

Real Time Composition Suggestions

Objective: To create a real time algorithm to suggest possible continuations to music
(composition/improv)

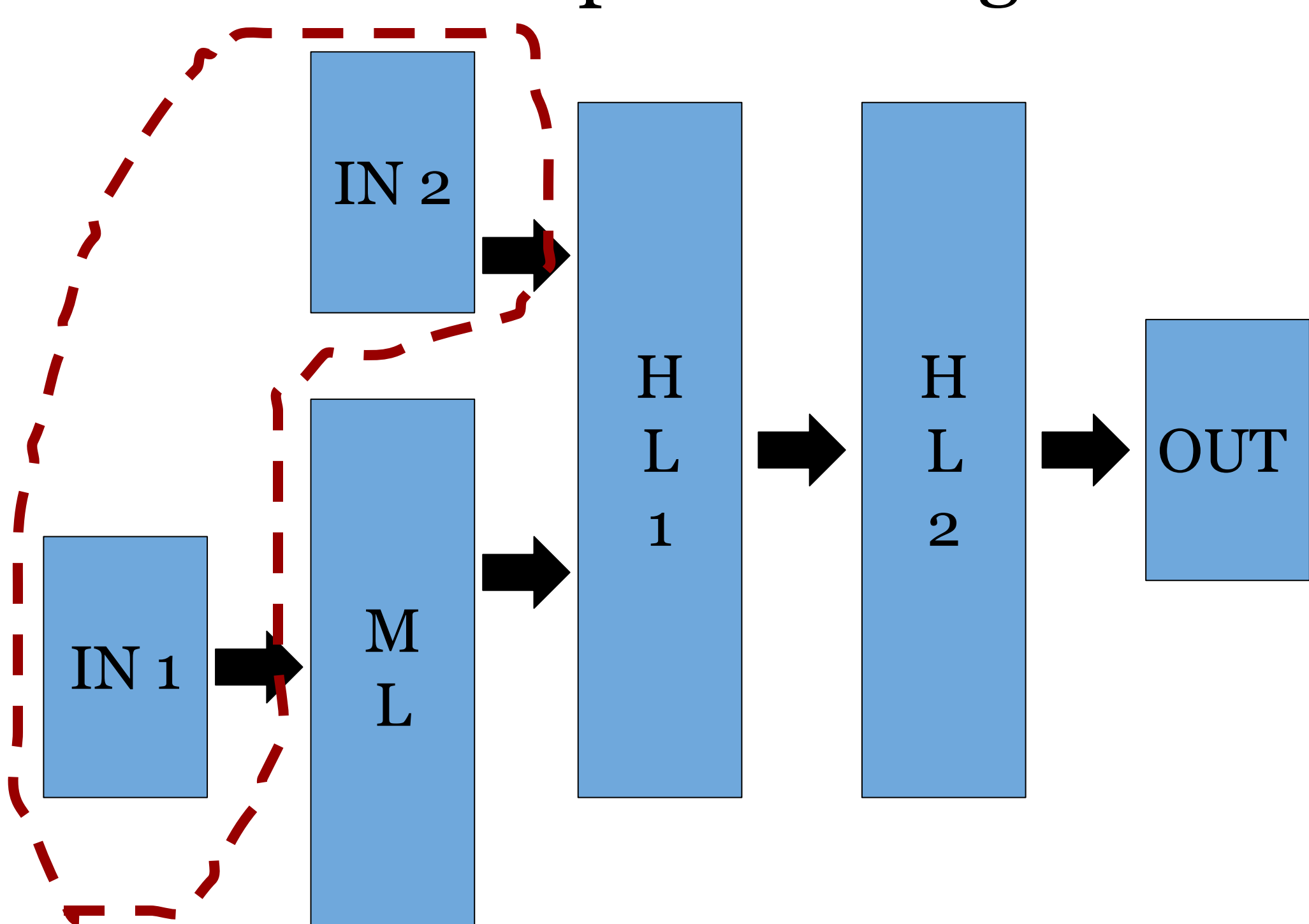
Overview of algorithm:

- Pre-train basic NN component
 - Based on user defined set of common intervals
- Chain many NN components to create higher depth analysis
 - Many different ways to do this
- Use real time user data to evolve/improve quality of suggestions
 - Gradual convergence to user 'style'

Base NN Component:

- Use of 'Staggered input' found to improve performance
- Modular component, can be chained together and combined to produce more complex analysis
 - Benefit of modularity: only 1 component has to be pre-trained → increased speed/ease of design

Base NN Component Diagram:

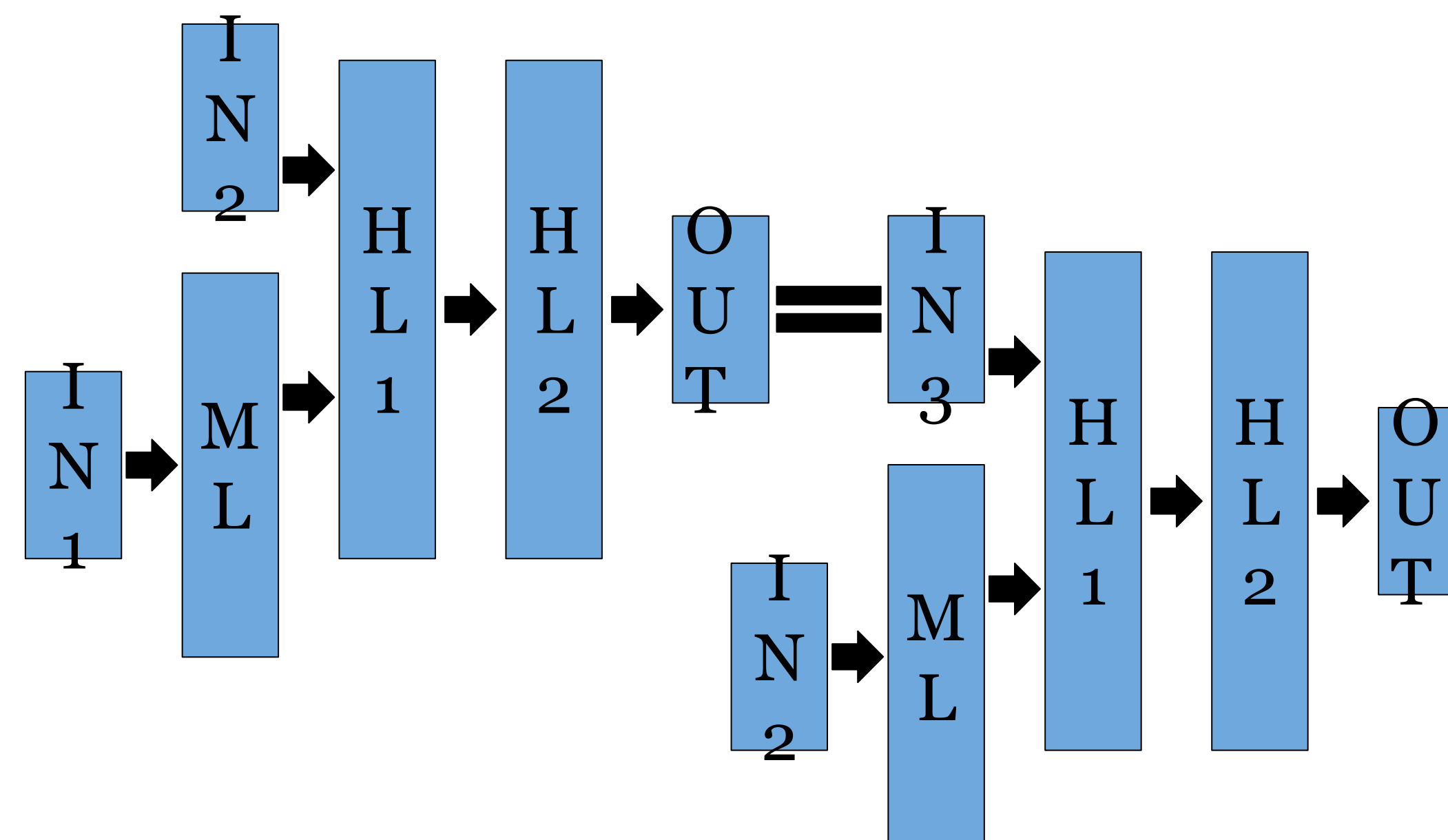


➔ : Weights and Biases Connection

══ : Direct Connection

Depth Increasing Methods:

- Use suggestions as inputs
- Use suggestions as inputs (combine into larger re-trainable network)
- Expand first input

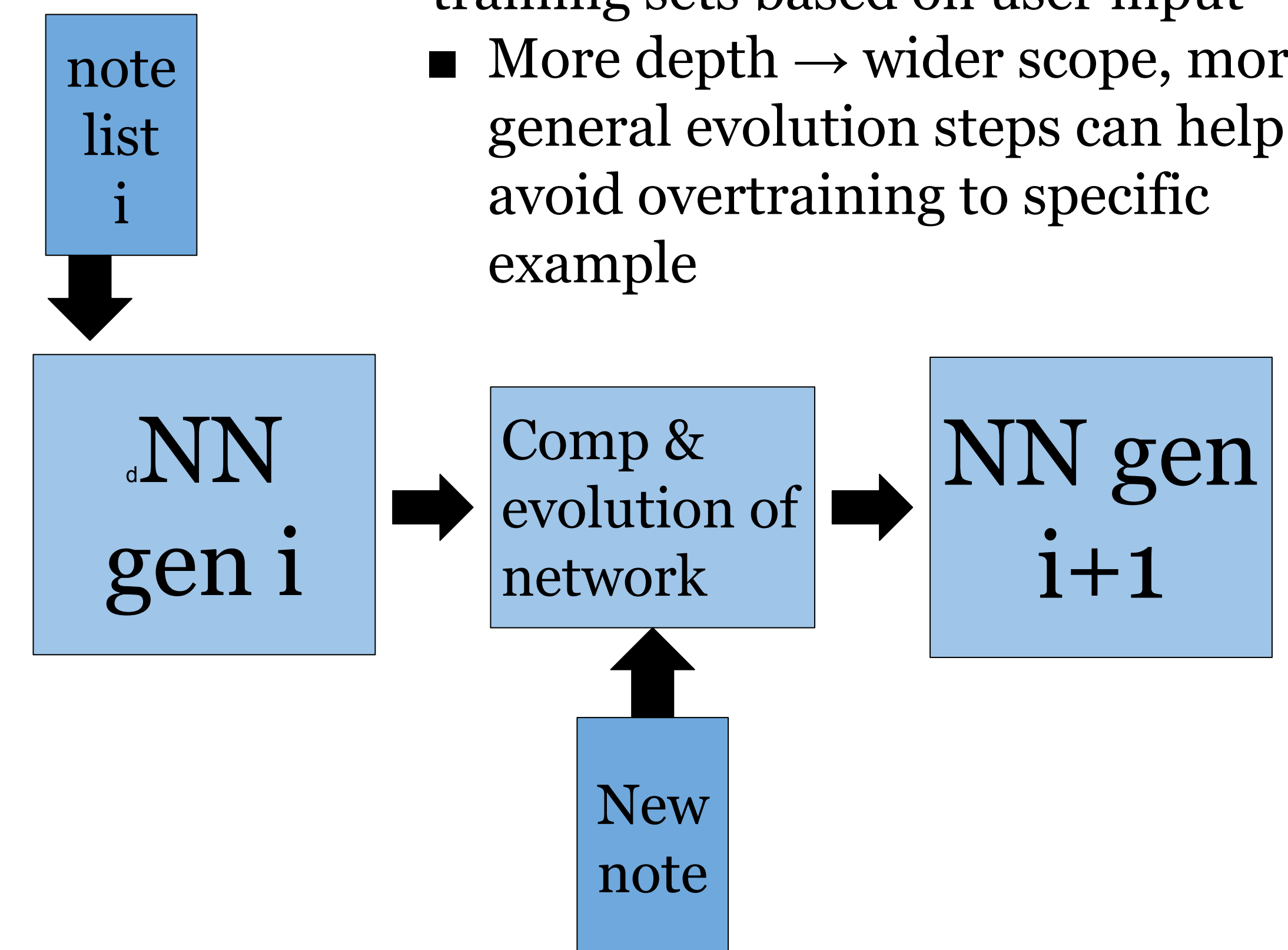


Effect of Pre-Trained Network:

- List of intervals base component is trained on has large effect of convergence time
- Experiment conducted on 2 note patterns (songs of format: n1,n2,n1,n2...)
- When base NN was trained on set of intervals found in pattern → conv. time as low as 8 evolution cycles
- When base NN was trained on set of 'bad' intervals (i.e. intervals not found in pattern) → conv. time around 25-30 cycles

Overview of Evolution:

- Network or combination of networks evolve according to user input
 - Based on comparison between suggested continuation and actual continuation (i.e. what was played)
 - Different ways of implementing this
 - Creates customizable depth new training sets based on user input
 - More depth → wider scope, more general evolution steps can help avoid overtraining to specific example



Future Plans:

- Increase suggestion duration (i.e. suggest more future notes)
- Add analysis of beat/tempo
- Experiment with more ways of generating suggestions