Overview of NTCIR-11

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ABSTRACT

This is an overview of NTCIR-11, the eleventh sesquiannual workshop for the evaluation of Information Access technologies. NTCIR-11 presents the most diverse set of evaluation tasks in the history of NTCIR, led by over 40 cutting-edge researchers worldwide. This paper presents a brief history of NTCIR and overall statistics of NTCIR-11, followed by an introduction of nine evaluation tasks. We conclude the paper by discussing the future directions of NTCIR. Readers should refer to individual task overview papers for their activities and findings.

Keywords

Evaluation, Information Access, Information Retrieval, Natural Language Processing, Summarization, Question Answering, Test Collection

1. INTRODUCTION

NTCIR is a leading evaluation forum for Information Access technologies located in Asia. The acronym stands for NII Testbeds and Community for Information access Research, since NTCIR-9. NTCIR is a community-led activity where researchers propose an evaluation task that is designed to address particular technical challenges in Information Access, and the proposals are assessed by the program committee formed by international experts in the domain. This ensures that the evaluation tasks of NTCIR are well motivated by a group of researchers, but also that the tasks are well designed and managed to attract diverse research groups worldwide.

NTCIR-11 started on July 2013 and ended on December 2014. At NTCIR-11, nine evaluation tasks were selected by the program committee. Of those, six were selected as core tasks and three were selected as pilot tasks. The core tasks were Math-2, MedNLP-2, iMine, MobileClick, RITE-VAL, and SpokenQuery&Doc, and pilot tasks were QALab, Temporalia and RecipeSearch. Math-2 and MedNLP-2 were the 2nd round of their activity since NTCIR-10, and the rest of the tasks were new or significantly revised at NTCIR-11. RecipeSearch was accepted via the 2nd call for task proposals, which was an attempt started at NTCIR-10 to accommodate emerging research topics during the 18 months of cycle. The historical transition of evaluations tasks from NTCIR-1 to NTCIR-11 is shown in Figure 1, along with the number of active participating teams.

The members of the NTCIR-11 Program Committee were Hsin-Hsi Chen (National Taiwan University, Taiwan), Charles Clarke (University of Waterloo, Canada), Kalervo Järvelin (University of Tampere, Finland), Hideo Joho (Co-Chair, University of Tsukuba, Japan), Gareth Jones (Dublin City University, Ireland), Kazuaki Kishida (Co-Chair, Keio University, Japan), Gary Geunbae Lee (POSTECH, South Korea), Maarten de Rijke (University of Amsterdam, The Netherlands), Stephen Robertson (Microsoft Research Cambridge, UK), and Ian Soboroff (NIST, USA).

Table 1: Number of participating teams by country/region

Country/Region	# of Teams
Japan	42*
China	12*
Taiwan	9
Germany	4
USA	4
Korea	3*
Ireland	2
Australia	1*
Austria	1
Bangladesh	1*
Canada	1
Czech Republic	1
France	1
India	1
Norway	1
Sweden	1*
United Kingdom	1
Vietnam	1*
TOTAL	87 (81)

Countries with * had joint international teams.

The selected tasks typically developed the evaluation methodologies and resources (i.e., test collections) in the first four to six months, and started to call for participation. Participating teams built systems using the test collection data and submitted runs (outputs of a system) to task organisers. Task organisers then assessed the submitted runs using some form of metrics, and returned the results to the participants. Participants and task organisers then wrote a paper reporting their findings from the NTCIR-11 participation. NTCIR-11 was concluded by the NTCIR-11 Conference held between 9th and 12th December, 2014 in Tokyo, Japan.

A total of 81 teams participated in at least one of the

Year	1999	2001	2002	2004	2005	2007	2008	2010	2011	2013	2014
Task/NTCIR round	1	2	3	4	5	6	7	8	9	10	11
Automatic Term Recognition and Role Analysis (TMREC)	9										
Ad hoc/Crosslingual IR(1) -> Chinese/English/Japanese IR(2) -> CLIR(3-6)	28	30	20	26	25	22					
Text Summarization Challenge (TSC)		9	8	9							
Web Retrieval (WEB)			7	11	7						
Question Answering Challenge (QAC)			16	18	7	8					
Patent Retrieval [and Classification] (PATENT)			10	10	13	12					
Multimodal Summarization for Trend Information (MUST)					13	15	13				
Crosslingual Question Answering (CLQA)(5,6) -> Advanced Crosslingual Information Access (ACLIA)(7,8)					14	12	19	14			
Opinion(6) -> Multilingual Opinion Analysis (MOAT)(7,8)						12	21	16			
Patent Mining (PAT-MN)							12	11			
Community Question Answering (CQA)								4			
Geotemporal IR (GeoTime)								13	12		
Interactive Visual Exploration (Vis-Ex)									4		
Patent Translation (PAT-MT)(7,8) -> Patent Machine Translation (PatentMT)(9,10)							15	8	21	21	
Crosslingual Link Discovery (Crosslink)									11	10	
INTENT(9,10) -> **Search Intent and Task Mining (IMine)**									16	11	**12**
One Click Access (1CLICK)(9,10) -> **Mobile Information Access (MobileClick)**									4	8	**4**
Recognizing Inference in Text (RITE)(9,10) -> **Recognizing Inference in Text and Validation (RITE-VAL)**									24	28	**23**
IR for Spoken Documents (SpokenDoc) (9,10) -> **Spoken Query and Spoken Document Retrieval (SpokenQuery&Doc)**									10	12	**11**
Mathematical Information Access (Math)										6	**8**
Medical Natural Language Processing (MedNLP)										12	**12**
QA Lab for Entrance Exam (QALab)											**11**
Temporal Information Access (Temporalia)											**8**
Cooking Recipe Search (RecipeSearch)											**4**
	37	39	61	74	79	81	80	66	102	108	**93**

Figure 1: Evaluation Tasks from NTCIR-1 to NTCIR-11. Note that numbers include those teams who participated in more than one tasks.

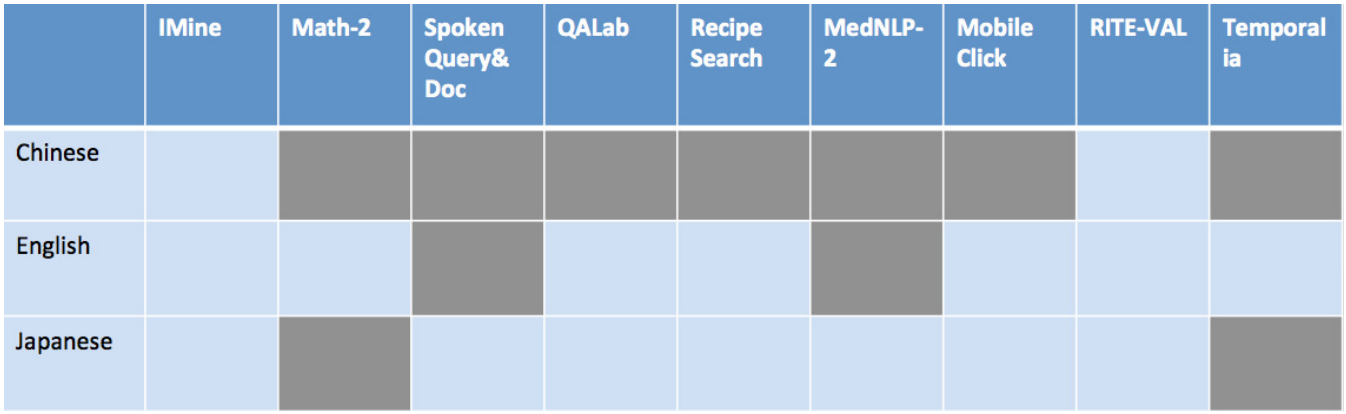

Figure 2: Languages covered by NTCIR-11 Tasks

NTCIR-11 tasks[1]. This number is smaller than NTCIR-9 [1] and NTCIR-10 [2] who had between 90 and 100 active teams. The decrease of participating teams can be due to a combination of several factors such as globally difficult financial situation for research communities, new young tasks with a smaller community base, or increased complexity of advanced evaluation tasks. It should be emphasised, however, that NTCIR-11 still attracted the 3rd largest participation in the history of NTCIR. The breakdown of the participating teams by country or region is shown in Table 1. As can be seen, while many participants were from Asian regions, researchers from North America and Europe have actively participated in NTCIR-11. A full list of all participating teams can be found in Appendix. The range of languages covered by NTCIR-11 tasks is shown in Figure 2.

Finally, we decided to stop providing a media (e.g., CD-ROM or USB stick) of conference proceedings to conference participants, since the papers of NTCIR conferences are always available from `http://research.nii.ac.jp/ntcir/workshop/OnlineProceedings11/index.html`. This helped reduce the cost of publishing conference proceedings significantly.

The next section will introduce the nine evaluation tasks run at NTCIR-11. For those who are interested in the cur-

[1]Due to incomplete status of one evaluation task at the time of writing, the number of participating teams reported in this paper includes provisional teams who are expected to submit a run to the task organisers.

rent and past activities of NTCIR, please visit the website[2] and publication page[3].

2. NTCIR-11 EVALUATION TASKS

NTCIR-11 had six core tasks and three pilot tasks, which are briefly introduced in this section. Readers should refer to the overview paper of individual tasks for more details regarding their activities and findings.

2.1 IMine

Typical search queries submitted to general search engines are short, ambiguous, and under-specified. Disambiguation of short and under-specified queries is difficult and error-prone, when users' search intentions are diverse. An alternative approach to address such queries is to diversify search results by merging relevant documents that are relevant to each of potential search intents behind the queries. At NTCIR, INTENT 1 and 2 tasks have created test collections for such query intent analysis and search result diversification in NTCIR-9 and 10.

IMine task is a successor of INTENT tasks, and consists of three subtasks. Subtopic mining subtask (Chinese, Japanese, English) is concerned with the mining of candidate search intents (called subtopics) for a given query. Unlike previous tasks, this subtask asked participants to provide two levels of subsumption topic hierarchies. Document ranking subtask (Chinese and English) asked participants to generate diversified ranked list of documents, where both topical diversity and relevance of intents are considered in performance measure. Finally, TaskMine subtask (Japanese) aimed to explore the methods of automatically finding subtasks of a given large task (i.e., moving).

IMine's three subtasks received a total of 73 runs submitted by 12 teams from USA, France, Canada, China, Korea, and Japan. Submitted runs were evaluated by a range of metrics including nDCG-based measures and $D\#$-based measures. However, the organisers also developed a new measure called H-measures to accommodate the hierarchical subtopic mining problems. For Chinese Document Ranking task, the organisers also performed user preference test for a selected set of runs to verify the correlation between search user's preference and diversified evaluation metrics. The details of their activities and findings can be found in the overview paper [3] and website[4].

2.2 MobileClick

Although the resolution and screen size of mobile devices have been increased, there is still a significant difference in search experience between PCs and mobile devices. Document summarisation is a key technology to increase the amount of relevant information shown to users with limited display space. At NTCIR, 1Click tasks have addressed search results document summarisation for mobile devices at NTCIR-9 and 10.

MobileClick task is a successor of 1Click tasks. Unlike previous tasks, MobileClick asked participants to create document summaries in two layers just like a nested hyperlink pages. MobileClick had two subtasks. iUnit Retrieval subtask (English and Japanese) asked participants to generate a ranked list of pieces of information (called iUnit) in order of their importance to a given query. iUnit Summarization subtask (English and Japanese), on the other hand, asked participants to generate two-layered textual outputs for a given query and list of iUnits.

The two subtasks received a total of 14 runs submitted by 4 teams from China, Taiwan, and USA. Submitted runs were evaluated by nDCG-based measures and Q-measures for iUnit Retrieval subtask, and by M-measure which was proposed by the task organisers to take users' trail probability of iUnits into account. The details of their activities and findings can be found in the overview paper [4] and website[5].

2.3 SpokenQuery&Doc

Much of the technical challenges addressed by Information Access researchers is based on written documents. Another type of textual documents that has great potential value as the source of Information Access is called *spoken documents*. Spoken documents are usually created from audio or video recordings of people's speech such as broadcasting programs, academic lectures, and all sorts of verbal presentations. Extraction of people's speech from the recordings is typically carried out by automatic speech recogniser (ASR) systems. Effective access to spoken documents poses significantly different types of challenges from those of written documents. At NTCIR, SpokenDoc task has addressed these challenges in NTCIR-9 and 10.

SpokenQuery&Doc is a successor of SpokenDoc task, and the task organisers built a new component of spoken query data in the test collection. SpokenQuery&Doc consisted of three subtasks. Spoken-query driven spoken content retrieval (SQ-SCR) subtask asked participants to retrieve spoken documents using spoken query inputs. Spoken-query driven spoken term detection (SQ-STD) subtask asked participants to retrieve occurrences of spoken query terms in spoken documents. Finally, Spoken term detection based spoken content retrieval (STD-SCR) asked participants to retrieve spoken documents using terms determined from spoken queries. All subtasks were carried out for Japanese.

Three subtasks received a total of 142 runs submitted by 11 teams from Japan, Taiwan, and Ireland. Submitted runs were evaluated by MAP-based measures for SQ-SCR, and by F-measure for SQ-STD. No run was submitted for STD-SCR. The details of their activities and findings can be found in the overview paper [5] and website[6].

2.4 RITE-VAL

Information Access technologies such as Information Retrieval sometime require a shallow level of text understanding. However, other types of IA technologies such as Question Answering and Summarisation can benefit from a deeper level of text understanding. At NTCIR, RITE Task have addressed the challenges of text entailment at NTCIR-9 and 10. Text entailment is a process of determining relationships between given two pieces of texts. Typically, researchers tries to determine whether a pair of texts states a similar message.

RITE-VAL is a successor of RITE, and the task organisers started looked at a wider range of relationship between two

[2] http://research.nii.ac.jp/ntcir/index-en.html
[3] http://research.nii.ac.jp/ntcir/publication1-en.html
[4] http://www.thuir.org/IMine/
[5] http://www.dl.kuis.kyoto-u.ac.jp/ntcir-11/mobileclick/
[6] http://www.nlp.cs.tut.ac.jp/ntcir11/

texts such as contradiction. Also, technical challenges were expanded to deal with multiple sentences, as opposed to single sentence in previous NTCIR tasks. Two subtasks were proposed. Fact validation subtask (Chinese, English, and Japanese) asked participants to develop a system that can identify whether a text is entailed from another text. System validation subtask, on the other hand, offered researchers an opportunity to understand the effects of linguistic phenomena on multi class recognition.

Two subtasks received a total of 170 runs submitted by 23 teams from Taiwan, Japan, Vietnam, China, and Norway. RITE-VAL had the largest number of participating teams among the NTCIR-11 evaluation tasks. Submitted runs were evaluated by macro-F1 score for both subtasks. The details of their activities and findings can be found in the overview paper [7] and website[7].

2.5 Math-2

Although mathematical representations of various phenomena are major components of academic publications, there is little working systems that allow researchers to access academic papers using mathematical representations. At NTCIR, Math task has started to address this novel problem at NTCIR-10 by developing a common workbench for mathematical formula search.

Math-2 Task is the second round of the mathematical information access task. It had two subtasks. Ad hoc retrieval subtask asked participants to generate a ranked list of relevant retrieval units containing a formula that matched a query. Wikipedia Open subtask allowed participants to explore their own research agenda using Wikipedia's math-related articles. Both subtasks focused on English documents.

Two subtasks received a total of 28 runs submitted by 8 teams from China, Germany, Japan, Czech Republic, USA, and Austria. Submitted runs were evaluated by MAP, P@5 and P@10, and Bpref with graded relevance assessments. The details of their activities and findings can be found in the overview paper [9] and website[8].

2.6 MedNLP-2

The amount of medical reports recorded in an electronic format has increased and started to replace traditional paper documents. This provides a great opportunity to help both medical practitioners and patients by developing IA systems for medical information. On the other hands, medical reports contain a range of privacy information which poses a significant challenge to the design of test collections for medical IA systems. At NTCIR, MedNLP task has addressed this challenge since NTCIR-10.

MedNLP-2 task is the second round of the medical NLP task at NTCIR. It had three subtasks, and all focused on records written in Japanese. Extraction subtask asked participants to extract diseases names and date/time information from medical records. ICD coding subtask asked participants to assign ICD (International Statistical Classification of Diseases and Related Health Problems) code to disease names. Finally, Free subtask allowed participants to set their own research goals based on MedNLP test collections.

Three subtasks received a total of X runs submitted by 12 teams. Submitted runs were evaluated by F-measures for Extraction and ICD coding subtasks. The details of their activities and findings can be found in the overview paper [11] and website[9].

2.7 QALab

As the complexity of Information Access systems increases, it becomes common to integrate multiple components within an end-user input to end-user output process. Intelligent Question-Answering systems are one of such cases where IR, NLP, knowledge-based resources, and other components need to be integrated in an effective way. However, optimised integration of multiple components poses a new challenge to the evaluation of IA systems. NTCIR tasks have practiced component-based evaluation structure in their design.

QALab, a new pilot task at NTCIR-11, further advances this direction by providing a module-based platform to achieve comparative evaluation of question answering systems. Candidate modules were question analysis, document retrieval, candidate answer extraction, and answer generation. For multiple choice questions, question format analysis module and final answer selection module were further added. Participants were allowed to choose any of these modules. Topics were based on university entrance exam questions in Japanese and English. The details of their activities and findings can be found in the overview paper [10] and website[10].

2.8 Temporalia

As discussed in the IMine task, understanding searchers' intent behind queries is a crucial task in IR. One significant aspect of search intents is *time*. For a given query, a user might be looking for the origin of the topic, recent development on the topic, or future directions of the topic. A query can also be atemporal where a searcher is looking for a definition of terms, for instance. Therefore, we need a system that can classify user queries into temporal classes (e.g., atemporal, past, recent, future). We also need a ranking alrogithm that can optimise search results for a particular temporal intent behind search.

Temporal Information Access (Temporalia) is a new pilot task to build a test collection for researchers who are interested in temporal aspects of Information Access systems. Temporalia had two subtasks. Temporal Query Intent Classification (TQIC) subtask (English) asked participants to classify queries into four temporal classes: atemporal, past, recency, and future. Temporal Information Retrieval task (English) asked participants to optimise document ranking for four temporal subtopics of a given topic.

Temporalia's two subtasks received a total of 35 runs submitted by 9 teams from USA, UK, France, Germany, China, India, and Japan. Submitted runs were evaluated by standard precision for TQIC subtask, and nDCG@20 and P@20 were used for TIR subtask. The details of their activities and findings can be found in the overview paper [6] and website[11].

[7] https://sites.google.com/site/ntcir11riteval/
[8] http://ntcir-math.nii.ac.jp/
[9] http://mednlp.jp/ntcir11/
[10] http://ntcir.nii.ac.jp/QALab/
[11] https://sites.google.com/site/ntcirtemporalia/

2.9 RecipeSearch

Cooking is a domain where the Internet has drastically changed the way we seek for information. Several community-based resources are now available to search and browse recipes on the Web. Cooking is such a creative task where the same dish can lead to diverse recipes depending on cook, available time and materials at hand. Since planning meals everyday is a challenging task, there is a great degree of demands in the technologies which allow people to access recipe information effectively.

RecipeSearch is a new pilot task at NTCIR-11 to address recipe information retrieval. The task consisted of two subtasks. Ad hoc recipe search subtask (English and Japanese) was a basic ad hoc retrieval task for recipes. Recipe pairing subtask (English and Japanese) assumed a case where a user would like to find a side dish that could go well with a main dish.

Two subtasks received a total of 31 runs submitted by 4 teams from Japan and Australia. Submitted runs were evaluated by MAP, MRR, and nDCG for both subtasks. The details of their activities and findings can be found in the overview paper [8] and website[12].

3. CONCLUSIONS

This paper presented the overview of 11th cycle of NTCIR activity carried out between July 2013 and December 2014. NTCIR-11 had the largest number of evaluation tasks in its history, suggesting the great diversity of Information Access challenges addressed by the community across the world. Most parts of the test collections developed by NTCIR-11 evaluation tasks will be released to non-participating research communities in the near future.

NTCIR-11 was the third cycle with a new organisation structure formed at NTCIR-9. It is our understanding that the new structure has worked well so far. However, we will continue to strive to improve NTCIR organisation structure, so that more researchers beyond the traditional Information Access domains can join the community, and advance their research using test collection based evaluation methodologies.

4. ACKNOWLEDGEMENTS

The authors would like to thank the task organisers of all NTCIR-11 tasks for their tremendous amount of effort devoted to run successful tasks, the task participants for their valuable contributions to the Information Access research community, and program committee members for their great feedback on our program. Finally, we would like to thank the current and past members of the NTCIR office for their continuous and careful support of our activity.

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APPENDIX

A. PARTICIPATING TEAMS

Table 2: NTCIR-11 Participating Teams (A-M)

Team ID	Organisation	Country/Region
AKBL	Toyohashi University of Technology	Japan
ALPS	University of Yamanashi & Utsuro Lab.	Japan
Andd7	Dhirubhai Ambani Institute of Information and Communication Technology	India
ASNLP	Academia Sinica	Taiwan
BARY	The University of Tokyo	Japan
BnO	National Institute of Informatics	Japan
BRKLY	University of California, Berkeley	USA
BYRTM	Beijing University of Posts and Telecommunications	China
CL	Nara Institute of Science and Technology	Japan
CMUQA	Carnegie Mellon University	USA
CNGL	Dublin City University	Ireland
CNU	Capital Normal University	China
DCUMT	Dublin City University	Ireland
FLL	Fujitsu Laboratories, Ltd.; Fujitsu Research and Development Center Co., Ltd.	Japan, China
Forst	Yokohama National University	Japan
FRDC	Fujitsu Research and Development Center Co., Ltd.	China
FRDC_QA	Fujitsu Research and Development Center Co., Ltd.	China
FSE	Technische Universität Berlin	Gernamny
GUKUR	Gunma University; Kiryu University; Royal Melbourne Institute of Technology	Japan, Australia
HCRL	Hitachi, Ltd.	Japan
HCU	Hiroshima City University	Japan
HITSZ	Graduate School of Harbin Institute of Technology at Shenzhen	China
HULTECH	University of Caen	France
HYM14	Gifu University	Japan
ICST	Institute of Computer Science and Technology, Peking University	China
IFISB	Technische Universität Braunschweig	Gernamny
III&CYUT	Institute for Information Industry, Chaoyang University of Technology	Taiwan
IISR	National Central University	Taiwan
IMLab	Kogakuin University	Japan
imtku	Tamkang University	Taiwan
ISOFT	Pohang University of Science and Technology	Korea
IWAPU	Iwate Prefectural University	Japan
JAVN	Japan Advanced Institute of Science and Technology; University of Engineering and Technology, Hanoi	Japan, Vietnam
KitAi	Kyushu Institute of Technology	Japan
kjp	National Institute of Informatics	Japan
KLE	Pohang University of Science and Technology	Korea
KPNM	Hunan University of Science and Technology	China
KSU	Kyoto Sangyo University	Japan
KTU	Kyoto University	Japan
KUAS	National Kaohsiung University of Applied Sciences	Taiwan
KUIDL	Kyoto University	Japan
KWARC	Jacobs University Bremen	Germany
kyoto	Kyoto University	Japan
mcat	National Institute of Informatics	Japan
MCUIM	Ming-Chuan University	Taiwan
MIG	National Chengchi University	Taiwan
MIRMU	Masaryk University	Czech Republic
MPII	Max Planck Institute for Informatics	Germany

Table 3: NTCIR-11 Participating Teams (N-Y)

Team ID	Organisation	Country/Region
nak	Keio University	Japan
NKGW	Toyohashi University of Technology	Japan
NKI14	Toyohashi University of Technology	Japan
nnlp	Hokkaido University	Japan
NTOUA	National Taiwan Ocean University	Taiwan
NUL	Nihon Unisys, Ltd.	Japan
NWNU	Northwest Normal University	China
OKAPU	Okayama Prefectural University	Japan
OKSAT	Osaka Kyoiku University	Japan
OPU	Okayama Prefectural University	Japan
R531	National Taiwan University	Taiwan
rit	Rochester Institute of Technology	USA
RYSDT	Ryukoku University	Japan
SCTD3	NTT Science and Core Technology Laboratory Group	Japan
Sem13	Toyohashi University of Technology	Japan
SHZU	Shizuoka University	Japan
SITLP	Shibaura Institute of Technology	Japan
sJanta	Begum Rokeya University, Rangpur; The Graduate University of Advanced Studies	Bangladesh, Japan
SKL	Nagoya University	Japan
SUHUK	Hokkaido University	Japan, Sweden
TBFD	Daido University	Japan
THSAM	Tsinghua University; Samsung Electronics	China, Korea
TUTA1	The University of Tokushima	Japan
TUW-IMP	Vienna University of Technology	Austria
udel	University of Delaware	USA
uhyg	University of Hyogo	Japan
UM13	University of Montreal	Canada
Uni14	Nihon Unisys, Ltd	Japan
UniMAN	The University of Manchester	UK
whute	Wuhan University	China
WUST	Wuhan University of Science and Technology	China
Yamraj	Norwegian University of Science and Technology	Norway
ysdsc	Yasuda Women's College	Japan