Structured Neural Networks for NLP: From Idea to Code

Graham Neubig

Carnegie Mellon University
Language Technologies Institute

Examples:
https://github.com/neubig/yrsnlp-2016

Neural Networks and Language

- Neural networks give us new tools to process data: images, speech, text

- We want to go from idea to code quickly

- I will show some examples from DyNet:

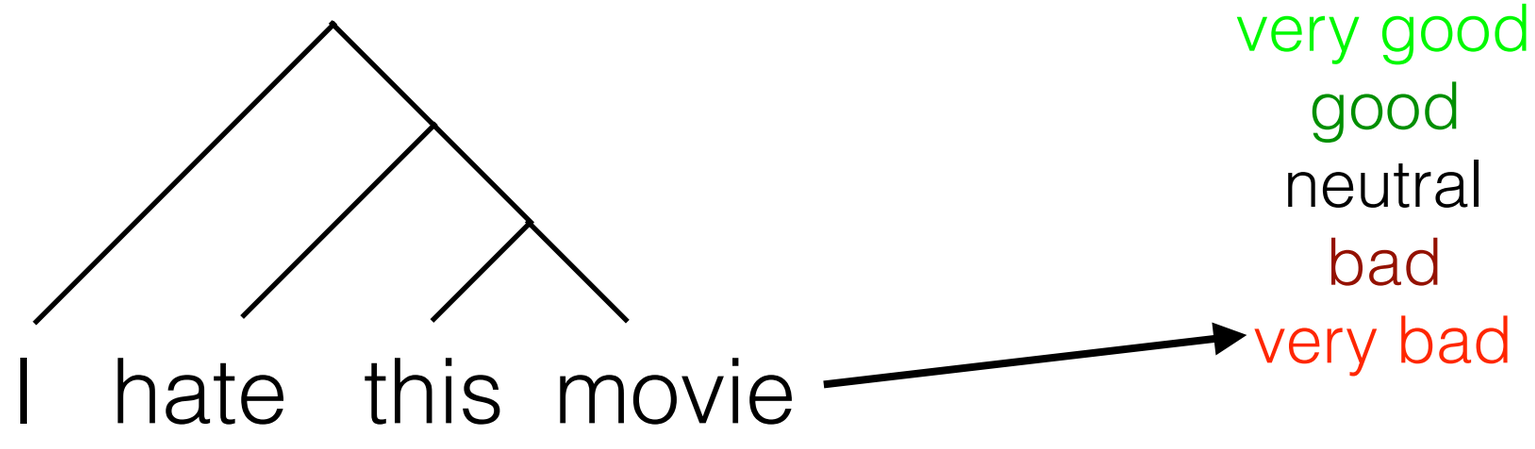
  - **DyNet is intuitive**, program like you think (c.f. TensorFlow, Theano)

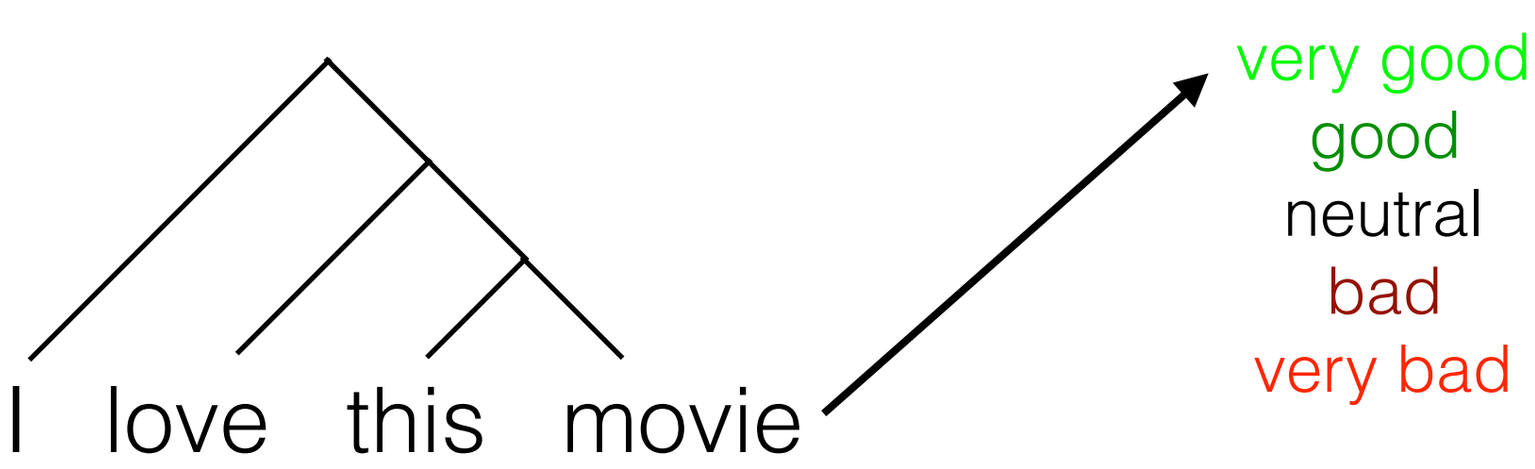
  - **DyNet is fast for complicated networks** on CPU (c.f. autodiff libraries, Chainer)

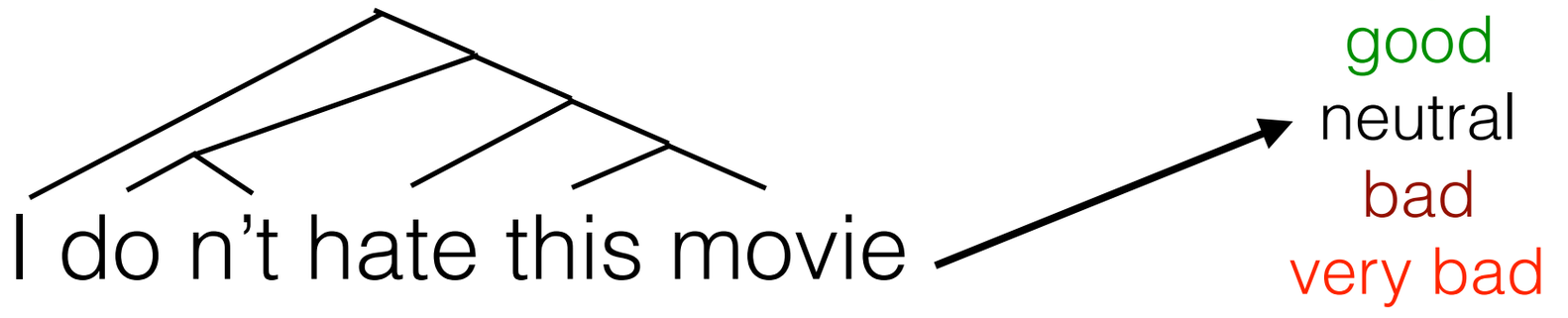
Basic Idea

- Create a model
- For each example
  - **create a graph** that represents the computation you want
  - **calculate the result** of that computation
  - if training, perform **back propagation and update**

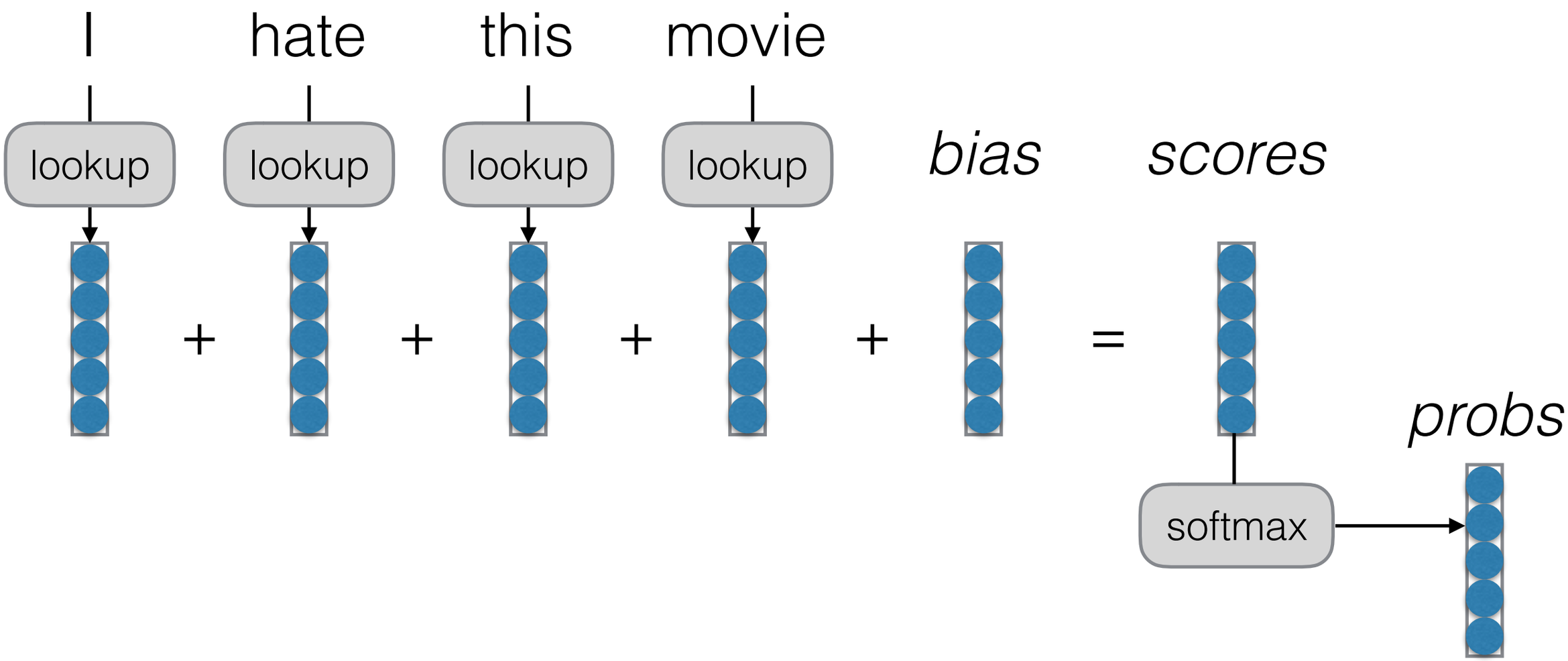
Example Task: Sentiment



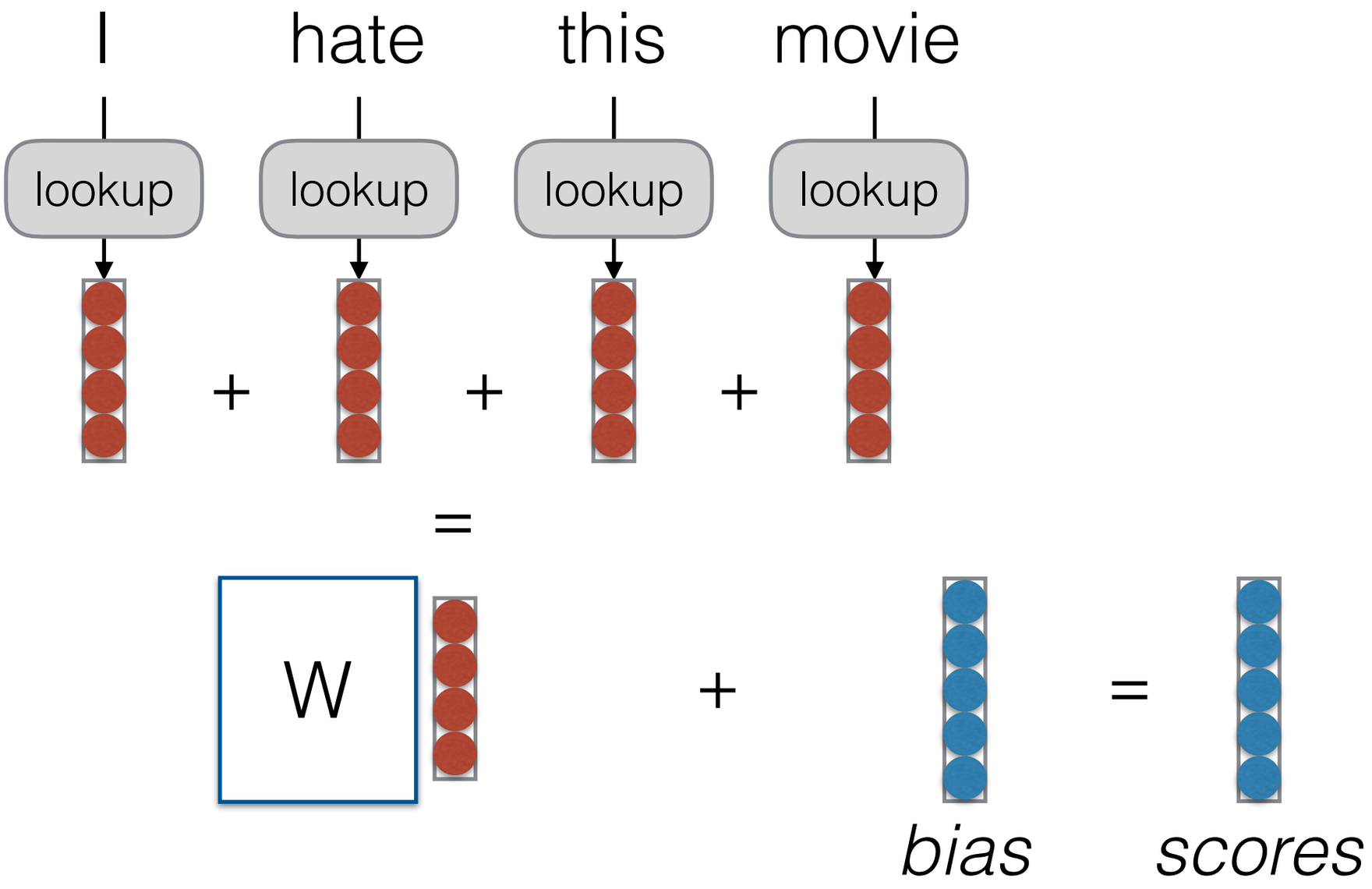




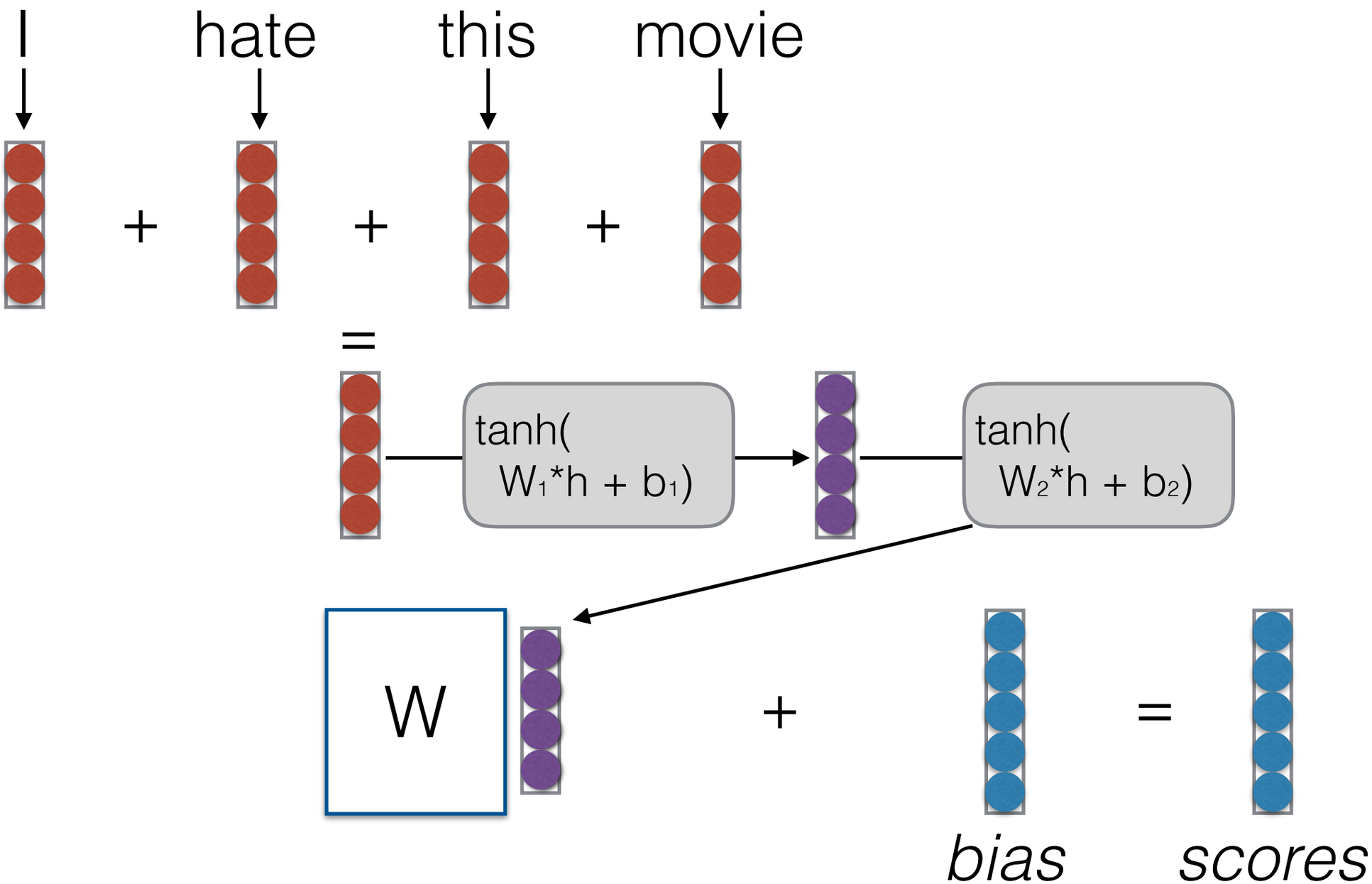
Bag of Words (BOW)



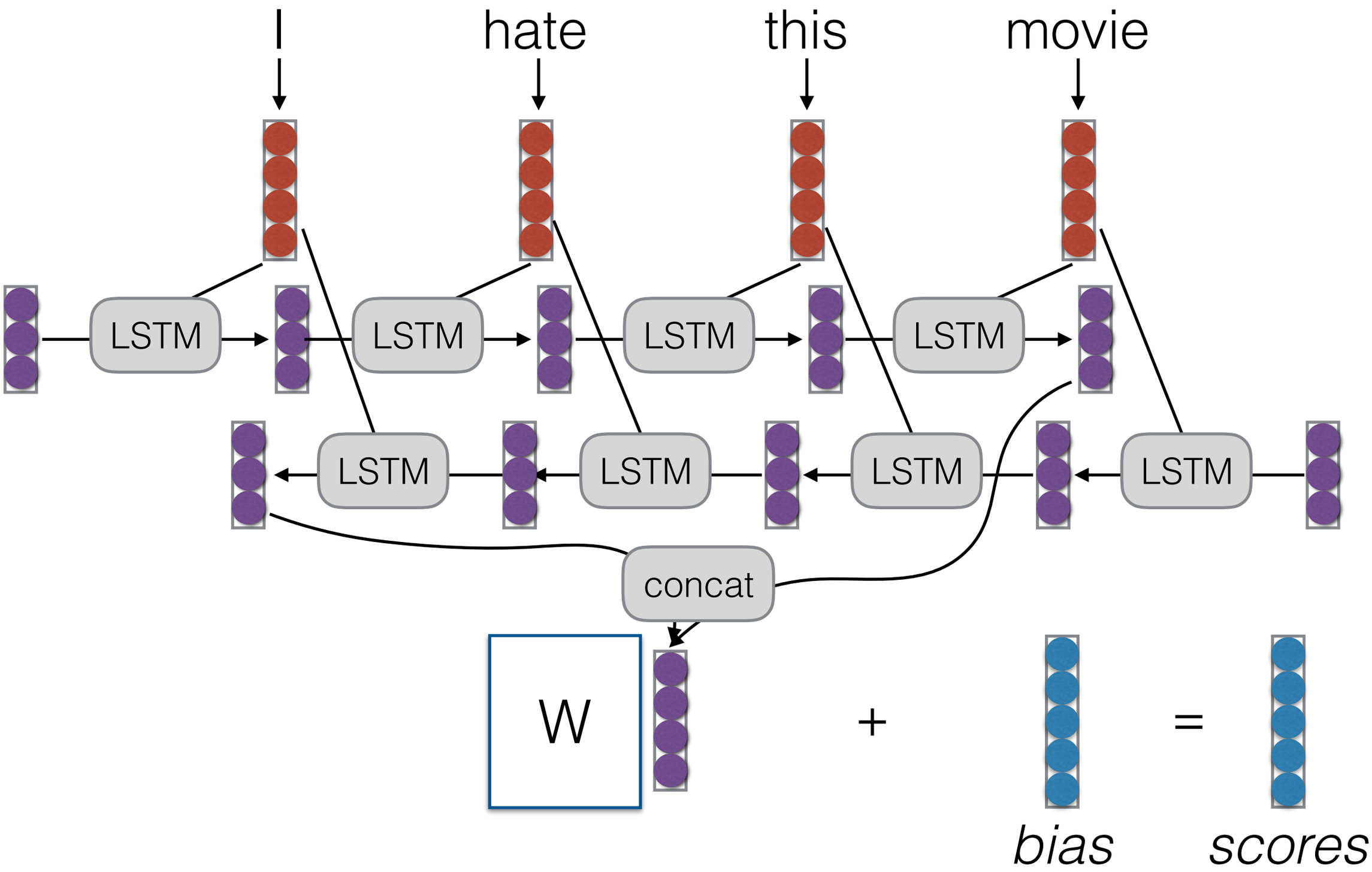
Continuous Bag of Words (CBOW)



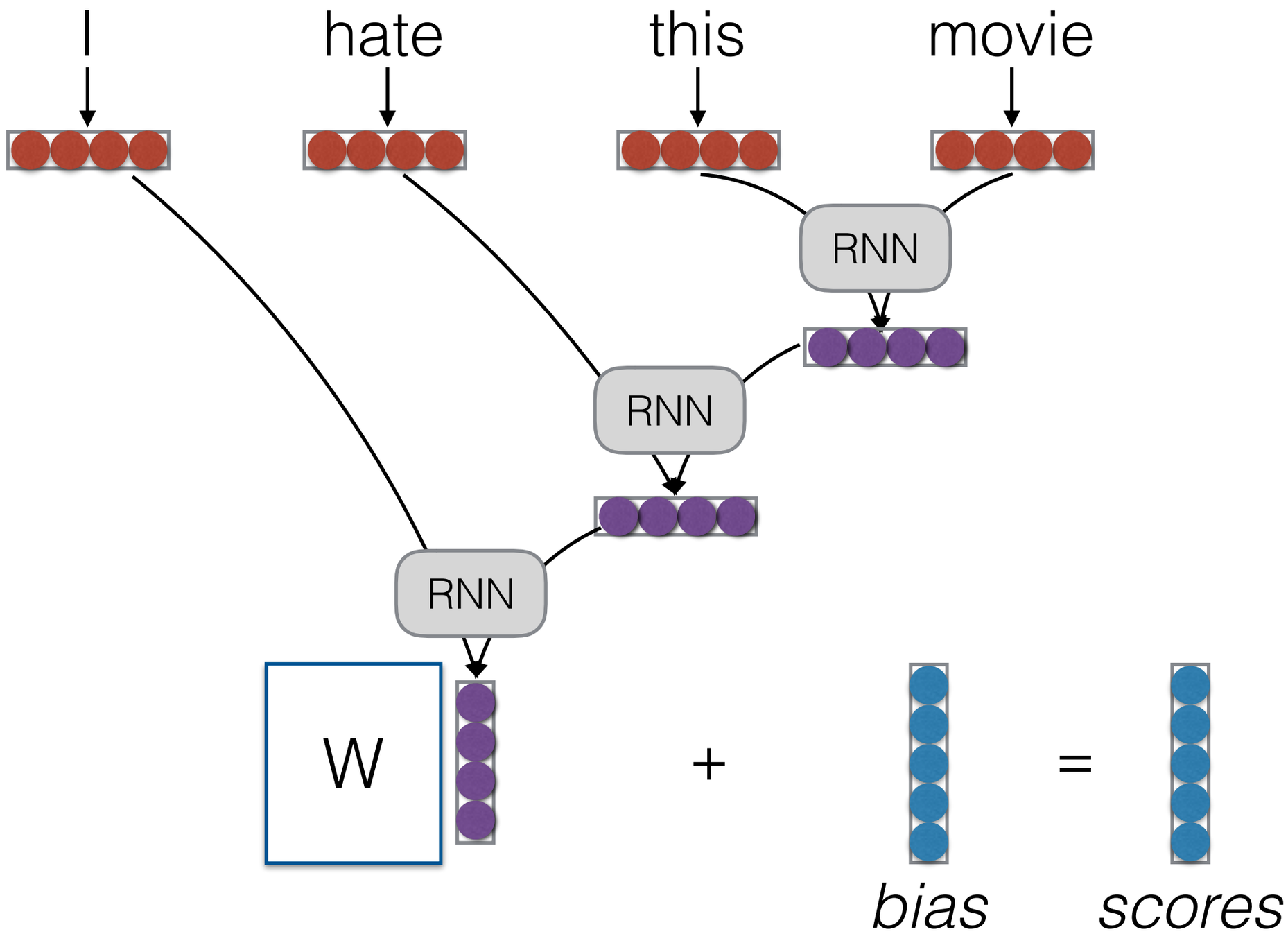
Deep CBOW



Bi-directional LSTM



Tree-structured RNN/LSTM



Questions?