Socher et al. - Reasoning with tensor networks

\[ g(e, R, e_2) = u^T f(e^T W^{e_1:1} e_2 + V [e_1] + b) \]

"slices" of tensor (3-D array)

\[ W^{[i:k]} \]

\[ e_1 \]

\[ e_2 \]

\[ b \]

\[ |e_1| = |e_2| = d \quad \text{(here, 3, in practice 100)} \]

depth of weight array \[ W^{[i:k]} = k \quad \text{(here 2, in practice 4)} \]

e.g., relation \( R = \text{nationality} \), instance \( (Pablo Picasso, \text{nationality, Spain}) \)

Can infer this from Freebase Triples (has nearly \( 2 \times 10^9 \))

About 90% correct on held-out test (non) examples.

Basically, this is similarity inference (analogy)