

# Deep Learning in Spatial Transcriptomics

## Intro to Neural Networks

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09/08/2025

# Announcements

- No class next week 😞
  - I will send an announcement on Canvas as a reminder
- The class the following week (9/22) will be on zoom!
  - I will send zoom link closer to then
- Feel free to reach out if you ever have any questions or want to meet!
  - [challin1@jh.edu](mailto:challin1@jh.edu)

# Class outline

- Brief refresher on Spatial Transcriptomics
- What is a neural network? Coding in python
  - 2-3 classes
- What is a convolutional neural network? Coding in python
  - 1 class
- Pytorch crash course
  - 2 classes
- Discussion of Spatial Transcriptomics analyses performed. Reading in ST data to python
  - 1 class
- Discussion of DL applications to ST data
  - 1 class
- Using what we have learned to do this ^
  - 1 class

# Class goals

- Truly understand how a neural network functions
- Given a modified neural network (visually or code), you can parse out how it works because you understand the basics
- Basic understanding of spatial transcriptomics – what it is and how it works
- Finally, how DL can be applied to ST

# GitHub for class

The screenshot shows a GitHub repository page for a repository named 'DL4ST'. The repository is public and has 8 commits. The commit history shows contributions from 'calebhallinan' and 't'. The repository contains files like 'lectures/slides', 'policies', '.gitignore', 'LICENSE', 'README.md', and 'misc.py'. The 'README' file is currently selected. The repository has an Apache-2.0 license. There are no releases, packages, or languages listed.

**DL4ST** Public

main 1 Branch 0 Tags

Go to file Add file Code About

calebhallinan add intro slides 5dfc49f · last week 8 Commits

lectures/slides add intro slides last week

policies edits 2 weeks ago

.gitignore add intro slides last week

LICENSE Initial commit last year

README.md edit readme 2 weeks ago

misc.py add misc.py to the repo 10 months ago

README Apache-2.0 license

**HEART: Deep Learning for Spatial Transcriptomics**

Class lectures, code, data, etc.

No description, website, or topics provided.

Readme Apache-2.0 license Activity 0 stars 1 watching 0 forks

No releases published Create a new release

No packages published Publish your first package

Python 100.0%

Now public, recommend connecting to local folder as we will begin using code today

# Neural Networks from Scratch in Python

- <https://nnfs.io/order>
- [https://github.com/Sentdex/nnfs\\_book/tree/main](https://github.com/Sentdex/nnfs_book/tree/main)

**E-Book** →



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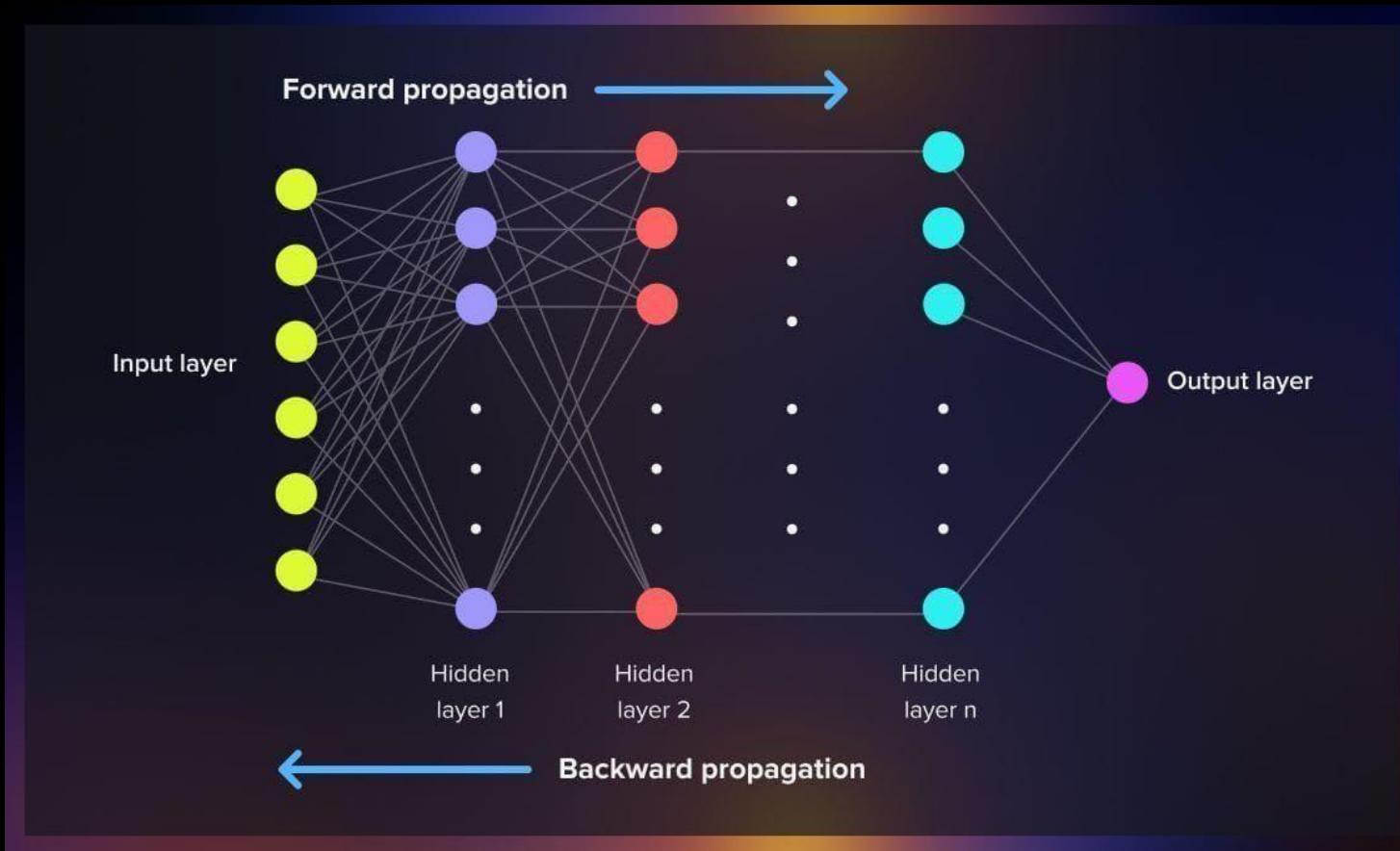
**Neural Networks from Scratch Hardcover**

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Add to cart

# Today's coding

How do NN do forward propagation?



Next class: How do NN do backward propagation?

# Reflection Cards

## Reflection Card

Please reflect on today's lesson in Deep Learning for Spatial Transcriptomics 2025.

Reflection cards are not graded for content. However, the contents of these reflection cards may help identify potential common areas of confusion that can be addressed in the next class along with helping me make the class better :)

- Essentially a means to help me make this class better!
1. What is something that you learned in today's lecture?
  2. What is something that you are still confused about from today's lecture?
  3. Do you have any other comments/feedback/thoughts/suggestions/concerns?

<https://forms.gle/QwjjUPFD8YFThhyL9>