Interval Valued Neural Networks for Uncertainty Assessment

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Many approaches for uncertainty quantification in neural networks rely on bayesian networks whose stochastic nature allows for example for variance estimation in the output. In this talk, I will present a method for uncertainty assessment in ReLU networks using interval propagation. The concept relies on propagating the input through a network with interval valued parameters using standard interval arithmetic. These bounds of the network's parameters are then trained in a way that each input yields tight output intervals which most likely contain the point prediction as well as the true label. These output interval bounds can then be used to assess the uncertainty of the network's prediction. In my talk, I also want to touch on the advantages and problems as well as future prospects of this method.