Dr. Muhammad **Shakeel**

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Experience

Honda Research Institute Japan, Co., Ltd. (HRI-JP)   *Tokyo, Japan*
SCIENTIST   *Nov. 2022 - till date*
- Research and development of an end-to-end deep learning-based system, in collaboration with Carnegie Mellon University, to provide accurate and contextualized automatic transcription for the hearing impaired.

Honda Research Institute Japan, Co., Ltd. (HRI-JP)   *Tokyo, Japan*
RESEARCH INTERNSHIP   *Dec. 2021 - Aug. 2022*
- Research and development of an end-to-end deep learning-based system for the hearing impaired.

COMSATS University Islamabad (CUI)   *Islamabad, Pakistan*
LECTURER   *Sep. 2015 - Mar. 2019*
- Development of clustering algorithm for ALPIDE chip data on Kintex-7 in collaboration with ALICE (CERN) and CUI.

Smart-I   *Rome, Italy*
AI & MACHINE LEARNING ENGINEER   *Feb. 2015 - Aug. 2015*
- Design, development, and optimization of machine learning algorithms for real-time traffic forecasting on the roads.

Smart-I   *Rome, Italy*
MACHINE LEARNING INTERN   *Feb. 2014 - May. 2014*
- Integrated support vector machines and Kalman filter to develop real-time prediction models, reducing energy consumption by 90% for pedestrian traffic and 80% for road traffic.

Human-Robot Informatics Lab - Tohoku University   *Sendai, Japan*
VISITING TRAINEE   *Sep. 2013 - Dec. 2013*
- Environmental sensing using a millimeter wave sensor equipped on a 3D rotation table for autonomous vehicles.

Education

Tokyo Institute of Technology   *Tokyo, Japan*
PH.D. IN SYSTEMS AND CONTROL ENGINEERING   *Sep. 2019 - Sep. 2022*
Thesis title: Anomaly detection and classification in multi-sensor systems using deep learning

Sapienza University of Rome   *Rome, Italy*
MASTER'S DEGREE IN ARTIFICIAL INTELLIGENCE AND ROBOTICS ENGINEERING   *Jan. 2012 - Jan. 2015*
Thesis title: 3D Measurement and Environmental Sensing using Millimeter-wave Sensor

COMSATS University Islamabad   *Islamabad, Pakistan*
BACHELOR'S DEGREE IN ELECTRONICS   *Sep. 2006 - Sep. 2010*
Thesis title: Multi-Task Autonomous Robot Using Reconfigurable Media (FPGA) and Machine Vision Techniques

Honors and Awards

INTERNATIONAL

2024	**BEST PAPER AWARD, Co-author**, IEEE Spoken Language Technology	*Macau, China*
2019	**MEXT**, Fully funded Ph.D. Research Fellowship (Japanese Government Scholarship)	*Tokyo, Japan*
2013	**TOHOKU UNIVERSITY EXCHANGE PROGRAMME**, Student Mobility Scholarship for Master's thesis	*Rome, Italy*
2012	**ERASMUS MUNDUS**, EU scholarship for seeking Master's degree in AI & Robotics	*Rome, Italy*

Scientific Activities

SELECTED PUBLICATIONS
CONTEXTUALIZED AUTOMATIC SPEECH RECOGNITION

Dec. 2024	**Contextualized Automatic Speech Recognition with Dynamic Vocabulary**, Yui Sudo, Yosuke Fukumoto, <u>Muhammad Shakeel</u>, Yifan Peng, Shinji Watanabe	*BEST PAPER AWARD IEEE SLT 2024*
Sep. 2024	**Contextualized End-to-end Automatic Speech Recognition with Intermediate Biasing Loss**, <u>Muhammad Shakeel</u>,Yui Sudo, Yifan Peng, Shinji Watanabe	*INTERSPEECH 2024*
Apr. 2024	**Contextualized Automatic Speech Recognition with Attention-Based Bias Phrase Boosted Beam Search**, Yui Sudo, <u>Muhammad Shakeel</u>, Yosuke Fukumoto, Yifan Peng, Shinji Watanabe	*IEEE ICASSP 2024*

Speech Foundation Model

OWSM V3. 1: Better and Faster Open Whisper-Style Speech Models Based on E-Branchformer,
Sep. 2024   Yifan Peng, Jinchuan Tian, William Chen, Siddhant Arora, Brian Yan, Yui Sudo, <u>Muhammad Shakeel</u>,   *INTERSPEECH 2024*
Kwanghee Choi, Jiatong Shi, Xuankai Chang, Jee-weon Jung, Shinji Watanabe

OWSM-CTC: An Open Encoder-Only Speech Foundation Model for Speech Recognition,
Aug. 2024   **Translation, and Language Identification**, Yifan Peng, Yui Sudo, <u>Muhammad Shakeel</u>, Shinji   *ACL 2024*
Watanabe

Reproducing Whisper-Style Training Using an Open-Source Toolkit and Publicly Available
Data, Yifan Peng, Jinchuan Tian, Brian Yan, Dan Berrebbi, Xuankai Chang, Xinjian Li, Jiatong Shi,
Dec. 2023   Siddhant Arora, William Chen, Roshan Sharma, Wangyou Zhang, Yui Sudo, <u>Muhammad Shakeel</u>,   *IEEE ASRU 2023*
Jee-weon Jung, Soumi Maiti, Shinji Watanabe

Unified Speech Model

Joint Optimization of Streaming and Non-Streaming Automatic Speech Recognition with   *IEEE ICASSPW*
Apr. 2024   **Multi-Decoder And Knowledge Distillation**, <u>Muhammad Shakeel</u>, Yui Sudo, Yifan Peng, Shinji   *HSCMA 2024*
Watanabe

Sep. 2023   **Time-synchronous one-pass Beam Search for Parallel Online and Offline Transducers with**   *INTERSPEECH 2023*
Dynamic Block Training, Yui Sudo, <u>Muhammad Shakeel</u>, Yifan Peng, Shinji Watanabe

Sep. 2023   **4D ASR: Joint modeling of CTC, Attention, Transducer, and Mask-Predict decoders**, Yui Sudo,   *INTERSPEECH 2023*
<u>Muhammad Shakeel</u>, Yifan Peng, Shinji Watanabe

Sep. 2023   **DPHuBERT: Joint Distillation and Pruning of Self-Supervised Speech Models**, Yifan Peng, Yui   *INTERSPEECH 2023*
Sudo, <u>Muhammad Shakeel</u>, Shinji Watanabe

Anomaly Detection and Classification

Jan. 2023   **Metric-based multimodal meta-learning for human movement identification via footstep**   *IEEE/SICE SII 2023*
recognition, <u>Muhammad Shakeel</u>, Katsutoshi Itoyama, Kenji Nishida and Kazuhiro Nakadai

Feb. 2022   **3D Convolution Recurrent Neural Networks for Multi-Label Earthquake Magnitude**   *Applied Sciences*
Classification, <u>Muhammad Shakeel</u>, Katsutoshi Itoyama, Kenji Nishida and Kazuhiro Nakadai   *(MDPI)*

Apr. 2021   **Detecting earthquakes: a novel deep learning-based approach for effective disaster response**,   *Applied Intelligence*
<u>Muhammad Shakeel</u>, Katsutoshi Itoyama, Kenji Nishida and Kazuhiro Nakadai

Jan. 2021   **EMC: Earthquake Magnitudes Classification on Seismic Signals via Convolutional Recurrent**   *IEEE/SICE SII 2021*
Networks, <u>Muhammad Shakeel</u>, Katsutoshi Itoyama, Kenji Nishida and Kazuhiro Nakadai

Reviewer

2025   **ICLR**, The Thirteenth International Conference on Learning Representations
2024, 2025   **IEEE**, International Conference on Acoustics, Speech, and Signal Processing (ICASSP)
2024   **ISCA**, INTERSPEECH
2023, 2024   **IEEE**, International Symposium on System Integration (SII)
2023   **IEEE**, International Conference on Robot and Human Interactive Communication (RO-MAN)
2023   **IEEE**, Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)
2022   **IEEE**, 21st International Conference on Humanoid Robots (Humanoids)

Organizer

2023   **WORKSHOP**, "Speech-based communication for robots and systems," workshop in IEEE
International Conference on Robot and Human Interactive Communication (RO-MAN).

2023   **SESSION CHAIR**, "Robot Perception for Interaction and Communication," in IEEE International
Conference on Robot and Human Interactive Communication (RO-MAN).

Research Profiles

a. **Google Scholar**
b. **Semantic Scholar**
c. **ORCiD**
d. **ResearchGate**
e. **Scopus**

Extracurricular Activities

- Elected and served as a Vice-President in 2020-2021 for Pakistan Student Association Japan (PSAJ).
- Served as a staff volunteer for IJCAI-PRICAI 2020 conference held online from January 7-15, 2021.