CE956: Statistical Learning
Department of Computer Engineering
Sharif University of Technology
Spring 2019: Room CE204, Sat. & Mon.: 13:30-15:00

Quiz 06 (20 Points) – (May-18-2019)

Solution

Interpretable Learning:

1. What are the main deficiencies of deep networks? Explain. (5 points)
   - They are vulnerable to spoofing (adversarial attack problem)
   - They are inefficient (small data problem)
   - They lack to explain why? (interpretability problem)
   - They fail to explain common sense and functions
2. What is meta RL? In what respect it helps interpretability? (7.5 points)
   - Meta-learning algorithm try to automatically find the best architecture and hyperparameters in a learning problem (learning-to-learn: self-supervised learning). Meta RL is just applying meta-learning to RL by expanding the scope of training and training the network for more than one task by exploiting recurrent connections. Since it learns from the past and the learning process id self-supervised, it can reason and interpret to generate new concepts.
3. What is a graph network? In what respect it helps interpretability? (7.5 points)
   - The human prior knowledge are hardwired in brain (inductive biases). Graph neural networks are deep learning systems that have an innate bias toward representing things as objects and relations (the input to these systems are graphs of relations instead of signals). In other words, graph neural networks (GNNs) are connectionist models that capture the dependence of graphs via message passing between the nodes of graphs. Unlike standard neural networks, graph neural networks retain a state that can represent information and hence they are interpretable by predicting how relationships evolves over time.