Machine learning Remote Sensing Image Processing

SUNJAY SUNJAY (India)

Key words: Photogrammetry; Keyword 1; Keyword 2; Keyword 3

SUMMARY

Remote sensing imagery image processing and interpretation is employed for extractive industries hydrocarbon, minerals mapping, coal geothermal energy resources exploration, agriculture crops, land use, pedology soil texture studies,Geohazards monitoring, disaster management, carbon , methane aerosol emissions detection for climate change, environmental monitoring and management, forest , wildlife conservation, etc. High resolution Image processing is completed by using wavelet transform . Wavelet transform computaion dilation first the translation this is not commutative. Graphic processing unit GPU is used for image analysis sobel filter -gradient filter canny edge detection etc.Machine learning ML, deep learning DL in image processing uses computer algorithms for understanding the relationships between large amounts of complex interrelated surface geological geoinformation data.Artificial intelligence adaptive, cognitive science applications for geosciences surface imaging and interpretation, Digital twins of multiscale seismic imaging of faults, fractures, wavelet transform for machine learning WCNN training CNN with wavelet transform for image classification, Machine learning ML, Explainable interpretable machine learning XML, Dictionary learning in seismic interpretation uses computer algorithms for understanding the relationships between large amounts of complex interrelated subsurface geological information data.Artificial intelligence adaptive, cognitive science applications for geosciences geospatial surface imaging and interpretation, Artificial Neural Network-ANN, Recurrent Neural Networks RNN-time series data, ANN-CNN Convolutional Neural Network, DNN Deep Neural Network, ResNet Residual Neural Network, generative adversarial networks (GANs), deep Bayesian convolutional neural network, unsupervised and supervised machine learning, deep learning, reinforcement learning for seismic imaging and inversion, seismic attributes ,seismic interpretation, reservoir characterization, geosciences data analytics ,bigdata analytics, data assimilation modelling and simulation,etc. Physics Informed Neural Network PINN ,greybox model [whitebox-physics,blackbox-data, black+white= grey], Graph Neural Network

GNN machine learning for subsurface imaging and interpretationDictionary learning is a branch of signal processing and machine learning that aims at finding a frame (called dictionary) in which some training data admits a sparse representation. wavelet transform for machine learning WCNN training CNN with wavelet transform for image classification and geological feature extractions.The most highly-used subset of ImageNet is the Large Scale Visual Recognition Challenge (ILSVRC) evaluates algorithms for object detection and image classification at large scale. One high level motivation is to allow researchers to compare progress in detection across a wider variety of objects -- taking advantage of the quite expensive labeling effort. Another motivation is to measure the progress of computer vision for large scale image indexing for retrieval and annotation. Partial Differential Equations are also used for image processing.Machine Learning (ML) and remote sensing technology aids in many applications requiring large amounts of spectral and geospatial data needed for pattern recognition. ML uses algorithms through computer systems, computer vision, and ML,DL techniques to collect and identify features in Earthscience with precise accuracy and speed. ML a subset of Artificial Intelligence (AI) and computer vision (CV) to understand the data collected in order to find resolutions for remote sensing data and improve the overall accuracy of the data classification and can enhance the reliability and assessment of the features of data collected. ML algorithms through neural networks can improve the analysis of large areas to classify objects, identify temporal change, data fusion, cloud removal, and spectral analysis from satellite or aerial imagery that will overcome challenges of remote sensing data. Satellite observations geospatial data Hyperspectral Satellite sensors, advanced spectral resolution and capabilities to detect carbon (CO_2) and methane (CH_4), aerosol emissions and monitoring. My role whole sole goal to control greenhouse gases emissions with a view to global warming mitigation and climate change.