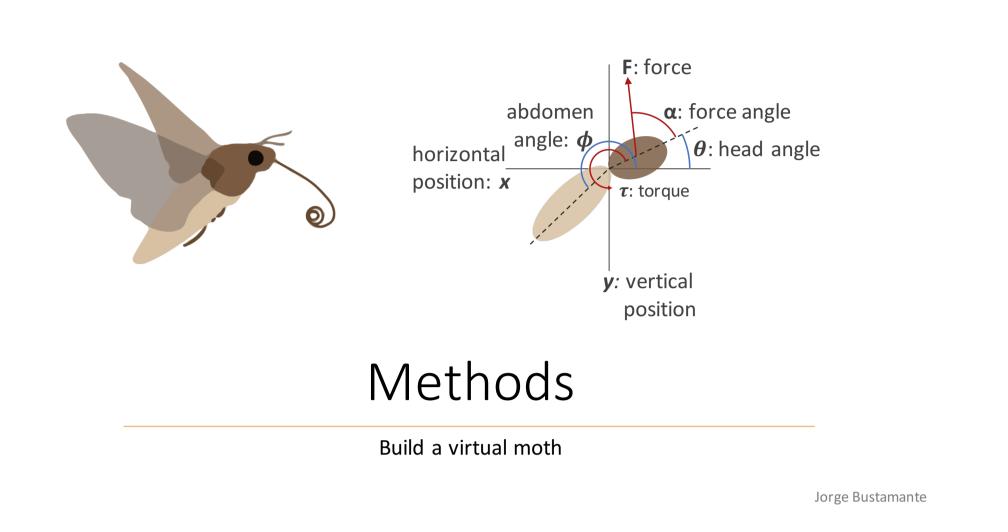
Neural Network Visualization

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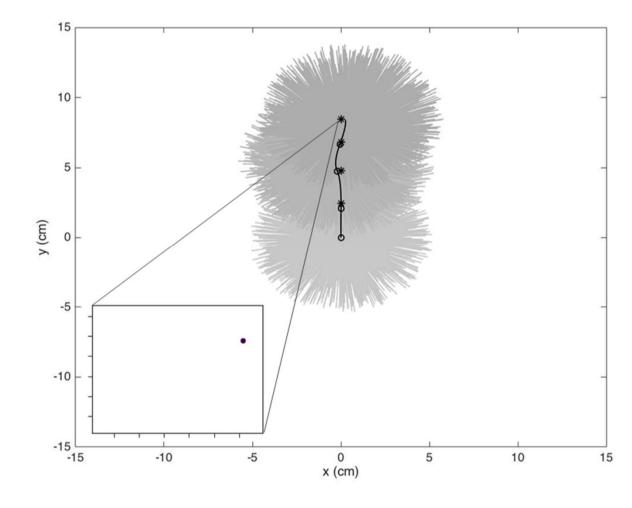


Motivation

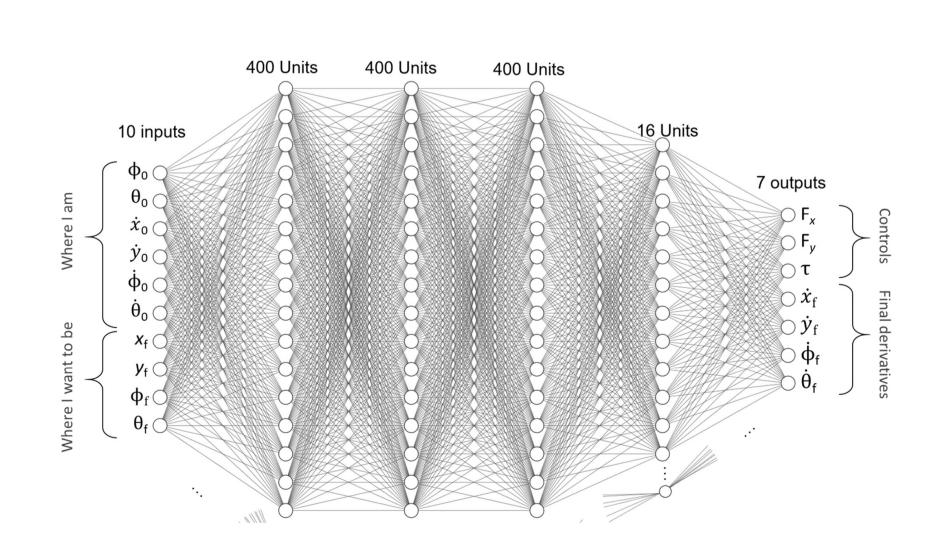
Learning a non-linear controller for insect flight dynamics with a deep neural network



Question: What is the temporal pattern of forces required to follow a complex trajectory? If I know where I am, and where I want to go, how do I get there?



Answer: Deep learning + Model Predictive Control

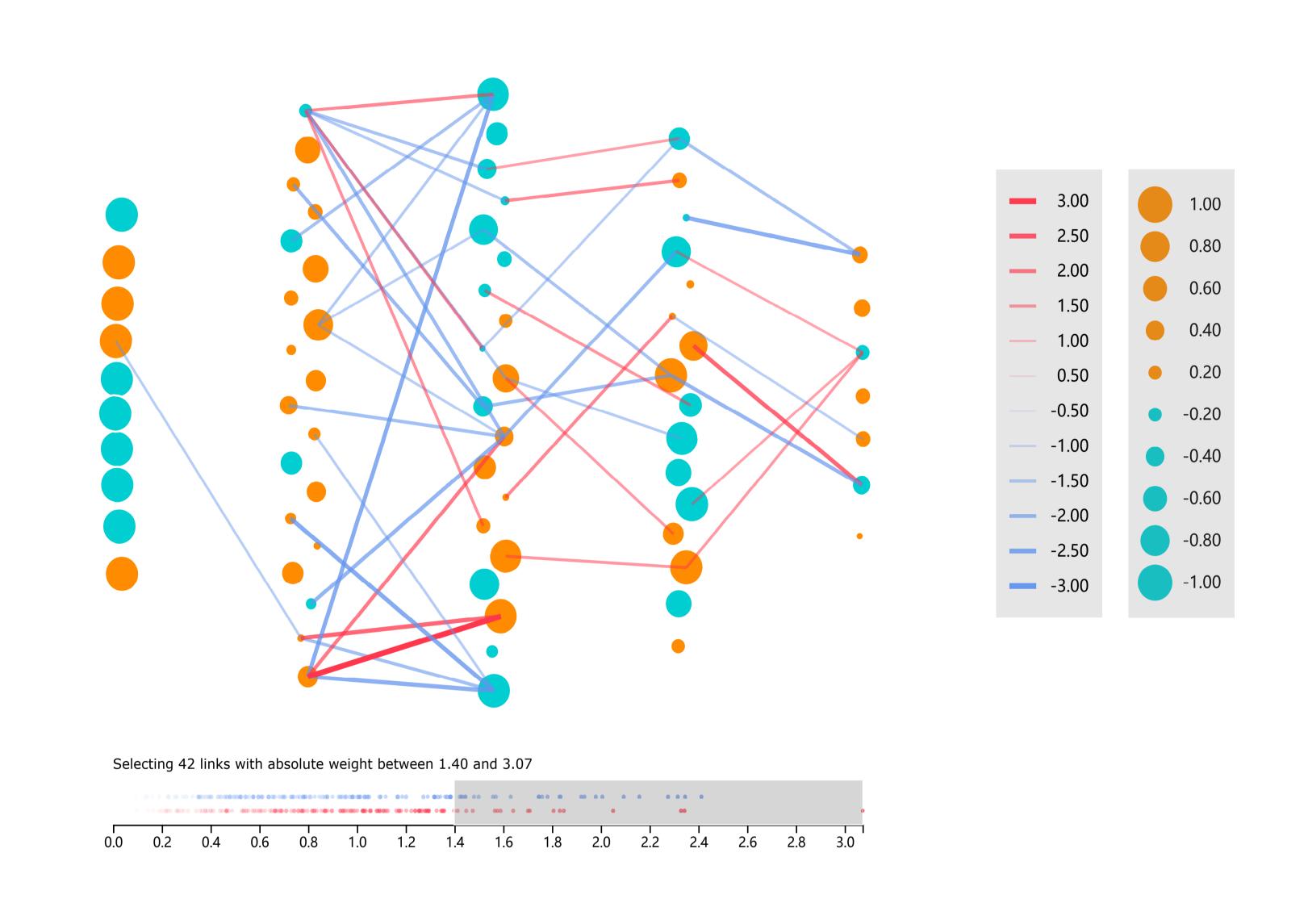


Goal: Visualize the "internal workings" of a feed forward neural network.

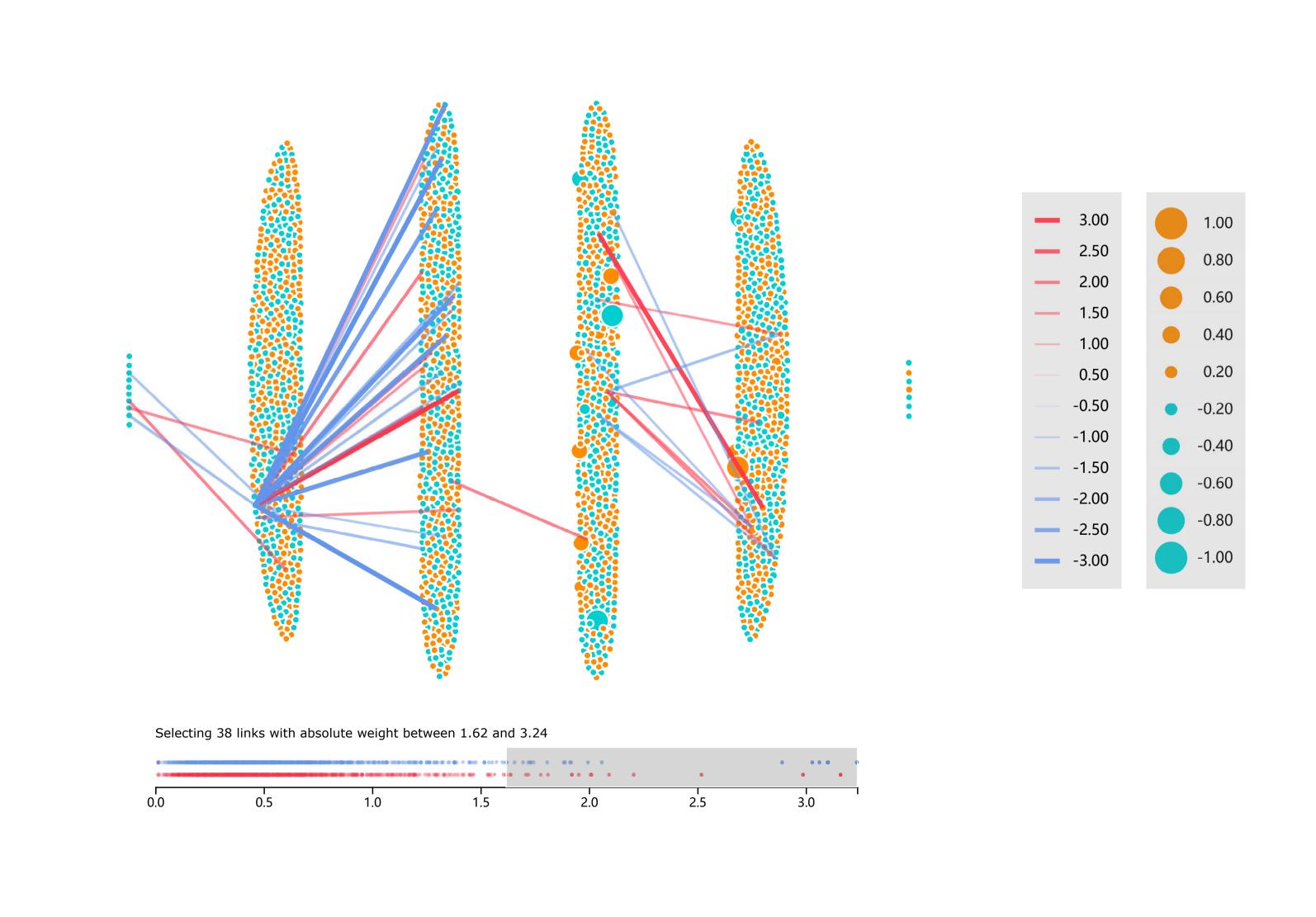
Visualizing neural network architecture

This is a nerual network with 3 hidden layers of size: 20, 20, 16.

The inputs are: $\phi_0= heta_0=\dot x_0=\dot y_0=\dot\phi_0=\dot heta_0=-0.5$ and $x_f=y_f=\phi_f= heta_f=0.5$.



This is a nerual network with 4 hidden layers of size: $512,\ 512,\ 512,\ 512.$ The inputs are: $\phi_0=\theta_0=\dot{x}_0=\dot{y}_0=\dot{\phi}_0=\dot{\theta}_0=x_f=y_f=\phi_f=0.$



Interaction techniques

- ▶ The nodes can be dragged to re-position.
- ▶ Dropdown menu that allows to choose different neural network.
- ► Sliders that allow to choose values for each input variable.
- ► The brush allows to choose the range of the weight (in absolute value) to be shown.
- ▶ When hover on the nodes or links, the details will show up.

Improvements

- ► Hide all "dead" nodes
- ► For any node, show the strongest path.