Making Real AI Series

4. An Example Way to Append New Contextual Information into Old Pieces of Data

(Shaka) Shih-Chia Chen

Founder/CEO
www.libgirl.com

Don’t shuffle the data, it will destroy contextual information.

- Yoshua Bengio

https://blog.crossminds.ai/post/yoshua-bengio-from-deep-learning-to-consciousness

So we encode data into
one single lifelong data stream
to keep temporal contextual information.

An example way to append new contextual information

Let a formal language sequence $S[t], t \in \mathbb{N}$

Given that

1. We encoded a data point X into S from $S[k]$ to $S[k+m]$
2. with some originally known context of X as CX_0 encoded into S to from $S[(k-g)-c_0]$ to $S[(k-g)-1]$
3. with some encoding delimiter between CX_0 and Xencoded into S from $S[k-g]$ to $S[k-1]$
4. and then we have already trained a language model until $S[k+m]$.

An example way to append new contextual information

Now if we

1. supply updated contextual information of X as CX_1 encoded into S from $S[l]$ to $S[l + c_1], l > k + m$
2. and resupply the encoding delimiter and X into S from $S[(l + c_1) + 1]$ to $S[(l + c_1) + g + m]$, which should be fuzzily equal to $S[k - g]$ to $S[k + m]$
3. and then fine-tune the language model

Conceptually, this self-supervised trained and fine-tuned model can learn the the originally missing but updated contextual information CX_1 of X.

Paradigm Shift

1. Real world AI applications must encounter data distribution shifts and task specification changes.
2. Which means real world AI problems are more close to task-general AI problems.
3. Learning contexts is all you need to make task-general AI.
4. Unbounded data context length without data shuffling is must-have to learn contextual information.
5. We know how to append new contextual information to old pieces of data in lifelong data stream.
6. Let’s (almost) always design task-general AI that can learn from single lifelong data stream. Especially it’s more like how humans learn from real world temporal experience.

Real world needs artificial general intelligence

And we have a way to step ahead

Let’s go ahead!

References

Hester, T., Vecerik, M., Pietquin, O., Lanctot, M., Schaul, T., Piot, B., Horgan, D., Quan, J., Sendonaris, A., Dulac-Arnold, G., Osband, I., Agapiou, J., Leibo, J. Z., & Gruslys, A. (2017). Deep Q-learning from Demonstrations. *ArXiv:1704.03732 [Cs]*. https://arxiv.org/abs/1704.03732