TEXAS TECH UNIVERSITY
Department *of* Computer Science

REFINED Convolutional Neural Networks

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Zoom

Abstract: Deep learning with Convolutional Neural Networks has shown great promise in various areas of image-based classification and enhancement but is often unsuitable for predictive modeling involving non-image based features or features without spatial correlations. This talk will present a new approach for representation of high dimensional feature vector in a compact image form termed REFINED (REpresentation of Features as Images with NEighborhood Dependencies) that is conducible for convolutional neural network based deep learning. I will illustrate the suitability of the proposed representation for higher accuracy anti-cancer drug sensitivity prediction as compared to existing approaches using multiple datasets. I will also discuss extensions of the work to consider different choices of distance metrics and/or projection schemes that can improve upon a single projection based REFINED-CNN model. The REFINED methodology can be considered as a novel regression framework that can convert high dimensional predictors into mathematically justifiable image objects that can be processed by convolutional network based deep learning methodologies.

Bio: Ranadip Pal received the BTech degree in electronics and electrical communication engineering from the Indian Institute of Technology, Kharagpur, India, in 2002, and the MS and PhD degrees in electrical engineering from Texas A & M University, College Station, in 2004 and 2007, respectively. From 2007, he has been with Texas Tech University where he is currently a professor in the Electrical and Computer Engineering Department. His research areas are genomic signal processing, computational systems biology, machine learning and stochastic modeling and control. He is the author of more than 100 peer-reviewed articles including publications in high impact journals such as Nature Medicine, Nature Communications and Cancer Cell and author of a book entitled "Predictive Modeling of Drug Sensitivity". He has contributed extensively to robustness analysis of genetic regulatory networks and predictive modeling of drug sensitivity. His research has been supported through NSF, NIH, DOE and USDA grants including NSF Career and NIH R01s. Pal received the Whitacre Faculty fellow in 2018, Chancellor's council distinguished research award in 2016, Whitacre Research Award, 2014; President's excellence in Teaching Award, 2012; and NSF CAREER Award, 2010.