Introduction

• Task: Answer a question given a set of facts
  — e.g. John went to the bathroom. Mary went to the Kitchen. Where is John?
• Dataset: Facebook bAbI dataset
  — Set of 20 synthetic tasks which serve as baseline for any ‘complete’ AI

Answering Questions on the bAbI Dataset Using Memory Networks (with LSTMs)

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Model

• Memory Network
  — Idea: Combine an inference model with a database of knowledge for longer term storage
  — LSTM for inference model
    • Outputs a probability over words from the sentences and questions
  — LSTM for determining queries to knowledge database
    • Selects ‘relevant’ sentences

Data

• Each training example in the dataset is a “story”
• Stories are comprised of sentences and questions
• The training set has the correct answer to the question as well as indices for the sentences which are relevant to the answer

Learning Curves

• Pre-trained word vectors replace words
  — Using the 50 dimensional GloVe representation
• Goal: Minimize combined objective of the sum of negative log likelihoods from the inference model and the memory access
  — i.e. the sum of NLL for selecting relevant sentences and predicting the write answer
  — In practice, Theano takes care of symbolic gradients

Results (example)

Supporting Facts:
  — Needs went to the kitchen.
  — John journeyed to the kitchen.
  — Needs went back to the garden.
  — Mary traveled to the hallway.
  — Needs went to the bathroom.
  — Daniel journeyed to the garden.

Questions: Where is Daniel?
  — True Answer: garden
  — Predicted Answer: garden
  — Predicted Relevant Facts: John journeyed to the kitchen.
  — Daniel journeyed to the garden.

Conclusion/Future Work

• In summary, we implemented a memory network which outperforms a vanilla LSTM by selecting relevant facts to process
• Some of the bAbI tasks require higher order logic processing which was inaccessible to our model