A Deep Learning Method for Local Climate Zone Classification

Deniz Yildirim (Turkey), Maria Vakalopoulou (France), Konstantinos Karantzalos (Greece) and Oguz Gungor (Turkey)

SUMMARY

Environmental issues such as energy conservation have led to fine land cover classifications including Local Climate Zone (LCZ) classification that divides urban and rural regions into 17 classes with the aim to better characterize the physical structure of human settlements. World Urban Database (WUDAPT) website has a procedure for LCZ classification using SAGA GIS software and Landsat imagery. In classification and feature extraction on audio, video and imagery, many prevalent algorithms are equivalent to certain deep learning (DL) algorithms. Better DL systems than these special cases now exist that have enabled a dramatic enhancement in achievement results. For instance, ImageNet classification error rates have decreased from around 20% to around 5%, using variants of Convolutional Neural Networks (CNN). Besides supervised and unsupervised learning, a third paradigm in learning is reinforcement learning, reminiscent of the Markov Decision Processes. In this study, also incorporating ideas from reinforcement learning, we have devised a deep learning based method for LCZ classification. We have compared with and achieved favorable results against various deep and shallow algorithms such as ones based on Support Vector Machines or Random Forests including the default SAGA GIS LCZ classification.

A Deep Learning Method for Local Climate Zone Classification (9583)
Deniz Yildirim (Turkey), Maria Vakalopoulou (France), Konstantinos Karantzalos (Greece) and Oguz Gungor (Turkey)

FIG Congress 2018
Embracing our smart world where the continents connect: enhancing the geospatial maturity of societies
Istanbul, Turkey, May 6–11, 2018