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International Conference 2022

**Air quality forecasting using
big data and machine learning algorithms**

2022. 8. 24. Wed

**The-K Hotel Seoul
Geomungo Hall(A,B)**

Hosted by



미세먼지관리 특성화대학원
Graduate School of Particulate Matter Management

Sponsored by



International Conference 2022

Air quality forecasting using big data and machine learning algorithms

- Date : August 24th(Wed.), 2022 10:00~18:00 (Korean Time)
- Venue : Geomungo Hall(A,B), The-K Hotel Seoul (with Zoom)

Time	Program
10:00~12:00	Young Researchers Sessions
12:00~13:30	Lunch
	Opening Ceremony
13:30~13:40	Opening Remarks Youn-Seo Koo (Professor, Anyang University)
	Welcome Remarks Jo-Chun kim (President, Korean Society for Atmospheric Environment)
13:40~15:40	Invited Sessions I (in English)
15:40~16:00	Break
16:00~18:00	Invited Sessions II (in Korean)
18:00~20:00	Dinner

* This program is subject to change.

Young Researchers Sessions

Chair Ho, Chang-Hoi(Professor, Seoul National University)

Zoom ID: 836 4373 0213

Password: 1234

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- 10:00~10:20 **Intercomparison of Deep-learning based Super-Resolution Bias-Correction (SRBC) methods for Indian Summer Monsoon Rainfall using CORDEX-SA climatic simulation**
Deveshwar Singh · Yunsoo Choi
Department of Earth and Atmospheric Sciences, University of Houston
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- 10:20~10:40 **A Coupled Deep Learning Model for Estimating Surface NO₂ Levels from Remote Sensing Data: 15-Year Study Over the Contiguous United States**
Masoud Ghahremanloo · Yannic Lops · Yunsoo Choi
Department of Earth and Atmospheric Sciences, University of Houston, Houston, TX, USA, 77004
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- 10:40~11:00 **Deep Learning Solver for solving Advection-Diffusion Equation in comparison to Finite Difference Methods**
Ahmed Khan Salman · Arman Pouyaei · Yunsoo Choi · Yannic Lops · Alqamah Sayeed
Department of Earth and Atmospheric Sciences, University of Houston
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- 11:00~11:20 **Untangling the contribution of input parameters to an artificial intelligence PM_{2.5} forecast model using the layer-wise relevance propagation method**
Dasol Kim¹ · Chang-Hoi Ho² · **Ingyu Park**² · Jinwon Kim³ · Lim-Seok Chang⁴ · Min-Hyeok Choi⁴
¹*Department of Geography, University of Florida*
²*School of Earth and Environmental Sciences, Seoul National University*
³*National Institute of Meteorological Sciences*
⁴*National Institute of Environmental Research*
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- 11:20~11:40 **PM2.5 Image enhancement using GAN and Convolution-LSTM**
Ji-Seok Koo · Hee-yong Kwon
Department of Computer Engineering, Anyang University
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- 11:40~12:00 **Sequence Processing Convolutional Long Short-Term Memory for PM_{2.5} Prediction of Fine Dust Concentration**
Joon-Min Lee · Kyung-Tae Kim · Jae-Young Choi
Pattern Recognition and Machine Intelligence (PMI) Lab, Department of Computer Engineering, Hankuk University of Foreign Studies
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Invited Sessions I (in English)

Chair Youn-Seo Koo(Professor, Anyang University)

Zoom ID: 894 2351 5914

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- 13:40~14:00** **A novel CMAQ–CNN hybrid model to forecast hourly surface–ozone concentrations 14 days in advance**
Alqamah Sayeed¹ · Yunsoo Choi¹ · Ebrahim Eslami¹ · Jia Jung¹ · Yannic Lops¹
· Ahmed Salman¹ · Jae-Bum Lee² · Hyun-Ju Park² · Min-Hyeok Choi²
¹Department of Earth and Atmospheric Sciences, University of Houston
²National Institute of Environmental Research, Incheon, Korea
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- 14:00~14:20** **A Cluster–based Graph Neural Network Approach for Forecasting PM_{2.5} Concentrations in India using Monitoring Sensors Data**
Ejurothu Pavan Sai Santhosh · Subhojit Mandal · Mainak Thakur
Department of Computer Science and Engineering, Indian Institute of Information Technology, Sricty
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- 14:20~14:40** **Determination of Input variables for Artificial Intelligence Models to predict the High PM_{2.5} concentration events in Seoul**
Moon-Soo Park · Sang-Heon Kim¹
Department of Climate and Environment, Sejong University
¹Climate Change & Environmental Research Center, Sejong University
-
- 14:40~15:00** **LSTM–based PM_{2.5} forecast system in Korea**
Ho, Chang-Hoi¹ · Ingyu Park¹ · Jinwon Kim² · Jae-Bum Lee³
¹School of Earth and Environmental Sciences, Seoul National University, Seoul, Republic of Korea
²National Institute of Meteorological Sciences, Seogwipo, Republic of Korea
³National Institute of Environmental Research, Incheon, Republic of Korea
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- 15:00~15:20** **Long–Term Air Quality Prediction of South Korea Based on Deep Neural Network**
Sangkyun Lee
School of Cybersecurity, Korea University
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- 15:20~15:40** **Virtual observation at green and red bands of geostationary environment monitoring spectrometer using a deep learning technique**
Han-Sol Ryu¹ · Jeong-Eun Park¹ · Goo Kim² · Jaehoon Jeong² · Sungwook Hong¹
¹Department of Environment, Energy, and Geoinformatics, Sejong University
²Environmental Satellite Center, National Institute of Environmental Research
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Invited Sessions II (in Korean)

Chair Sangkyun Lee(Professor, Korea University)

Zoom ID: 811 1708 6593

Password: 1234

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- 16:00~16:20 **Research of Particulate Matter Prediction Modeling Based on Deep Learning**
Lee, Seong Gu
Department of Human ICT Convergence, Sungkyunkwan University
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- 16:20~16:40 **Improvement of Particulate Matter Prediction Performance in Subway Stations Using Reconstruction Error-based Spatiotemporal Transformer**
Youngkwang Kim · Bokju Kim¹ · SungMahn Ahn²
Data Solution Business Department, WesleyQuest Co., Ltd.
¹*D&A Platform Department, Woori Finance Information System Co., Ltd.*
²*School of Business Administration, Kookmin University*
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- 16:40~17:00 **How to amplify anomaly data in consideration of environmental changes and improve prediction performance**
Chul Hyun Hwang
Department of Big Data, Kyoung-Bok University
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- 17:00~17:20 **Development of short-term artificial intelligence PM_{2.5} forecast model**
Hui-Young Yun¹ · Dae-Ryun Choi¹ · Ji-Seok Koo² · Kyung-Hui Wang³
· Youn-Seo Koo¹
¹*Department of Environmental and Energy Engineering, Anyang University*
²*Department of Computer Engineering, Anyang University*
³*Department of Environmental Engineering, Graduate School of Anyang University*
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- 17:20~17:40 **Spatiotemporal Variations in Air Quality over East Asia(China and South Korea) from 2015 to 2020 using CMAQ with Data Assimilation**
Dae-Ryun Choi¹ · Hui-Young Yun¹ · Ji-Seok Koo² · Kyung-Hui Wang³
· Youn-Seo Koo¹
¹*Department of Environmental and Energy Engineering, Anyang University*
²*Department of Computer Engineering, Anyang University*
³*Department of Environmental Engineering, Graduate School of Anyang University*
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- 17:40~18:00 **Improved air quality forecasting accuracy by applying ensemble method**
Sung-Tae Kim
E2M3 Inc.
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Direction Conference Site

Address

70, Baumoe-ro 12-gil, Seocho-gu, Seoul (former address: 202, Yangjae-dong, Seocho-gu, Seoul)

Public Transportation

Subway

By Foot	Exit 5 of Shinbundang Line Yangjae Citizen's Forest Station (5 min walk)
Shuttle Bus	Exit 9, Seoul Subway Line 3 Yangjae Station, in front of Seocho Culture & Arts Center
Green Bus	Exit 10 and 11, Line 3 Yangjae Station → Green Buses Seocho 08, 20 → disembark at hotel rear gate

Bus

Blue Bus (Standard)	Blue Bus: 405, 421, 140, 470, 441 → Disembark at Yangjae Flower Market station (10 min walk)
Green Bus (08, 20)	Exit 10 and 11, Line 3 Yangjae Station → Green Buses Seocho 08, 20 → disembark at hotel rear gate