A Generalized Web-Based Application for Neural Network Visualization

Bennett Wendorf

University of Wisconsin - La Crosse

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1. Objective

- Develop a web-based tool that will allow users to visualize neural networks
- Generalized to allow models from frameworks like TensorFlow, Keras, and PyTorch

2. Background

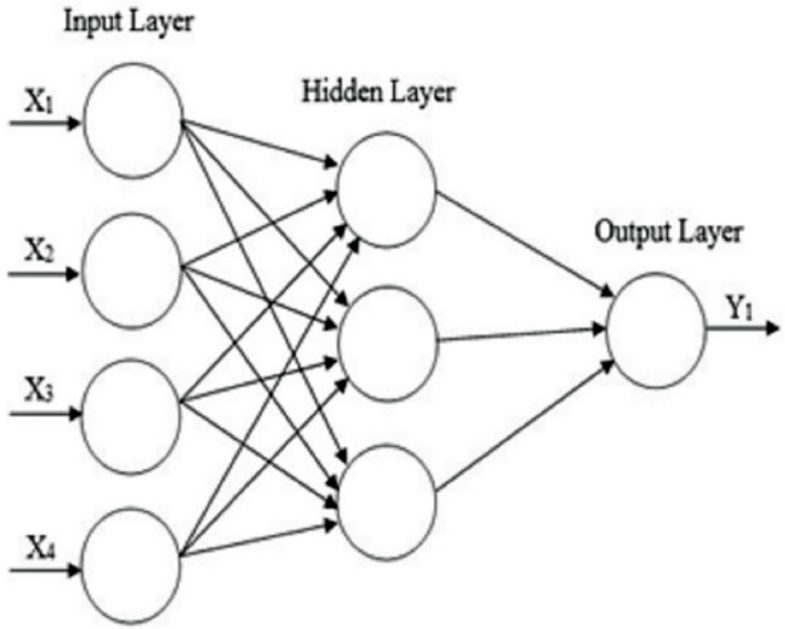
Existing Tools:

- TensorBoard
- Netron
- ENNUI

These tools lack support for multiple frameworks, different types of networks, and animation capabilities.

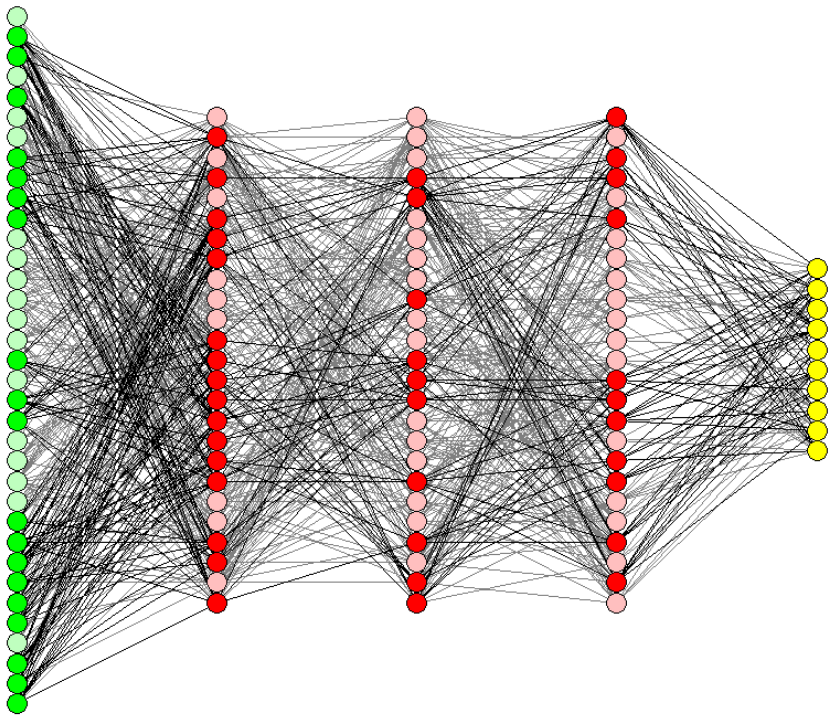
3. Primary Goals

- Visualize networks from TensorFlow, Keras, and PyTorch models
- Visualize simple feed-forward and convolutional neural networks
- Visualize the overall structure, plus details like weights and biases



4. Stretch Goals

- Animations of the network's training
- Inputs to generate custom networks and code for them
- Export visualizations and animations to tikz graphs for LaTeX
- Support for recurrent neural networks
- Support for ML.NET and scikit-learn models



5. Challenges

- Model parser complexity
- Graph generation and visualization complexity
- Complex network types (convolutional, etc.) are needed to be competitive
- Code export requires a deep understanding of the framework APIs
- Animations are challenging, especially when generating programmatically

6. Schedule

Phase	**From**	**To**	**Credits**
Develop requirements document and problem analysis	Sept 1, 2023	Sept 31, 2023	1
Produce MVP	Oct 1, 2023	Dec 31, 2023	5
Add stretch features	Jan 1, 2024	Feb 31, 2024	3
Refine and test	Mar 1, 2024	Mar 31, 2024	2
Demonstration and project report	Apr 1, 2024	May 10, 2024	1
		Total:	12

7. Resources

- Personal computer
- Hosting as needed
- Popular datasets (MNIST, Iris, etc.)

Thank you

Questions

Sources

- https://www.tensorflow.org/
- https://keras.io/
- https://pytorch.org/
- https://peerj.com/articles/cs-344/
- https://cdn-images-1.medium.com/v2/resize:fit:1200/1*-teDpAIho_nzNShRswkfrQ.gif