Posted by u/yogeshhkulkarni 2 days ago

graph2graph neural network?

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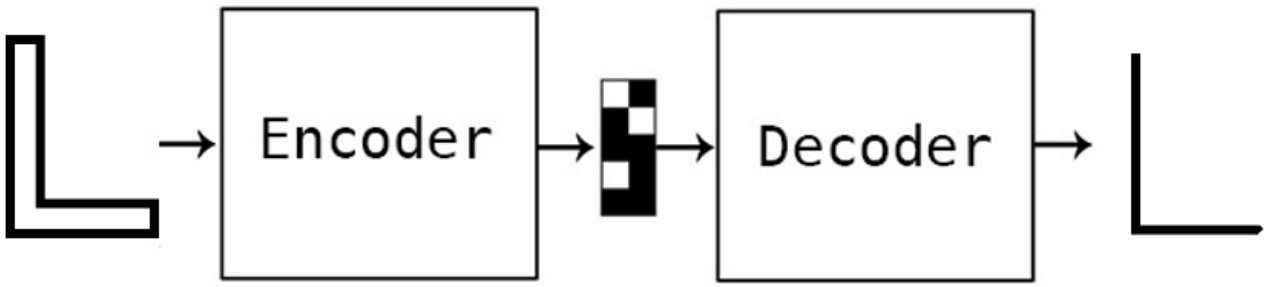
Here is a problem that I continue to research on, in my spare time, which I initially started looking at, as a subtopic of my PhD work in the field of Geometric Modeling.

Problem: Similar to Seq2Seq models, are there graph2graph neural networks possible/available?

Context: Subtopic of my PhD work was about generating midcurves, a dimension reduction problem on 2D shapes. I attempted it using rules-based programing at that time. Later, as I became familiar with Machine/Deep Learning, thought of attempting it using graph neural networks techniques, where,
- Shapes are represented as graph,
- Vertices as nodes,
- Connecting curves as edges.
- Dimension reduction operation is called as Midcurve generation.
- Input is 2D profile, say a closed polygon. Example: thick 'L' profile on left in the image below.
- Output is 1D curve in the middle of the profile. Example: thin 'L' curve on the right in the image below

Wish to build an encoder-decoder network which accepts graphs as input as well as output. I have training set of such input and output graphs, a supervised set.



Schematic Diagram of Dimension Reduction

As I could not find ready graph2graph network, I converted the problem to image2image (say, pix2pix like)

have been open-sourced there. Feel free to work on it, if interested.

My next step is to investigate if graph2graph network is possible or not, how to build such encoder decode network? Is there any such work going on under 'Geometric Deep Learning' or 'Graph Neural Networks'?

Please note that as both, input and output are different, this can not be Autoencoder.

Any ideas?

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