2019

SL NO	CONFERENCES	PAPER NAMES	ABSTRACT
1	The International Conference on Learning Representations (ICLR)	Ordered Neurons: Integrating Tree Structures Into Recurrent Neural Networks	Natural language is hierarchically structured: smaller units (e.g., phrases) are nested within larger units (e.g., clauses). When a larger constituent ends, all of the smaller constituents that are nested within it must also be closed. While the standard LSTM architecture allows different neurons to track information at different time scales, it does not have an explicit bias towards modeling a hierarchy of constituents. This paper proposes to add such an inductive bias by ordering the neurons; a vector of master input and forget gates ensures that when a given neuron is updated, all the neurons that follow it in the ordering are also updated. Our novel recurrent architecture, ordered neurons LSTM (ON-LSTM), achieves good performance on four different tasks: language modeling, unsupervised parsing, targeted syntactic evaluation, and logical inference1.
2	The International Conference on Learning Representations (ICLR)	The Lottery Ticket Hypothesis: Finding Sparse, Trainable Neural Networks	Neural network pruning techniques can reduce the parameter counts of trained networks by over 90%, decreasing storage requirements and improving computational performance of inference without compromising accuracy. However, contemporary experience is that the sparse architectures produced by pruning are difficult to train from the start, which

			would similarly improve training performance.
3	International Conference on Machine Learning (ICML)	Challenging Common Assumptions in the Unsupervised Learning of Disentangled Representations	The key idea behind the unsupervised learning of disentangled representations is that real-world data is generated by a few explanatory factors of variation which can be recovered by unsupervised learning algorithms. In this paper, we provide a sober look at recent progress in the field and challenge some common assumptions. We first theoretically show that the unsupervised learning of disentangled representations is fundamentally impossible without inductive biases on both the models and the data. Then, we train more than 12000 models covering most prominent methods and evaluation metrics in a reproducible large-scale experimental study on seven different data sets. We observe that while the different methods successfully enforce properties "encouraged" by the corresponding losses, well-disentangled models seemingly cannot be identified without supervision.
4	International Conference on Machine Learning (ICML)	Transferable Multi-Domain State Generator for Task-Oriented Dialogue Systems	Over-dependence on domain ontology and lack of knowledge sharing across domains are two practical and yet less studied problems of dialogue state tracking. Existing approaches generally fall short in tracking unknown slot values during inference and often have difficulties in adapting to new domains. In this paper, we propose a Transferable Dialogue State Generator (TRADE) that generates

			dialogue states from utterances using a copy mechanism, facilitating knowledge transfer when predicting (domain, slot, value) triplets not encountered during training. Our model is composed of an utterance encoder, a slot gate, and a state generator, which are shared across domains. Empirical results demonstrate that TRADE achieves state-of-the-art joint goal accuracy of 48.62% for the five domains of MultiWOZ, a human-human dialogue dataset
5	International Conference on Machine Learning (ICML)	Learning Existing Social Conventions via Observationally Augmented Self-Play	In order for artificial agents to coordinate effectively with people, they must act consistently with existing conventions (e.g. how to navigate in traffic, which language to speak, or how to coordinate with teammates). A group's conventions can be viewed as a choice of equilibrium in a coordination game. We consider the problem of an agent learning a policy for a coordination game in a simulated environment and then using this policy when it enters an existing group. When there are multiple possible conventions we show that learning a policy via multi-agent reinforcement learning (MARL) is likely to find policies which achieve high payoffs at training time but fail to coordinate with the real group into which the agent enters. We assume access to a small number of samples of behavior from the true convention and show that we can augment the MARL objective to help it find

			policies consistent with the real group's convention. In three environments from the literature – traffic, communication, and team coordination – we observe that augmenting MARL with a small amount of imitation learning greatly increases the probability that the strategy found by MARL fits well with the existing social convention. We show that this works even in an environment where standard training methods very rarely find the true convention of the agent's partners.
6	International Conference on Machine Learning (ICML)	On the Variance of the Adaptive Learning Rate and Beyond	The learning rate warmup heuristic achieves remarkable success in stabilizing training, accelerating convergence and improving generalization for adaptive stochastic optimization algorithms like RMSprop and Adam. Here, we study its mechanism in details. Pursuing the theory behind warmup, we identify a problem of the adaptive learning rate (i.e., it has problematically large variance in the early stage), suggest warmup works as a variance reduction technique, and provide both empirical and theoretical evidence to verify our hypothesis. We further propose RAdam, a new variant of Adam, by introducing a term to rectify the variance of the adaptive learning rate. Extensive experimental results on image classification, language modeling, and neural machine translation verify our intuition and demonstrate the effectiveness and robustness of our proposed method.