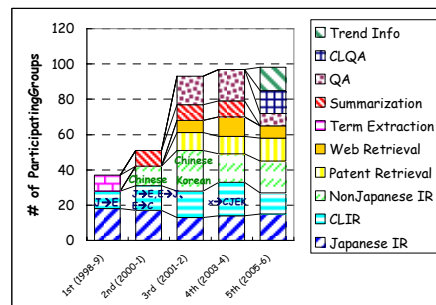


Figure 4. Number of Participating Groups, by Task

Table 2. Active Participating Groups of the Third NTCIR Workshop

<p>[CLIR] DAEDALUS Data/ Decisions and Language Fu Jen Catholic Univ Hummingbird Institute for Infocomm Research Institute of Software; Chinese Academy of Sciences National Cheng Kung Univ National Institute of Information and Communications Technology NII / Univ of Hildesheim Oki Electric Industry Pohang Univ of Science and Engineering Queens College; CUNY Queensland Univ of Technology RMIT Computer Science & IT Ryukoku Univ / National Institute of Information and Communications Technology The Hong Kong Polytechnic Univ TLR Research & Development Group Toshiba Corporate R&D Center Tsinghua Univ/ Central China Normal Univ Univ of Amsterdam Univ of California, Berkeley Univ of Helsinki Univ of Neuchatel Unversity of North Texas Yahoo</p> <p>[CLQA] Academia Sinica; Taiwan ATR Spoken Language Translation Research Laboratoires Carnegie Mellon Univ National Cheng Kung Univ Institute of Computing Technology; Chinese Academy of Sciences/ Dublin City Univ National Institute of Information and Communications Technology National Taiwan Ocean Univ NTT CS Lab. Queens College; CUNY Toyohashi Univ of Technology/ Univ of Tsukuba/ Nagoya Univ Univ of Limerick Univ of North Texas Yokohama National Univ</p>	<p>[PATENT] IBM Research Fuji Xerox Fujitsu Laboratories Hitachi Justsystem Corporation KAIST National Institute of Information and Communications Technology NTT DATA CORPORATION Pohang Univ of Science and Technology RICOH Toyohashi Univ of Technology Univ of Tsukuba WebGenie Information Ltd.</p> <p>[[QAC] Hokkaido Univ Iwate Prefectural Univ Nagaoka Univ of Technology National Institute of Information and Communications Technology Ritsumeikan Univ Toyohashi Univ of Technology/ Univ of Tsukuba/ Nagoya Univ Yokohama National Univ</p> <p>[WEB] NEC Corporation Justsystem Corporation NII; Univ. of Tokyo/ KYA group Osaka Kyoiku Univ RICOH Univ of Aizu Univ of Tsukuba</p> <p>[MuST] Dai Nippon Printing Co.,Ltd, Hiroshima City Univ Justsystem Corporation Keio Univ National Institute of Information and Communications Technology NTT CS Lab. Ochanomizu Univ OKI Osaka Prefecture Univ The Graduate School of Natural Science and Technology Tokyo Metropolitan Univ Faculty of System Design Toyohashi Univ of Technology Yokohama National Univ</p>
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3. Test Collections

3.1 Documents

Table 3 shows the test collections constructed through the series of *NTCIR workshops*. In the *NTCIR* the term “*test collection*” is used for any kind of data set usable for system testing and experiments. One of our interests is to prepare realistic evaluation infrastructures and efforts include scaling up the document collection and increasing variety of document genres and languages. Both patent and scientific document collections have *parallel corpora* of English and Japanese abstracts. For news document collections which are used in *NTCIR-5 CLIR*, *CLQA*, and *QAC*, we prepared the new document collections, of which documents are published in the years of 2000-2001, where as *NTCIR-3* and *-4* used those of 1998-1999. For each language sub-collection has multiple sources of the newspapers. However, the size of each document collection used in *NTCIR-5 CLIR* is not well-balanced, in which the sizes of Chinese and Japanese document collections are increased than previous ones and are larger than those for the English and

Korean document collections used in *NTCIR-5 CLIR*. The Patent document collection increased the size to the fulltext documents filed in the 10 years of 1993-2002, where as *NTCIR-4 PATENT* used the fulltext filed in the 5 years of 1993-1997. And it contains about 3.5 Million documents. WEB also renewed the document collection *NW1000GB-04*, in which 1.36 TB, and its size is more than 10 times of *NW100G-01*, used in *NTCIR-4 WEB*.

The task (experiment) design and relevance judgment criteria were set according to the nature of the document collection and of the user community who use this type of document in their everyday life.

3.2 Topics and Questions

The structure of the topic in the IR test collections is similar to that used in TREC [5] and CLEF [6]. These topics are defined as natural language statements of “users’ requests” rather than “queries”, strings submitted to the system, so that both manual and automatic query construction can be done.

Table 3. Test collections constructed by NTCIR

Collection	Task	Documents						Task data		
		Genre	Filename	Lang.	Year	# of docs	Size	Lang	Question #	Relevance judge
NTCIR-1	IR	Sci. abstract	ntc1-je	JE	1988-1997	339,483	577MB	J	83	3 grades
			ntc1-j	J		332,918	312MB		60	
			ntc1-e	E		187,080	218MB		-	
	TE*5		ntc1-tmrc	J		2,000	-		-	
CIRB010	IR	News	CIRB010	C _t	1998-1999	132,173	132MB	C _t E	50	4 grades
NTCIR-2	IR	Sci. abstract	ntc2-j	J	1986-1999**	400,248	600MB	JE	49	4 grades
			ntc2-e	E	134,978	200MB				
NTCIR-3 CLIR	IR	News	KEIB010	K	1994	66,146	74MB	C _t KJ E	50	4 grades
			CIRB011	C _t	1998-1999	132,173	870MB			
			CIRB020			249,508				
			Mainichi	J	220,078					
			EIRB010	E	10,204					
			Mainichi Daily		12,723					
NTCIR-3 PATENT	IR	Patent	kkh *3	J	1998-1999	697,262	18GB	C _t C _s KJE	31	3 grades
		Abstract	jsh *3	J	1995-1999	1,706,154	1,883MB			
		Abstract	paj *3	E	1995-1999	1,701,339	2,711MB			
NTCIR-3 QA	QA	News	Mainichi	J	1998-1999	220,078	282MB	J*	1200	exact answer
NTCIR-3 WEB	IR	Web (html/text)	NW100G-01	multiple*	crawled in 2001	11,038,720	100GB	J*	47	4 grades + relative
			NW100G-01	4		1,445,466	10GB			
NTCIR-4 CLIR	IR	News	CIRB011	C _t	1998-1999	132,173	ca.3GB	C _t KJ E	60	4 grades
			CIRB020			249,203				
			Hankookilbo +	K		149,921				
			Chosenilbo +			104,517				
			Mainichi	J		220,078				
			Yomiuri +	E		373,558				
			EIRB010			10,204				
			Mainichi Daily			12,723				
			Korea Times +			19,599				
			Hong Kong Standard +			96,683				
			Xinhua +	208,167						
NTCIR-4 PATENT	IR	patent full	unexamined patent	J	1993-1997	ca. 1,700,000	ca.27GB	E	Main: 34, Add: 69	3 grades
		Abstract	Patent Abstracts of Japan (PAJ) +	E	1993-1997	ca. 1,700,000	ca.5GB			
NTCIR-4 QA	QA	News	Mainichi	J	1998-1999	220,078	ca.776MB	J*	197	exact answer
			Yomiuri +			373,558			199	
NTCIR-4 WEB	IR	Web (html/text)	NW100G-01	multiple*	crawled in 2001	11,038,720	100GB	J*		3 grades
NTCIR-5 CLIR	IR	News	CIRB040r	C _t	2000-2001	901,446		C _t KJ E	50	4 grades
			Hankookilbo			K				
			Chosenilbo	135,124						
			Mainichi	J		199,681				
			Yomiuri	658,719						
			Mainichi Daily	12,155						
			Korea Times	E		30,530				
			Daily Yomiuri			17,741				
			Xinhua			198,624				
NTCIR-5 CLQA	QA	News	CIRB040r	J	2000-2001	901,446		CJE	smp1:300 + tes 200 *6	3 grades *7
			Yomiuri			658,719				
			Daily Yomiuri			17,741				
NTCIR-5 PATENT	IR	patent full	Publication of unexamined patent	J	1993-2002	ca. 3,500,000	ca.45GB	JE	34+1189	3 grades
		Abstract	Patent Abstracts of Japan (PAJ) +	E	1993-2002	ca. 3,500,000	ca.10GB			
NTCIR-5 QA	QA	News	Mainichi	J	2000-2001	199,681		J*	50 series (360 Q)	graded
NTCIR-5 WEB	IR	Web (html/text)	NW1000G-04	multiple*	crawled in 2004		1.36TB	J*	269 + 847	3 grades

J:Japanese, E:English, C:Chinese (C_t:Traditional Chinese, C_s: Simplified Chinese), K:Korean;

"+" indicates the document collection was newly added for NTCIR-4

* English translation is available

** gakkai subfiles: 1997-1999, kaken subfiles: 1986-1997

*3: kkh : Publication of unexamined patent application, jsh: Japanese abstract, paj: English translation of jsh

*4: almost Japanese or English (some in other languages)

*5: Term extraction/ role analysis

*6: 300+200 questions for C documents, and 300+200 questions for JE documents

*7: Right, Unsupported, Wrong

In NTCIR, *Mandatory Runs* are defined for each IR-related task, and every participant must submit at least one mandatory run using the specified topic field only. The purpose of this is to enhance cross-system comparisons by basing them on common conditions, and to judge the effectiveness of the additional information.

3.3 Relevance Judgments and Evaluation

In IR-related tasks, relevance judgments were graded using a scale similar to previous NTCIR workshops: highly relevant, relevant, partially relevant and irrelevant.

4. Tasks

4.1 Cross-Lingual Information Retrieval [7]

CLIR consists of three subtasks:

- *Multilingual CLIR* (MLIR),
- *Bilingual CLIR* (BLIR), and
- *Single Language IR* (SLIR).

The structure of subtasks and languages are basically the same as those in NTCIR-4 CLIR and ran on the new document collections, published in the years of 2000-2001. The sizes of the document collections for English and Korean are almost the same, and those for Chinese and Japanese increased. NTCIR-4 CLIR collection was used for training.

One of the focuses of this CLIR was treatment of named entities and out-of-vocabulary (OOV) terms. For CLIR within the languages written in Roman alphabets, named entities or proper nouns are rather easy as they do not need to be translated and cognate matching worked generally well. However, in the Asian languages context in which different character sets are used, translation of proper nouns and named entities is critical issues.

PIRCS [15] tested the effectiveness of detecting the named entities in the queries. For OOV problems, web-based methods were tested by several groups, which originally proposed in NTCIR-3 by Aitao Chen at BRKLY and modified variously. RMIT [16] proposed an algorithm based on co-occurrence statistics.

For IR in general, it has been known that the differences of the search effectiveness between different topics are quite large, even much larger than the differences between systems. A robust system which can obtain better results for every topic is ideal and a line of investigation targeting such robust IR is one of the critical issues. Also pseudo relevance feedback (PFR) is known to be effective to improve the search effectiveness on average of the multiple topics, but its effectiveness differs on different topics. Many groups proposed and tested different query expansion techniques, including PRF, Web-based, statistical thesaurus, bounce-and-throw, document

re-ranking. PIRCS tested a filter to for select the topics to apply Web-based expansion.

Difference on search effectiveness across languages showed different tendency from those in NTCIR-4 CLIR. We hope to compare the search effectiveness of the same systems on both NTCIR-5 and NTCIR-4 CLIR collections, and would like to ask cooperation from task participants.

4.2 Cross-Lingual Question Answering [8]

This is a new task and run as a pilot for this NTCIR. The participation showed a good balance -- a number of QAC "veterans" groups and other strong NLP-oriented groups participated as well as new comers challenged it. There are two sets of subtasks:

- Subtasks on JE documents: JE, EJ, CE, and
- Subtasks on C documents: CC, EC.

Since this is the first attempt, the task is designed to be simple as much as possible. The answers are restricted to the named entities only and each run returns only one answer for each of questions. The collections for the above mentioned two sets of subtasks were prepared separately. As NTCIR-5 CLIR also provided emphasis on the named entities, some of the question for CC and EC were created from CLIR topics.

The results showed that the effectiveness CLQA is generally 5-10% inferior than the monolingual QA. For JE, NCQAL out-performed and they used a monolingual QA system which worked well on previous tests in a series of NTCIR QAC and their mechanisms to translate proper nouns worked well. For further comparison, submission of monolingual QA is preferable as baselines. Unbalance between document sets can be fixed in the future tasks -- unbalance of the collection size of English, and unbalance of the topics covered by document collections, for example Chinese documents and English documents published in Japan.

4.3 Patent Retrieval [9][10]

This is the third attempt on Patent in the series of the NTCIR Workshop. It consists of three subtasks

- Document Retrieval Subtask
- Passage Retrieval Subtask, and
- Classification Subtask.

One of the major challenges for this Patent task is investigating the possibility of the evaluation without human judgments. Document Retrieval tested the invalidity search as in NTCIR-4 was performed, but the numbers of search topics were increased from 34 to more than 1200, and the size of target document collection was increased from fulltext of patent applications filed in the 5 years of 1993-1997 to those in 1993-2002. Citations of the Patent Examiners were as relevance judgments.

For Passage, the passages were sorted according to the relevance to the topic in a document retrieved by a topic for invalidity purposes.

Classifying patent applications has promise to improve the quality of the patent map generation task, which was tested in NTCIR-4 as a feasibility task. Additionally, the document classification can automatically be evaluated using the patent classification system. In our case, a multidimensional classification system called “F-term (File Forming Term)” was used.

The results of the system rankings produced on 1187 citation judgments only topics and on 34 human judgments topics were generally showed the similar tendency if sufficient number of topics were used for the citation-judgment topics, but more detailed analysis shall be needed to reach the conclusion.

4.4 Question Answering Challenge [11]

QAC at this NTCIR focused on “Series of Questions”, which have been tested as subtask 3 in the NTCIR-3 and NTCIR-4. The task design was almost the same as those used in NTCIR-4, i.e. “Information Access Dialog”, in which simulated the interaction between systems and users who intended to collect information needed to write a report on a topic. In order to overcome the problems raised in the NTCIR-4, graded judgments were introduced to the answer judgment criteria, so that the system performance score would not degrade because of the failure with very minor answers. The results showed that effectiveness on the first questions and the following ones in a series differed much and the resolution of the context of a series of questions is still unsolved problem. Further investigation is expected.

4.5 WEB [12]

WEB concentrated to the Navigational Retrieval Subtask among 4 different subtasks set in NTCIR-4. A new document collection, NW1000G-04 contained 1.36TB documents and more than 10 times bigger than the NW100G-01, which used in NTCIR-3 and -4. This size is a challenge for organization to ship the data and for the participants to execute the experiments. 296 topics were used for formal evaluation and 847 additional topics are still under judgments and that larger collections of topics are expected to serve to improve the stableness of the evaluation.

4.6 Multimodal Summarization for Trend Information [13]

Multimodal Summarization for Trend Information (MuST) is organized as a pilot workshop of the NTCIR. It investigates the task to extract numeric expressions from a set of documents, summarize, and visualize so that the

users easily understand the tendencies among the set of documents. The examples of the topics are the stock market price, amount of import/export of a particular products, etc. Thirteen groups participated. This is an interesting mixture of different communities, IR, NLP, Web intelligence, Fuzzy, etc. The results will be presented in the separate workshop held in March, 2006.

5. Discussion

A brief overview of the *fifth NTCIR Workshop* is reported here. The details of the achievements from each task and those of each participant are reported in the reports from each task in this issue, the papers in this volume [4].

The test collections used in the tasks of the NTCIR-5 and the archives of the system produced submission raw data will be available for research purpose. We expect that many of the research groups involved in the larger NTCIR community will work collaboratively to investigate the system mechanisms and to analyze the further results, and then learn each other from each other's experience.

Evaluation must adapt to technological evolution and the change in social needs. We are working towards this goal, and suggestions are always welcome.

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