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SenSIP Student Seminar Series

Effective Prior Selection and Knowledge Transfer

Presenter: Sameeksha Katoch

PhD Student

October 15, 2021, 3:00 PM / Zoom https://asu.zoom.us/j/85026601218

Abstract

To enable real-world deployment, machine learning models should possess the ability to generalize to novel unseen tasks or unknown covariate shifts. The existing strategies imply that knowledge transfer in a deep learning network is mainly a function of gradients. Through this work we aim to understand whether gradients capture all information pertinent to the domain, task and model priors and determine what prior should be used for most meaningful knowledge transfer? We consider the challenging problem of task and domain generalization, where there are no known semantic relationships a priori. For task generalization (TG), we present Invenio, a structured meta-learning algorithm to infer semantic similarities between a given set of tasks and then leverage the inferred semantic structure to generalize to unobserved tasks under the limited data regime. For the problem of multi-source zero shot domain generalization (MDG) we propose MulDEns (Multi-Domain Deep Ensembles), a new approach for constructing deep ensembles in multi-domain problems that does not require constructing domain-specific models. Our empirical studies demonstrate significant performance improvements over existing baselines such as transfer learning, multi-task learning, meta learning (TG) and ERM and existing ensembling solutions for MDG.

Biography:

Sameeksha Katoch is a Ph.D. student in electrical engineering at Arizona State University (ASU). She received her Masters in electrical engineering from ASU in 2018 and a Bachelors in electronics and communication engineering from the National Institute of Technology, Srinagar, India, in 2015. She has interned with Lawrence Livermore National Laboratory and Prime Solutions Group, Inc. over the past summers. Her research interests include developing privacy conscious deep learning models for applications in healthcare and utilizing task/domain semantics for understanding and improving deep learning model performance on a wide variety of tasks.

Sponsored by the SenSIP Center and NSF I/UCRC

Technical Co-Sponsorship by the IEEE Signal Processing and Communications Chapter, Phoenix Section

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