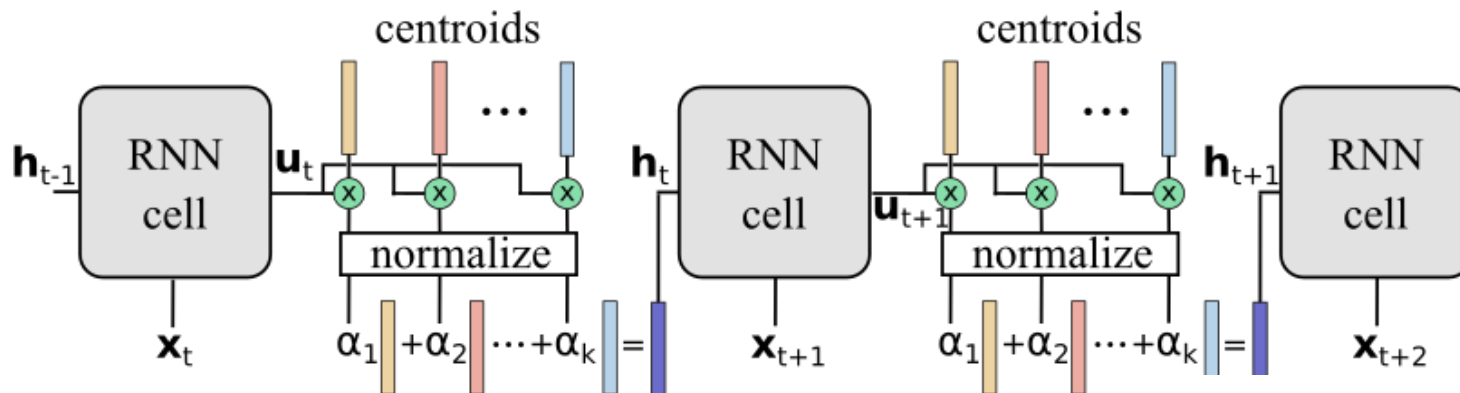


State-Regularized Recurrent Neural Networks

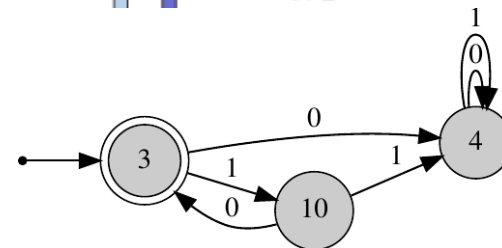
Cheng Wang and Mathias Niepert
NEC Laboratories Europe
{cheng.wang, mathias.niepert}@neclab.eu

For questions, please contact:
cheng.wang@neclab.eu

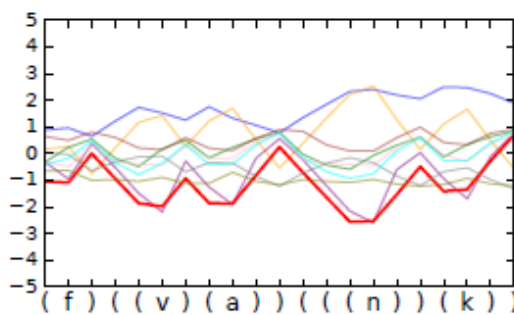
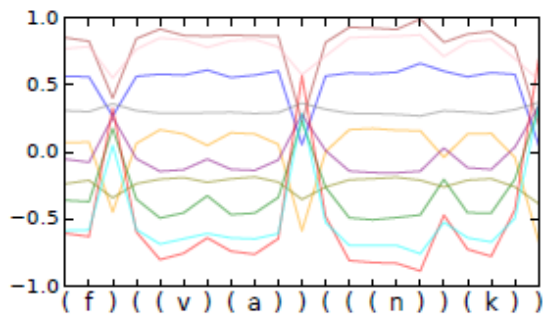
State-Regularized Recurrent Neural Networks



■ Learning a finite set of states (k centroids)



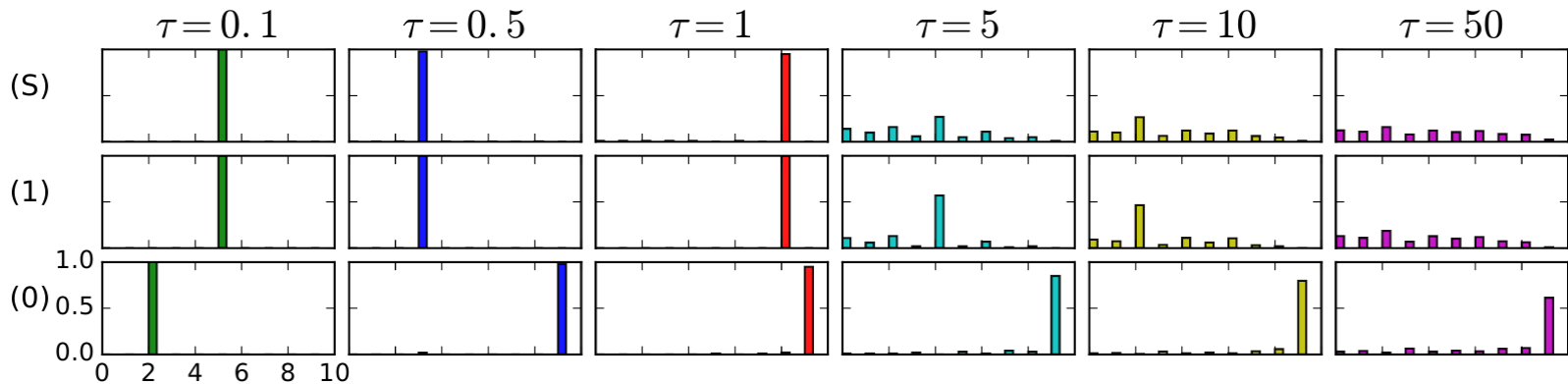
■ Force RNNs operate like automata with external memory



■ SR-LSTMs maintain two states

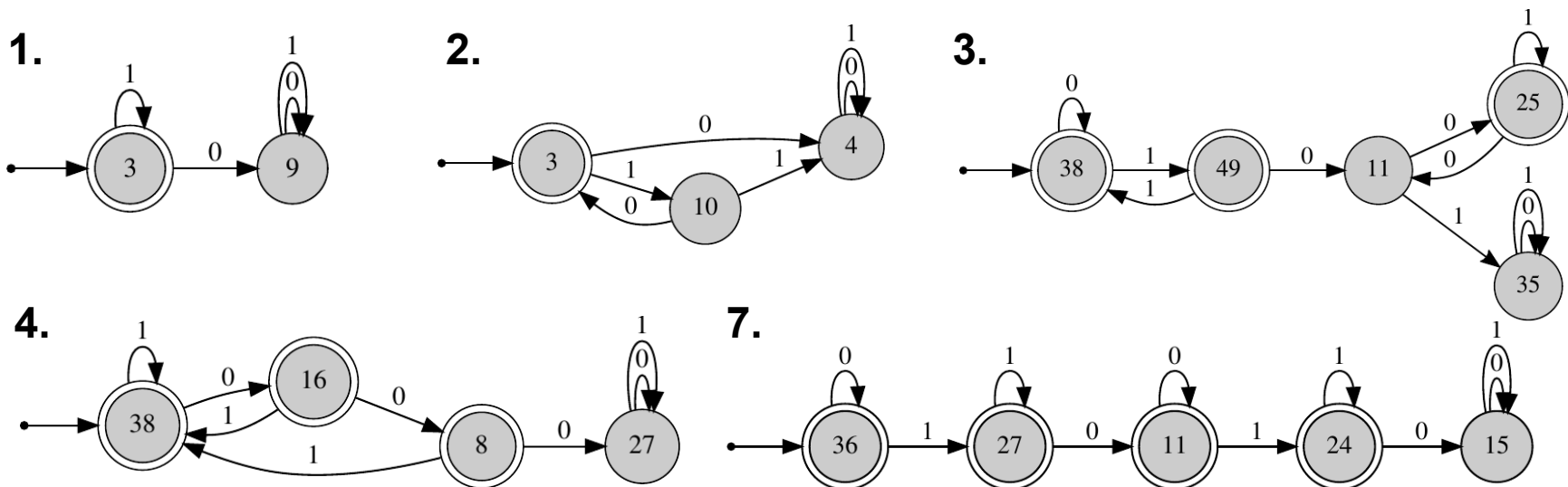
■ SR-LSTMs memorize with memory cell

Regular Language: DFA Extraction

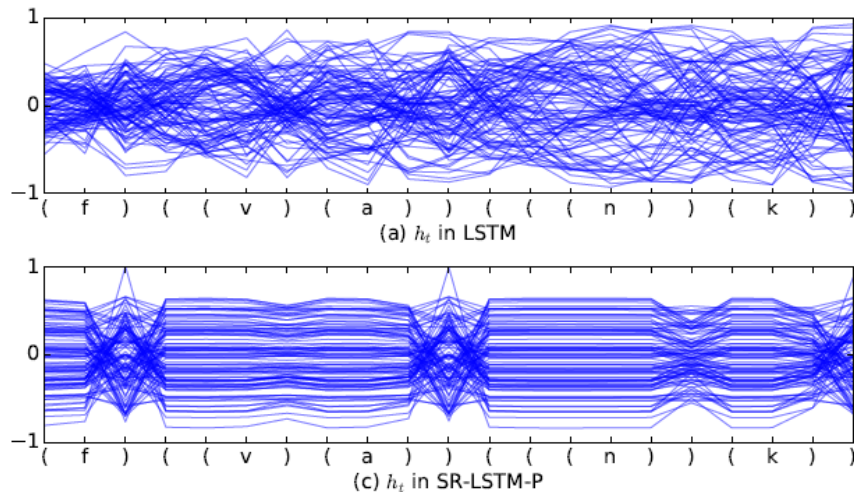


SR-GRU on Tomita Grammar 1

Extracted DFAs for Grammars:



Non-regular Language: Long-Term Memorization



Depth	LSTM	SR-LSTM-P
d=5	0.002	0.000
d=10	0.207	0.004
d=20	0.543	0.020

Error rate for the balanced parentheses test sets.

Thank You !

cheng.wang@neclab.eu

For more results, please visit our
poster@Pacific Ballroom #68

<https://github.com/deepsemantic/sr-rnns>