

Stochastic Answer Networks for Machine Reading Comprehension

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Contribution

- Propose a simple yet robust stochastic answer network (SAN) for **multi-step reasoning** in Machine Reading Comprehension (MRC).
- Idea: “dropout” on answer module
- Achieves competitive results on: SQuAD, Adversarial SQuAD and MS MARCO.

Multi-step Reasoning

➤ Machine Reading Comprehension: Given a question **Q** and a passage **P**, find an answer span, **A**.

Q: What collection does the V&A Theator & Performance galleries hold?

P: The V&A Theator & Performance galleries opened in March 2009. ... **They** hold the UK's biggest national collection of material about live performance.

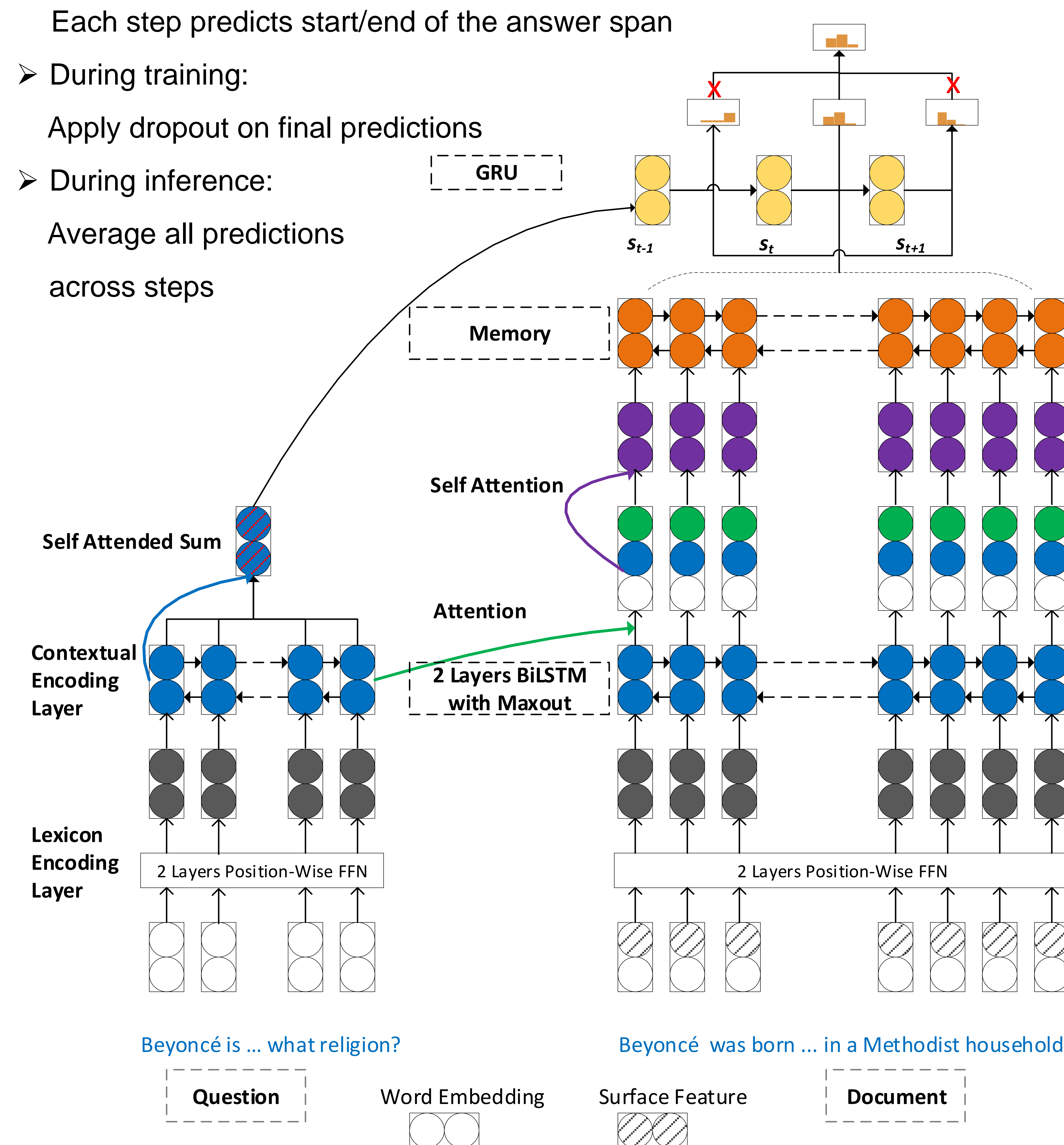
Answer in multi-step: (1) perform coreference resolution to link “They” and “V&A”; (2) extract direct object.

➤ Previous work vs. Current work

- Predetermined fix-step models (Hil 2016, Dhingra 2016, Sordani 2016, Kumar 2015)
- Dynamically determine number of steps based on reinforcement learning (Shen 2016)
- SAN: Fixed steps, but stochastically dropout predictions for the final answer model

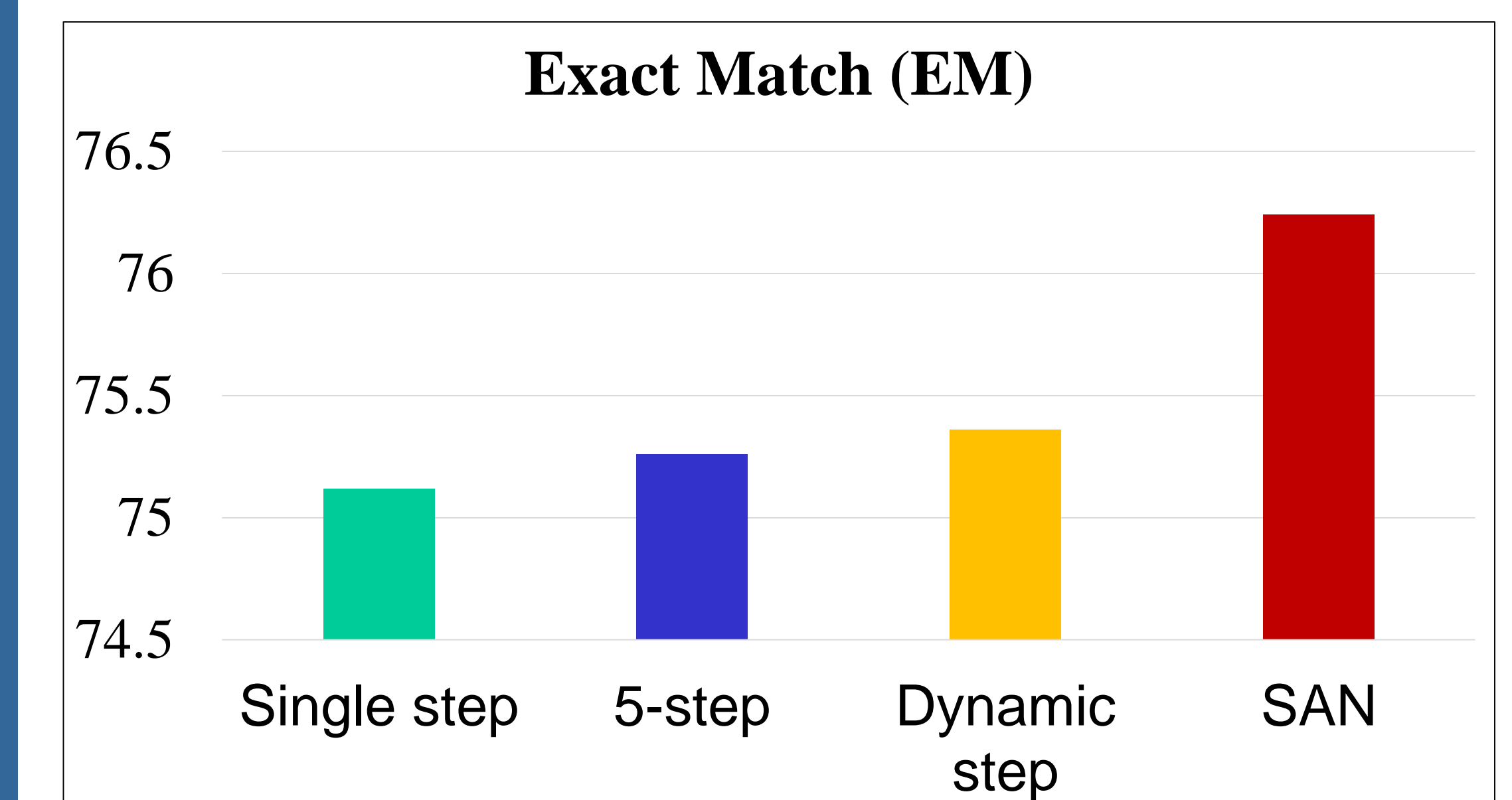
Model Architecture

- Fix number of steps (e.g. 5) in final answer module
- Each step predicts start/end of the answer span
- During training: Apply dropout on final predictions
- During inference: Average all predictions across steps



Experiments

➤ Comparison of different answer modules



➤ Leaderboard:

Model	SQuAD (EM/F1)	Adv SQuAD (EM/F1)	MS MARCO Dev (Rouge)
BiDAF	-/81.1	-/-	-/-
BiDAF+ELMo	78.58/85.83	-/-	-/-
QANet	76.2/84.6	45.2/55.7	
V-Net	-/-	-/-	45.65
SAN	76.83/84.40	46.6/56.6	46.14

➤ Analysis: Score by Question Type (SQuAD)

