SUREDOS24

Super-Resolution and Downscaling for EO and Earth Science

29–31 May 2024 | ESRIN | Frascati, Italy

Day 1: Wednesday, 2024 May 29: Magellan Room	
11:45	*Bus departure from Frascati (Piazza Marconi)*
12:30	*Registration opens*
Opening Session	
14:00–14:05	Opening and General Information Zoltan Bartalis, Nicolas Longépé (ESA)
14:05–14:15	Welcome and Introduction Rune Floberghagen (ESA)
14:15–14:30	Overview of ESA EO Activities Zoltan Bartalis, Nicolas Longépé (ESA)
Session 1: Advanced Artificial Intelligence and Deep Learning for Super-Resolution Applied to Sentinel-2	
14:30–14:50	Sentinel-2 and Related Missions: Status Update Ferran Gascon (ESA)
14:50–15:10	Super-Resolution of Multispectral Sentinel-2 Imagery with Latent Diffusion Models Simon Donike (University of Valencia, Spain)
15:10–15:30	S2DR3: Effective 12-Band 10x Single Image Super-Resolution for Sentinel-2 Yosef Akhtman (Gamma Earth, Switzerland)
15:30–15:50	Super-Resolution of Sentinel-2 Images Using the Second-order Attention Network and Geosat Images as Real Ground Truth Data Rubén Sesma (Tracasa Instrumental, Spain)
15:50–16:10	Real-World Sentinel-2 Super-Resolution Relying on Task-Driven Training Michal Kawulok (KP Labs, Poland)
16:10–16:40	*Coffee Break*
16:40–17:00	Reasonable Super-Resolution and Self-Supervision Jérémy Anger (Kayrros / ENS Paris-Saclay, France)
17:00–17:20	From Multispectral to Hyperspectral: A Deep Learning Architecture Integrating GAN and Channel Attention for Enhanced Spectral Super-Resolution Zuzana Gawrysiak (Four Point, Poland)
17:20–17:40	SEN2NAIP: Sentinel-2 Super-Resolution Dataset Using a Realistic Degradation Model Cesar Luis Aybar Camacho (University of Valencia, Spain)
17:40–18:00	Building an Operational Shallow Sentinel-2 Single Image Super-Resolution Network for EVOLAND Prototypes: Lessons Learned Julien Michel (CESBIO, France)
18:00	*Ice-breaker and networking*
19:00	*Bus departure to Frascati (Piazza Marconi)*
Day 2: Thursday, 2024 May 30: Magellan Room	
08:15	*Bus departure from Frascati (Piazza Marconi)*
08:30	*Registration opens*
Session 2: Super-Resolution Applied to a Wide Variety of Earth Observation Data	
09:30–09:50	Overview of ESA Third-Party Mission Activities Montserrat del Riego (ESA)

09:50–10:10	Deep Learning for Restoration and Super-Resolution of Satellite Panchromatic Images Enrico Magli (Politecnico di Torino, Italy)
10:10–10:30	Assessment of Deep Learning Approaches for Satellite Video Super-Resolution Thierry Germa (Magellium, France)
10:30–10:50	Super-Resolution Research at UCL-MSSL Applied to Panchromatic and Multispectral EO and Mars Surface Data Over the Last Decade Jan-Peter Muller (University College London, United Kingdom)
10:50–11:10	Super-Resolution of Sentinel-1 Imagery Using an Enhanced Attention Network and Real Ground Truth Data Juan Francisco Amieva (Tracasa Instrumental, Spain)
11:10–11:40	*Coffee Break*
11:40–12:00	Enhancing Night-Time Light Imagery for Sustainable Development: The SupR-NTL Project Alessandra Feliciotti (MindEarth, Switzerland)
12:00–12:20	Unsupervised Evaluation of Super-Resolution Techniques on Thermal Remote Sensing Data Julia Gottfriedsen (Ororatech, Germany)
12:20–12:40	Taming Super-Resolution Models for Cross-Sensor Applications Christian Mollière (Ororatech, Germany)
12:40–13:00	Internal Learning for Satellite Image Super-Resolution Mikolaj Czerkawski (ESA Phi-Lab, Italy)
13:00–13:20	Beyond Super-Resolution: Virtual Sensing Mihai Datcu (National University of Science and Technology POLITEHNICA Bucharest, Romania)
13:20–14:30	*Lunch*
Session 3: Downscaling Techniques in the Context of Earth Science and Earth Observation Applications	
14:30–14:50	Developing Purely 1-km High-Resolution Satellite-Derived Precipitation Estimation Using Machine Learning Algorithms Hamidreza Mosaffa (Research Institute for Geo-Hydrological Protection, National Research Council, Italy)
14:50–15:10	AI for Urban Climate: Using EO-Based and Community Data for Air Temperature Downscaling at Urban Scales Maria Castro (+ATLANTIC CoLAB, Portugal)
15:10–15:30	Super-Resolution of GOME-2 Nitrogen Dioxide (NO2) Data Using Sentinel-5P TROPOMI Observations: Beyond Temporal Aggregation to Train Atmospheric Models Riccardo Ratta (Università Degli Studi Di Ferrara, Italy)
15:30–15:50	A Methodology Based on AI Modules for Super-Resolution of Sentinel-5P Level 1B Data and Sentinel-3 Level 2 LST Data Davide De Santis (Tor Vergata University of Rome, Italy)
15:50–16:10	Enhancing Soil Moisture Resolution: Downscaling of SMOS Data over West Africa using Hybrid Model Odunayo David Adeniyi (University of Pavia, Italy)
16:10–16:40	*Coffee Break*
Session 4: Super-Resolution Product Quality, Adoption and Downstream Services	
16:40–17:00	Incorporating Perceptual Quality Measures in Super-Resolution for Enhanced Environmental Monitoring: Sentinel-2 for Waste Detection Teodora Selea (GMV Solutions, Romania)
17:00–17:20	Super Resolution Applied to Sentinel-2 Images for EO Applications and Services Vincent Poulain (Thales Services Numériques, France)

17:20–17:40	IRIX4US: Fine-Tuned Super-Resolution GAN Applied to Sentinel-2 in Urban Planning Ricardo Martínez Prentice (Cotesa, Spain)
17:40–18:00	Semi-Supervised Learning for Spatio-Temporal Super-Resolution Landcover Segmentation Lukas Brodsky (Mapradix, Czech Republic)
18:00	*Poster and networking session*
19:00	*Bus departure to Frascati (Piazza Marconi)*
Day 3: Friday, 2024 May 31: Magellan Room	
08:15	*Bus departure from Frascati (Piazza Marconi)*
08:30	*Registration opens*
Session 5: Super-Resolution Product Quality, Adoption and Downstream Services (Continued)	
09:30–09:50	Assessing the effectiveness and limitations of Super-Resolution in Satellite Remote Sensing Sherif Elsayed (Nabta Playa, Germany)
09:50–10:10	Evaluating Real-World Super-Resolution of Hyperspectral Images Michal Kawulok (KP Labs, Poland)
10:10–10:30	The HD Processing Algorithms Applied to VHR Optical Data: a Super-Resolution Use Case with Maxar Imagery Evaluated in the Context of the ESA/EDAP Project Sebastien Saunier (TPZ, France)
10:30–11:50	*Coffee Break*
Super-Resolution Intercomparison Exercise (SuperIX)	
10:50–11:50	SuperIX: General presentation, dataset and metrics, toolkits and WebGIS portal presentation Luis Gómez Chova, Alfredo Kalaitzis, Gunnar Brandt, and the OpenSR consortium
11:50–12:20	Discussion, manifestation of interest to join SuperIX All
Wrap-Up and Closing	
12:20–12:50	Wrap-Up from Session Chairs
12:50–13:00	Closing Remarks ESA

Posters
Assessing Future Changes in Greenland Runoff Via a Deep Learning Emulator Elke Schlager (Aarhus University, Denmark)
Towards a Controllable Diffusion Model for Photo-Realistic Super-Resolution of Sentinel-2 Muhammad Sarmad (Norsk Regnesentral, Norway)
Multi-Image Super-Resolution Underpinned with Graph-Based Input Data Representation Michal Kawulok (KP Labs, Poland)
Transfer of Pre-trained Generative Models for Satellite Image Super-Resolution Mikolaj Czerkawski (ESA Phi-Lab, Italy)
Remote Sensing-Based Spatiotemporal Monitoring and Mapping of Soil Salinity Dynamics in Sehb El Masjoune Region Tabiti Ikrame (Mohammed VI Polytechnic University, Morocco)
Remotely-Sensed High-Resolution Irrigation Extent in Italy Under Drought Stress Muhammad Usman Liaqat (Research Institute for Geo-Hydrological Protection, National Research Council, Italy)
Analysis of the Applicability of Super-Resolved Sentinel-2 Images for Detection and Segmentation of Photovoltaic Power Plants Pauline Hecker (Fraunhofer Ernst-Mach-Institut, Germany)
Monitoring of Intertidal Seaweed Habitats Using Satellite and UAV Data Fusion Damir Akhmetshin (South East Technological University, Ireland)
Super-Resolution for Climate Crisis Context: Sentinel-2 3 m Enhancement Maximilien Houël (Sistema, Austria)
AI-Enhanced Satellite Imagery for Sustainable Energy Monitoring in Asia Yohan Iddawela (Asian Development Bank, Philippines)
Interest of Nimbo Data for Large-Scale Super-Resolution Thomas Corpetti (CNRS, Italy)
Super-Resolution for Agriculture EO Services Project Sara Verbič (Sinergise Solutions, Slovenia)
Coseismic Surface Deformation Associated with the Mw 6.3, 25 January 2016 Al Hoceima (Morocco) Earthquake Using Time Series Analysis of SAR Images Rida Haddane (Mohammed V University In Rabat, Morocco)
Downscaling of Daily Precipitations over Morocco Using Deep Learning Techniques Mohammad El Aabaribaoune (Mohammed VI Polytechnic University, Morocco)
Realistic Daily Dynamics of Olive and Olive Fly at 250 m Resolution Using Cloud-Gap-Filled Canopy Temperature Data from MODIS LST Calibrated with MODIS NDVI Luigi Ponti (ENEA, Italy)
HD-CAMS: A Deep Super-Resolution Approach for Enhancing Geostationary Observations with Polar Orbital Satellite Surface Solar Irradiance Data Jose Gomez (Centre Observation Impacts Energie, Mines Paris, Paris Sciences & Lettres University, France)