



## LECTURE 5

# NEURAL NETWORKS AS KNOWLEDGE BASES: INTERPOLATION, GROKING, AND LOCATION ENCODERS

Geospatial Representation Learning

PRESS – OR SPACE. →

# Learning Outcomes

## Lecture

- Explain how modern overparameterized models challenge the classical bias-variance view of machine learning.
- Describe the interpolation regime, double descent, and grokking at a conceptual level.
- Interpret neural networks as implicit representations or neural knowledge bases that can store information in their parameters.
- Explain how implicit neural representations can encode spatial, temporal, or spatiotemporal data.
- Describe location encoders as neural models that map geographic coordinates and context to learned representations.
- Compare geospatial interpolation with learned location-based representation models.
- Explain the basic idea of SatCLIP-/GeoCLIP-like self-supervised geolocalization objectives.

## Lab

- Query or construct a small geospatial embedding database.
- Use location-based embeddings for similarity search, prediction, or spatial interpolation.
- Implement a simple location encoder or use an existing pretrained location representation.
- Compare location-based representations against conventional coordinate or hand-crafted features.



## PRACTICAL 5

# LOCATION ENCODERS AND EMBEDDING DATABASES

Geospatial Representation Learning

PRESS – OR SPACE.



© Marc Rußvurm

Licensed under [Creative Commons Attribution–NonCommercial 4.0 International \(CC BY-NC 4.0\)](https://creativecommons.org/licenses/by-nc/4.0/).  
You may share and adapt these slides for teaching, research, and other non-commercial educational purposes with attribution.  
Commercial training, paid workshops, consulting seminars, or incorporation into commercial course products require prior permission.