

IWSLT 2017
International Workshop on
Spoken Language Translation

PROCEEDINGS



iwslt.org

14th-15th December, 2017
Tokyo, Japan

Proceedings of the

International Workshop on Spoken Language Translation

14th-15th December, 2017
Tokyo, Japan

Edited by
Sakriani Sakti
Masao Utiyama

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FOREWORD



The International Workshop on Spoken Language Translation (IWSLT) is an annual scientific workshop, associated with an open evaluation campaign on spoken language translation, where both scientific papers and system descriptions are presented. The 14th International Workshop on Spoken Language Translation takes place in Tokyo, Japan on Dec. 14 and 15, 2017. Since 2004, the annual workshop has been held in Kyoto, Pittsburgh, Kyoto, Trento, Honolulu, Tokyo, Paris, San Francisco, Hong Kong, and Heidelberg, Lake Tahoe, Da Nang, Seattle, and this year in Tokyo.

One of the prominent research activities in spoken language translation is the work conducted by the Consortium for Speech Translation Advanced Research (C-STAR), which was an international partnership of research laboratories engaged in automatic translation of spoken language started in early 90s. The C-STAR members had initiated the first shared task-type Spoken Language Translation Workshop in 2004 and the IWSLT has been growing up with more participants and steering committee members.

The IWSLT includes scientific papers in dedicated technical sessions, either in oral or poster form. The contributions cover theoretical and practical issues in the field of Machine Translation (MT) in general and Spoken Language Translation (SLT), including Automatic Speech Recognition (ASR), Text-to-Speech Synthesis (TTS), and MT, in particular:

- Speech and text MT
- Integration of ASR and MT
- MT and SLT approaches
- MT and SLT evaluation
- Language resources for MT and SLT
- Open source software for MT and SLT
- Adaptation in MT
- Simultaneous speech translation
- Speech translation of lectures
- Efficiency in MT
- Stream-based algorithms for MT
- Multilingual ASR and TTS
- Rich transcription of speech for MT
- Translation of on-verbal events

Submitted manuscripts were carefully peer-reviewed by three members of the program committee and papers were selected based on their technical merit and relevance to the conference. In addition to core statistical machine translation papers, the technical program covers a wide spectrum of topics related to spoken language translation, ranging from issues related to real-time interpretation or to the translation of dialogs to more practical issues related to the integration of speech and translation technologies. Several important new annotated corpora will also be presented during the workshop. In summary, the large number of submissions as well as the high quality of the submitted papers indicates the interest on spoken language translation as a research field and the growing interest in these technologies and their practical applications.

The results of the spoken language translation evaluation campaigns organized in the framework of the workshop are also an important part of IWSLT. Those evaluations are organized in the manner of competition. While participants compete for achieving the best result in the evaluation, they come together afterwards, and discuss and share their techniques that they used in their systems. In this respect, IWSLT proposes challenging research tasks and an open experimental infrastructure for the scientific community working on spoken and written language translation. This year, the IWSLT evaluation offered a very challenging and appealing task on the spoken language translation of public speeches (TALK) in a variety of topics and dialogue, including a dedicated task to automatic speech recognition in order to cover the full pipeline of speech translation.

For each task, monolingual and bilingual language resources, as needed, are provided to participants in order to train their systems, as well as sets of manual and automatic speech transcripts (with n-best and lattices) and reference translations, allowing researchers working only on written language translation to also participate. Moreover, blind test sets are released and all translation outputs produced by the participants are evaluated using several automatic translation quality metrics. For the primary submissions of all MT and SLT tasks, a human evaluation was carried out as well.

Each participant in the evaluation campaign has been requested to submit a paper describing the system and the utilized resources. A survey of the evaluation campaigns is presented by the organizers.

Apart from the technical content of the conference, I hope all participants enjoy staying in Tokyo, one of the world's biggest metropolitan with cultural diversity.

Welcome to Tokyo!
Satoshi Nakamura,
Workshop Chair IWSLT 2017

ORGANIZERS

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- Tetsunori Kobayashi (Uni-Waseda, JP)

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 - Marcello Federico (FBK, IT)
- **Dialog Task:**
 - Katsuhito Sudoh (NAIST, JP)
 - Koichiro Yoshino (NAIST, JP)
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 - Jan Niehues (KIT, DE)
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ACKNOWLEDGEMENTS

Sponsorships & Endorsements

We are grateful to our silver sponsor:



Our gratitude also goes to our bronze sponsor:



Endorsed by

- Asia-Pacific Association for Machine Translation (AAMT)
- The Association for Natural Language Processing (ANLP)
- The Acoustical Society of Japan (ASJ)
- The Institute of Electronics, Information and Communication Engineers (IEICE)

In cooperation with

- The Information Processing Society of Japan (IPSJ), SIG-SLP

PROGRAM

Thursday, December 14th, 2017

08:15-09:00	WORKSHOP REGISTRATION
09:00-09:30	WELCOME REMARKS (1F 102 Presentation Room) Satoshi Nakamura (Workshop Chair) Alex Waibel (IWSLT Steering Committee) Fumihiko Tomita (NICT Vice President)
09:30-10:30	INVITED TALK 1 Chair: Alex Waibel (1F 102 Presentation Room) “The Move to Neural Machine Translation at Google”, Mike Schuster (Google, USA)
10:30-11:00	<i>Coffee Break</i>
11:00-12:00	REPORT Chair: Katsuhito Sudoh (1F 102 Presentation Room) “Overview of the IWSLT 2017 Evaluation Campaign”, Mauro Cettolo (FBK, Italy), Marcello Federico (FBK, Italy), Luisa Bentivogli (FBK, Italy), Jan Niehues (KIT, Germany), Sebastian Stüker (KIT, Germany), Katsuhito Sudoh (NAIST, Japan), Koichiro Yoshino (NAIST, Japan), Christian Federmann (Microsoft, USA)
12:00-13:30	<i>Lunch</i>
13:30-15:30	POSTER and EXHIBITION SESSION Chair: Sakriani Sakti (2F 205 Presentation Room) ■ Scientific Papers: P01: “Neural Machine Translation Training in a Multi-Domain Scenario”, Hassan Sajjad (QCRI-HBKU, Qatar), Nadir Durrani (QCRI-HBKU, Qatar), Fahim Dalvi (QCRI-HBKU, Qatar), Yonatan Belinkov (MIT CSAIL, USA) and Stephan Vogel (QCRI-HBKU, Qatar) P02: “Domain-independent Punctuation and Segmentation Insertion”, Eunah Cho (KIT, Germany), Jan Niehues (KIT, Germany), and Alex Waibel (KIT, Germany) P03: “Synthetic Data for Neural Machine Translation of Spoken-Dialects”, Hany Hassan (MSR AI, USA), Mostafa Elaraby (MSR AI, USA) and Ahmed Tawfik (MSR AI, USA) P04: “Toward Robust Neural Machine Translation for Noisy Input Sequences”, Matthias Sperber (KIT, Germany), Jan Niehues (KIT, Germany), and Alex Waibel (KIT, Germany) P05: “Monolingual Embeddings for Low Resourced Neural Machine Translation”, Mattia Antonino Di Gangi (FBK & Uni. Trento, Italy) and Marcello Federico (FBK, Italy) P06: “Effective Strategies in Zero-Shot Neural Machine Translation”, Thanh-Le Ha (KIT, Germany), Jan Niehues (KIT, Germany) and Alex Waibel (KIT, Germany)

Thursday, December 14th, 2017

13:30-15:30	<p>■ System Description Papers:</p> <p>P07: "Going beyond zero-shot MT: combining phonological, morphological and semantic factors. The UdS-DFKI System at IWSLT 2017", Cristina España-Bonet (UdS & DFKI GmbH, Germany) and Josef van Genabith (UdS & DFKI GmbH, Germany)</p> <p>P08: "The Samsung and University of Edinburgh's submission to IWSLT17", Pawel Przybysz (Samsung, Poland), Marcin Chochowski (Samsung R&D Center, Poland), Rico Sennrich (Uni. Edinburg, UK), Barry Haddow (Uni. Edinburg, UK) and Alexandra Birch (Uni. Edinburg, UK)</p> <p>P09: "The RWTH Aachen Machine Translation Systems for IWSLT 2017", Parnia Bahar (RWTH Aachen, Germany), Jan Rosendahl (RWTH Aachen, Germany), Nick Rosenbach (RWTH Aachen, Germany), and Hermann Ney (RWTH Aachen, Germany)</p> <p>P10: "FBK's Multilingual Neural Machine Translation System for IWSLT 2017", Surafel M. Lakew (FBK & Uni. Trento, Italy), Quintino F. Lotito (Uni. Trento, Italy), Marco Turchi (FBK, Italy), Matteo Negri (FBK, Italy), and Marcello Federico (FBK, Italy)</p> <p>P11: "KIT's Multilingual Neural Machine Translation systems for IWSLT 2017", Ngoc-Quan Pham (KIT, Germany), Matthias Sperber (KIT, Germany), Elizabeth Salesky (KIT, Germany), Thanh-Le Ha (KIT, Germany), Jan Niehues (KIT, Germany), and Alex Waibel (KIT, Germany & CMU, USA)</p> <p>■ Exhibition:</p> <p>Ex1: "Multilingual Translation System," Panasonic Corporation, Japan</p> <p>Ex2: "Superfast Online Speech Recognition with Offline Translation for CH/EN/JA/KO," Kodensha Co., Ltd., Japan</p> <p>Ex3: "NAIST Japanese-to-English Simultaneous Interpretation System," NAIST, Japan</p> <p>Ex4: "VoiceTra: Multilingual Speech Translation Application," NICT, Japan</p>
15:30-16:00	<i>Coffee Break</i>
16:00-17:30	<p>ORAL SESSION 1</p> <p>Chair: Marcello Federico (1F 102 Presentation Room)</p> <p>(each 30min: 25min presentation + 5min Q&A)</p> <p>O1-1: "Towards Better Translation Performance on Spoken Language", Chao Bei (GTCOM China) and Hao Zong (GTCOM, China)</p> <p>O1-2: "Kyoto University MT System Description for IWSLT 2017", Raj Dabre (Kyoto Uni., Japan), Fabien Cromieres (JST, Japan) and Sadao Kurohashi (Kyoto Uni., Japan)</p> <p>O1-3: "The 2017 KIT IWSLT Speech-to-Text Systems for English and German", Thai Son Nguyen (KIT, Germany), Markus Müller (KIT, Germany), Matthias Sperber (KIT, Germany), Thomas Zenkel (KIT, Germany), Sebastian Stüker (KIT, Germany), and Alex Waibel (KIT, Germany)</p>
18:00-	<p>SOCIAL EVENT DINNER</p> <p>Banquet at RIHGA Royal Hotel Tokyo</p> <p>3F Garden Terrace</p>

Friday, December 15th, 2017

08:30-09:30	WORKSHOP REGISTRATION
09:30-10:30	INVITED TALK 2 Chair: Satoshi Nakamura (1F 102 Presentation Room) Simultaneous Interpreting, Cognitive Constraints, and Information Structure Akira Mizuno (Aoyama Gakuin University & JAITS, Japan)
10:30-11:00	<i>Coffee Break</i>
11:00-12:00	ORAL SESSION 2 Chair: Luisa Bentivogli (1F 102 Presentation Room) (each 30min: 25min presentation + 5min Q&A) O2-1: “CharCut: Human-Targeted Character-Based MT Evaluation with Loose Differences”, Adrien Lardilleux (Fujitsu & DGT, Luxembourg) and Yves Lepage (Waseda Uni., Japan) O2-2: “Data Selection with Cluster-Based Language Difference Models and Cynical Selection”, Lucía Santamaría (Amazon, Germany) and Amittai Axelrod (Amazon, USA)
12:00-13:30	<i>Lunch</i>
13:30-15:00	ORAL SESSION 3 Chair: Sebastian Stüker (1F 102 Presentation Room) (each 30min: 25min presentation + 5min Q&A) O3-1: “Continuous Space Reordering Models for Phrase-based MT”, Nadir Durrani (QCRI-HBKU, Qatar) and Fahim Dalvi (QCRI-HBKU, Qatar) O3-2: “Evolution Strategy based Automatic Tuning of Neural Machine Translation Systems”, Hao Qin (Tokyo Inst. Tech, Japan), Takahiro Shinozaki (Tokyo Inst. Tech, Japan), and Kevin Duh (JHU, USA) O3-3: “Improving Zero-Shot Translation of Low-Resource Languages”, Surafel M. Lakew (FBK & Uni. Trento, Italy), Quintino F. Lotito (Uni. Trento, Italy), Matteo Negri (FBK, Italy), Marco Turchi (FBK, Italy), and Marcello Federico (FBK, Italy)
15:00-15:30	<i>Coffee Break</i>
15:30-17:00	PANEL DISCUSSION Chair: Jan Niehues (1F 102 Presentation Room) Panelists: Marcello Federico (FBK, Italy), Satoshi Nakamura (NAIST, Japan), Hermann Ney (RWTH Aachen, Germany), Mike Schuster (Google, USA), Alex Waibel (KIT, Germany & CMU, USA) Topic: 1. New Trends in Spoken Language Translation 2. The Future of the IWSLT Evaluation Campaign
17:00-17:30	CLOSING REMARKS + ANNOUNCEMENTS IWSLT 2017 Best Paper Award and Next IWSLT

KEYNOTES



The move to Neural Machine Translation at Google

Mike Schuster (Google, USA)

Abstract:

Machine learning and in particular neural networks have made great advances in the last few years for products that are used by millions of people, most notably in speech recognition, image recognition and most recently in neural machine translation. Neural Machine Translation (NMT) is an end-to-end learning approach for automated translation, with the potential to overcome many of the weaknesses of conventional phrase-based translation systems. Unfortunately, NMT systems are known to be computationally expensive both in training and in translation inference. Also, most NMT systems have difficulty with rare words. These issues have hindered NMT's use in practical deployments and services, where both accuracy and speed are essential. In this work, we present GNMT, Google's Neural Machine Translation system, which addresses many of these issues. The model consists of a deep LSTM network with 8 encoder and 8 decoder layers using attention and residual connections. To accelerate final translation speed, we employ low-precision arithmetic during inference computations. To improve handling of rare words, we divide words into a limited set of common sub-word units for both input and output. On the WMT'14 English-to-French and English-to-German benchmarks, GNMT achieves competitive results to state-of-the-art. Using human side-by-side evaluations it reduces translation errors by more than 60% compared to Google's phrase-based production system. The new Google Translate was launched in late 2016 and has improved translation quality significantly for all Google users.

Biography:

Dr. Mike Schuster graduated in Electric Engineering from the Gerhard-Mercator University in Duisburg, Germany in 1993. After receiving a scholarship he spent a year in Japan to study Japanese in Kyoto and Fiber Optics in the Kikuchi laboratory at Tokyo University. His professional career in machine learning and speech brought him to Advanced Telecommunications Research Laboratories in Kyoto, Nuance in the US and NTT in Japan where he worked on general machine learning and speech recognition research and development after getting his PhD at the Nara Institute of Science and Technology. Dr. Schuster joined the Google speech group in the beginning of 2006, seeing speech products being developed from scratch to toy demos to serving millions of users in many languages over the next eight years, and he was the main developer of the original Japanese and Korean speech recognition models. He is now part of the Google Brain group which focuses on building large-scale neural network and machine learning infrastructure for Google and has been working on infrastructure with the TensorFlow toolkit as well as on research, mostly in the field of speech and translation with various types of recurrent neural networks. In 2016 he led the development of the new Google Neural Machine Translation system, which reduced translation errors by more than 60% compared to the previous system.



Simultaneous Interpreting, Cognitive Constraints, and Information Structure

Akira Mizuno
(Aoyama Gakuin University, Japan)

Abstract:

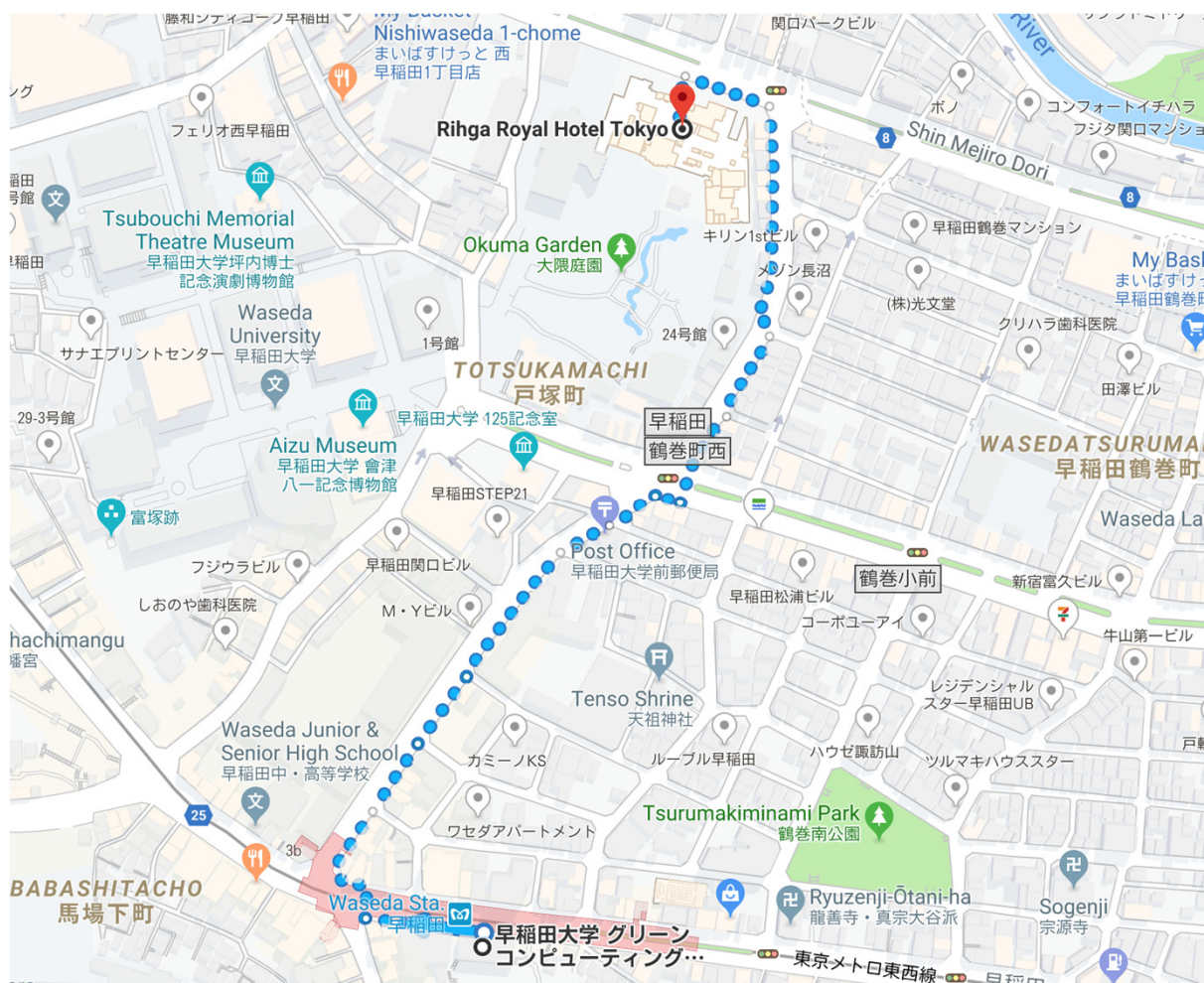
Simultaneous interpreting involves heavy cognitive load, which becomes heavier when interpreters interpret simultaneously between structurally different languages such as Japanese and English. The cognitive load can be measured by the number of chunks held in the focus of attention of the Cowan's model of working memory. An analysis of a small corpus of simultaneous interpreting between English and Japanese indicated that simultaneous interpreters frequently made use of translation strategies in order not to surpass the capacity of working memory. These strategies, different from traditional translation method which frequently involves word order reversal, seem to have intended to perform "a minimum reverse integration". In this talk, I will indicate that these are not ad-hoc strategies but more appropriate translation method than the traditional method, which can be supported by the theories of information structure and contribute to the research of machine translation.

Biography:

Akira Mizuno is a former professor of Aoyama Gakuin University and the President of the Japan Association for Interpreting and Translation Studies (JAITS). He has been involved in conference interpreting and broadcast interpreting since 1988. His main interest is Interpreting and Translation Studies, Functional Linguistics, and Cognitive Science. In 2010, he co-edited and co-authored *Translation Theories in Japan* and in 2015, published *Theories of Simultaneous Interpreting Cognitive Constraints and Translation Strategies*.

MAPS

Map and direction to the banquet place (10-min walk)



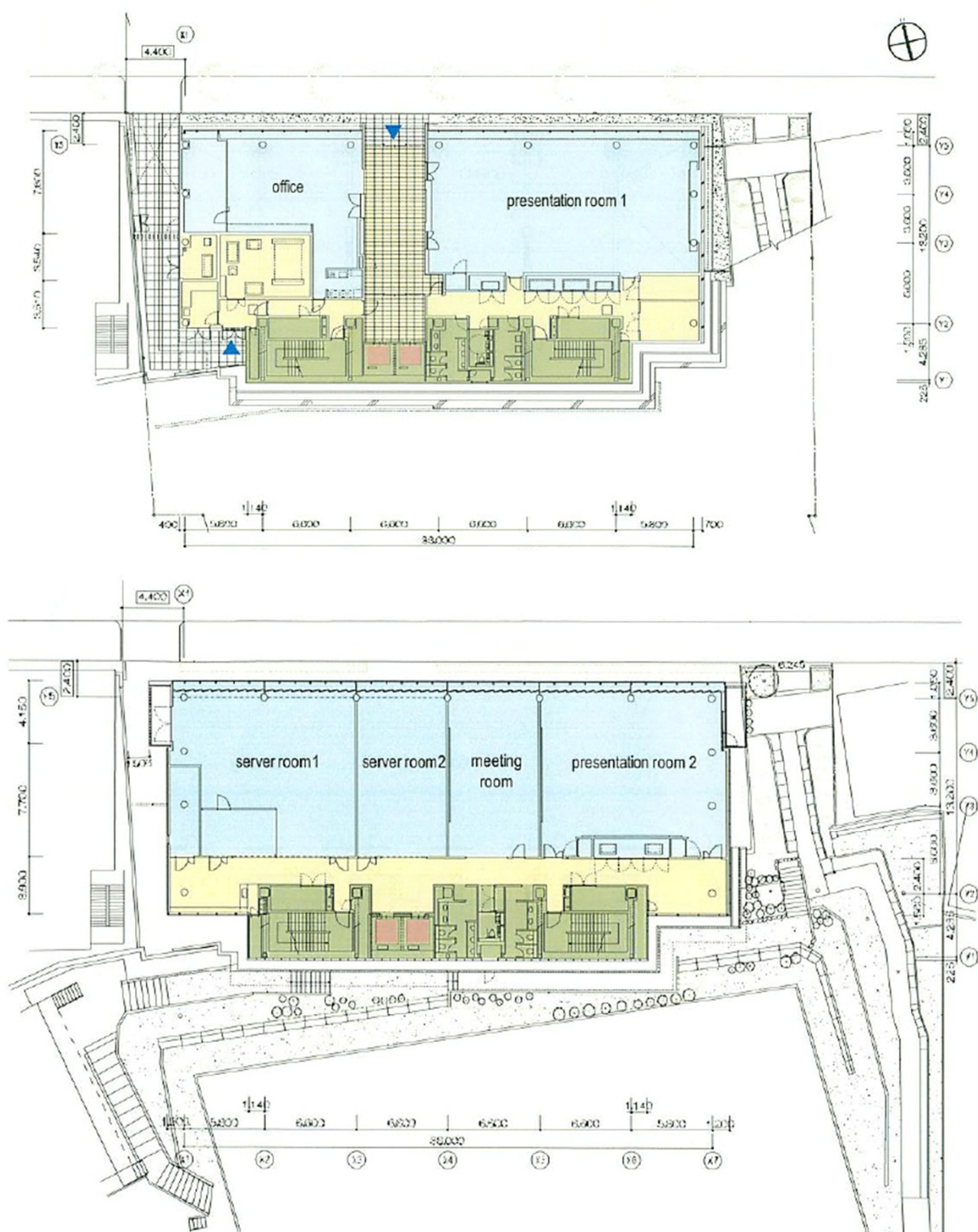
From RIHGA Royal Hotel Tokyo:

To Tokyo Metro Waseda Station: 10-minute walk

To JR Takadanobaba Station

- Free shuttle bus from hotel bus stop: 09:00 to 21:00, every 00/30 minutes
- 8 minutes by taxi (900 - 1,000 JPY)
- 30-minute walk

Floor Maps



An ID card is required to access to the 2F 205 presentation room.
If you want to access to the room, please ask the registration desk.