

Dilated Recurrent Neural Networks

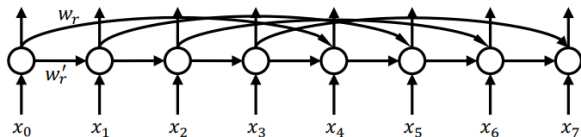
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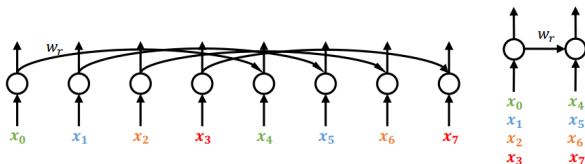
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Dilated Recurrent Neural Networks

- A single-layer RNN with recurrent skip connections :



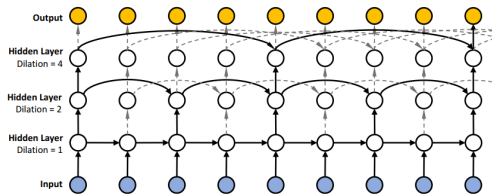
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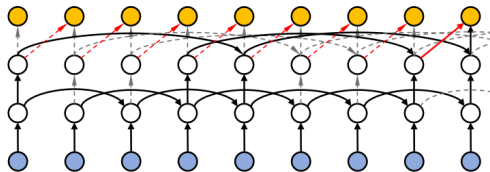
Exponentially Increasing Dilation

- $s^{(l)}$ is referred to as the skip length, or dilation of layer l .

$$s^{(l)} = M^{l-1+l_0}, \quad l = 1, \dots, L \text{ and } l_0 \geq 0$$



- To compensate missing data dependencies



Memory Capacity and Parameter Efficiency

- Memory Capacity
 - Mean recurrent length :
The average dilation across different time spans within a cycle.
- Parameter Efficiency
 - The number of parameters that achieves the given memory capacity.