Krishna Karra

Remote Sensing | Machine Learning | Data Visualization

Contact

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Technical Skills

Python ● Bash ● C/C++ ● MATLAB
Tensorflow ● Pytorch ● Scikit-learn
GCP ● AWS ● BigQuery ● Postgres
GDAL ● QGIS ● Mapshaper

Selected Media

"A Vivid View of Extreme Weather: Temperature Records in the U.S. in 2021", *The New York Times,* Jan 11 2022

"The True Colors of America's Political Spectrum are Gray and Green", *The New York Times*, Sep 2 2020 (Gold Award - Malofiej 29)

"Watch the Footprint of Coronavirus Spread Across Countries", *The New York Times*, Mar 17 2020

"A Decade of Urban Transformation, Seen From Above", *The New York Times,* Dec 27 2019

Academic Publications

"Satellite monitoring of terrestrial plastic waste", Kruse et al., *PLOS ONE,* Jan 18 2023

"Global land use/land cover with Sentinel 2 and deep learning", Karra et al., *IEEE IGARSS,* Jul 11 2021

"Towards tracking the emissions of every power plant on the planet", Couture et al., *NeurIPS,* 2020

"Modulation recognition using hierarchical deep neural networks", Karra et al., *IEEE DySpan Workshop*, Mar 6 2017

Patents

"Systems and methods to categorize mapping categories of pixels", *Filed by Impact Observatory*, Dec 29 2020

"Automated RF Dataset Creation", *Filed by KickView Corporation,* Jun 16 2020

Professional Experience

The Earth Genome | *Principal Associate* | Full-time **2022-2023**

- Earth Index: Led the development of technology that renders satellite imagery searchable through data compression and indexing.
  - Developed deep learning and remote sensing models to compute searchable embeddings from spatial and temporal reductions of multispectral Sentinel 2 imagery.
  - Prototyped a user-friendly interface that allows users to select a region on Earth, instantly returning areas that most closely resemble the input location.
  - Detected newly mined areas in the Amazon Basin to support Amazon Mining Watch.
  - Mapped open sewage waste pools in Alabama to support environmental justice programs sponsored by the U.S. Government.
  - Identified destroyed villages in Myanmar due to ethnic violence related to the ongoing Rohingya conflict.
- Global Plastic Watch: Implemented core components of the model pipeline to detect plastic waste sites from Sentinel-2 satellite imagery.

Earthsight | *CEO* | Consulting **2020-2022**

- Founded a consulting firm with a specialization in satellite imagery, machine learning, remote sensing and data visualization.
  - **ProPublica:** Computed vegetation indices from aerial imagery to measure the extent of urban green spaces in cities along the Colorado river in relation to their natural environment.
  - **The New York Times:** Processed and aggregated data from the GHCN weather station network in BigQuery to map temperature records across the U.S.
  - **Understory:** Constructed a pipeline for developing, deploying and evaluating machine learning models on high-resolution drone imagery (NatMap).
  - **Impact Observatory:** Trained, validated and deployed a deep learning segmentation model that identified land cover from Sentinel 2 imagery at 10 meter resolution (ESRI Land Cover).
  - **WattTime:** Developed geospatial data retrieval pipelines in Google Earth Engine for monitoring emissions from power plants (Climate TRACE).

Descartes Labs | *Applied Scientist* | Full-time **2018-2020**

- Architected and developed a machine learning system that utilized a combination of Sentinel 1, Sentinel 2 and aerial imagery to monitor oil and gas activity on a large geographic scale.
- Produced visual content and data products for journalists using the Descartes Labs platform.
  - Investigated the correlation between the natural hues of the landscape and political affiliation in the United States using aerial imagery from the National Agricultural Imagery Program.
  - Tracked the decrease in pollution over major cities across the globe during the COVID-19 pandemic using Sentinel 5P satellite data.
  - Mapped the growth of ex-urban areas in the U.S. over a decade through the creation of a deep learning model that identified impervious surfaces in Landsat imagery.

KickView Corporation | *Signal Processing Research Engineer* | Full-time **2017-2018**

BAE Systems | *Senior Principal Research Engineer* | Full-time **2014-2017**

BIT Systems | *Signal Processing Engineer* | Full-time **2011-2014**

Teaching

The Cooper Union | *Adjunct Professor* **2021-current**

- ECE471: Fundamentals of Remote Sensing and Earth Observation
- Course syllabus, geospatial tools assignment, machine learning assignment

Education

University of Southern California | *M.S. Electrical Engineering* **2012-2015**

The Cooper Union | *B.E. Electrical Engineering* **2007-2011**