

NeuraViz: A Web Application For Visualizing Artificial Neural Network Structures

Bennett Wendorf

University of Wisconsin - La Crosse

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NeuraViz

What is NeuraViz?

- What is NeuraViz?

NeuraViz

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- What is NeuraViz?
- Why NeuraViz?

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- What is NeuraViz?
- Why NeuraViz?

Goals

- Breadth of supported models

NeuraViz

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Goals

- Breadth of supported models
- Ease of use

NeuraViz

What is NeuraViz?

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Goals

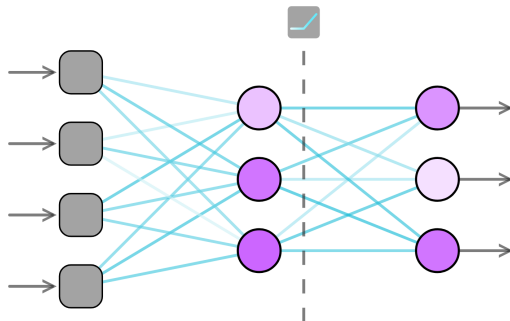
- Breadth of supported models
- Ease of use
- Portability

Artificial Neural Networks

What is an artificial neural network?

Artificial Neural Networks

What is an artificial neural network?



Life Cycle Model

Models

- Waterfall

Life Cycle Model

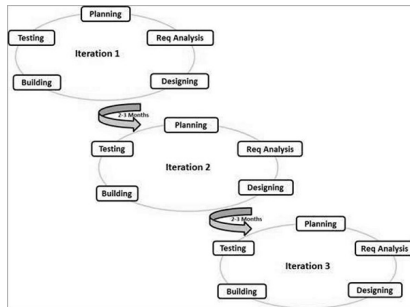
Models

- Waterfall
- Iterative

Life Cycle Model

Models

- Waterfall
- Iterative
- Agile (Scrum)



Scrum Tweaks

■ Sprint Length:

Scrum Tweaks

- **Sprint Length:** 1 week

Scrum Tweaks

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- **Standups:**

Scrum Tweaks

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Scrum Tweaks

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- **Retrospectives:**

Scrum Tweaks

- **Sprint Length:** 1 week
- **Standups:** weekly
- **Retrospectives:** integrated into standups

Process Technologies

Projects / NeuraViz / Scrum

Sprint 25

🕒 9 days remaining



Complete sprint



Add people

Quick filters ▾

GROUP BY

Stories ▾

📊 Insights

⚙️ View settings

BACKLOG 1

Add glossary

0%

☒ NRVZ-63

+ Create issue

PROGRAMMING 2

Add documentation/help page/landing page

50%

☒ NRVZ-53

Make revisions

25%

☒ NRVZ-65

+ Create issue

TESTING REQUIRED 2

Add security section of report

75%

☒ NRVZ-61

Add conclusion section of report

50%

☒ NRVZ-62

DONE



Requirements

Functional Requirements

- As a user, I can see the full graph of a valid uploaded model once it finishes processing.
- As a user, I can pan and zoom the model visualization.
- As a user, I can export the graph to \LaTeX TikZ syntax.
- Etc.

Requirements

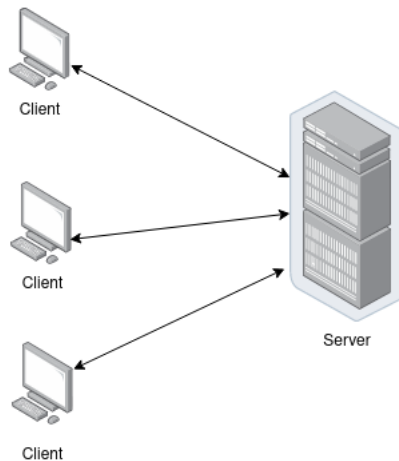
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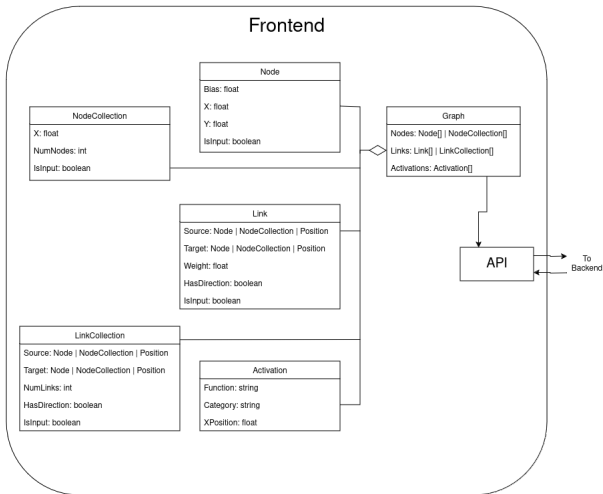
Non-Functional Requirements

- Large network layers are collapsed if they are too big to reasonably render.
- Invalid models are rejected and not stored on the server unnecessarily.
- Etc.

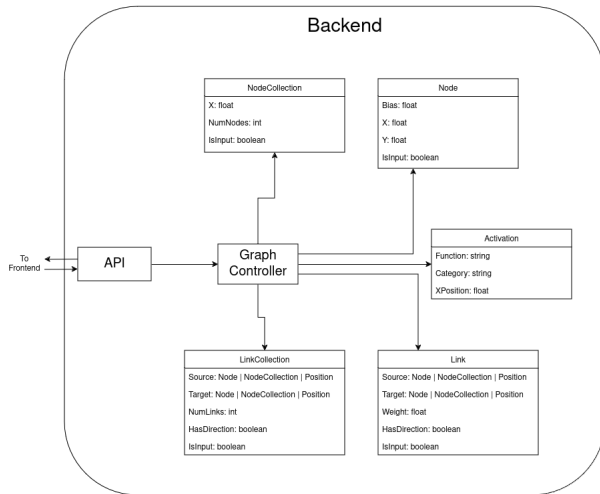
Web Application



Frontend Design



Backend Design

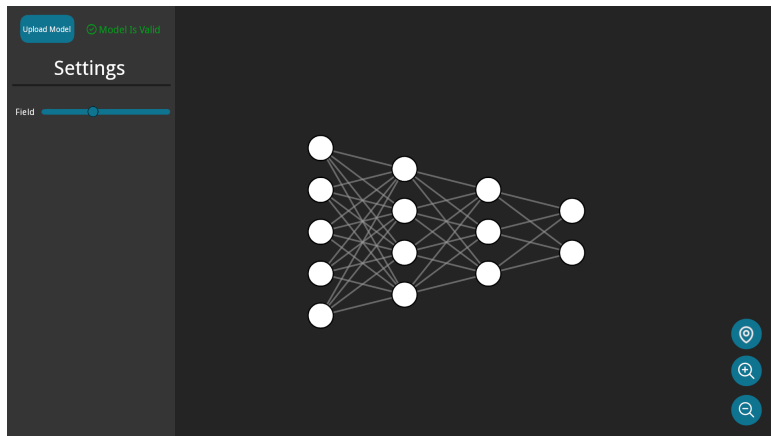


Database & Sessions

- `_id`
- `graphs`
 - `nodes`
 - `edges`
 - `activations`
- `last_used`



User Interface



User Interface

Select Model:

STE_IRts_Large_Even_La... X

gpt4.keras


☒ Model is valid

Settings


☐ Dark Mode

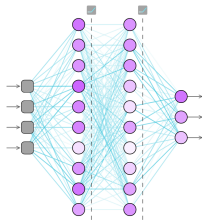
Key

Weights/Links

Lower  Higher

Biases/Nodes

Lower  Higher



Frontend Technologies & Graph Generation

- Svelte
- Flowbite
- D3.js

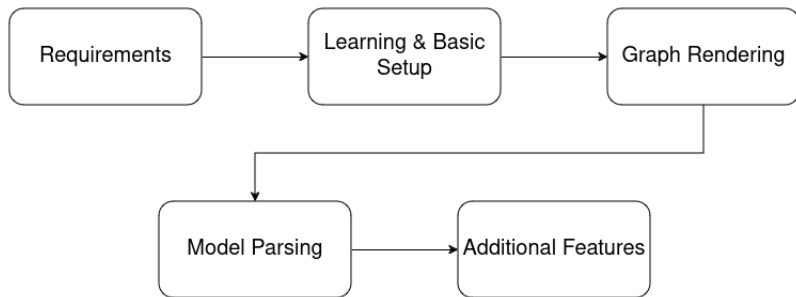


Backend Technologies & Model Parsing

- Quart
- Keras
- PyTorch



Development



Deployment

- Ubuntu 22.04 LTS
- PM2
- GitHub Actions



Testing

- Frontend Unit Testing

Testing

- Frontend Unit Testing
- Backend Unit Testing

Testing

- Frontend Unit Testing
- Backend Unit Testing
- Regression and Integration Testing

Security

Web Application Security

- HTTPS
- White-List Parsing

Security

Web Application Security

- HTTPS
- White-List Parsing

Session Management

- Anonymous
- Data Pruning

Challenges

- Lack of framework documentation

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- Information filtering

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- Lack of framework documentation
- Information filtering
- Time management

Future Work

- Complex network types

Future Work

- Complex network types
- Additional frameworks

Future Work

- Complex network types
- Additional frameworks
- Animations

Thank you

Questions

Sources

- https://www.tutorialspoint.com/sdlc/sdlc_agile_model.htm
- <https://www.mongodb.com>
- https://en.wikipedia.org/wiki/File:Svelte_Logo.svg
- <https://flowbite.com/>
- <https://github.com/d3/d3-logo/blob/master/d3.png>
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logo/blob/master/src/png/quart_short_logo_color.png](https://github.com/koddr/quart-logo/blob/master/src/png/quart_short_logo_color.png)
- https://en.wikipedia.org/wiki/File:Keras_logo.svg
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- <https://ubuntu.com/>
- <https://pm2.io/>
- <https://github.com/>