Advanced Python for Neuroscientists

Lecture 1: Introduction, Visualization

2022/06/28

Introduction

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  - Human behavior (eye movement) / MEG
  - Monkey electrophysiology
  - Modelling & calcium data

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  - Human behavior (eye movement) / MEG
  - Monkey electrophysiology
  - Modelling & calcium data
- Who are you?
  - Undergrad major / lab
  - Previous programming experience
  - Working with any dataset?

Preaching

- Results = do_this (Input, option)
- Continued learning experience
  - Organizing code, data…
  - Read other people’s code
- Use functions!
- Use editors!
- Save plots in pdf and by date

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  - What this is: math / conceptual understanding
  - How to do this
- Sounds good?

What to expect / what do you wish to learn

- Class 1: Visualization
- Class 2: Dimensionality Reduction
- Class 3: Regression / Classification (Decoding)
- Class 4: Generative Models (Encoding) - or linear algebra?
- What’s not covered - dependent on labs / field
  - Task programming
  - Higher-end visualization that requires specific packages (imaging)

Visualization

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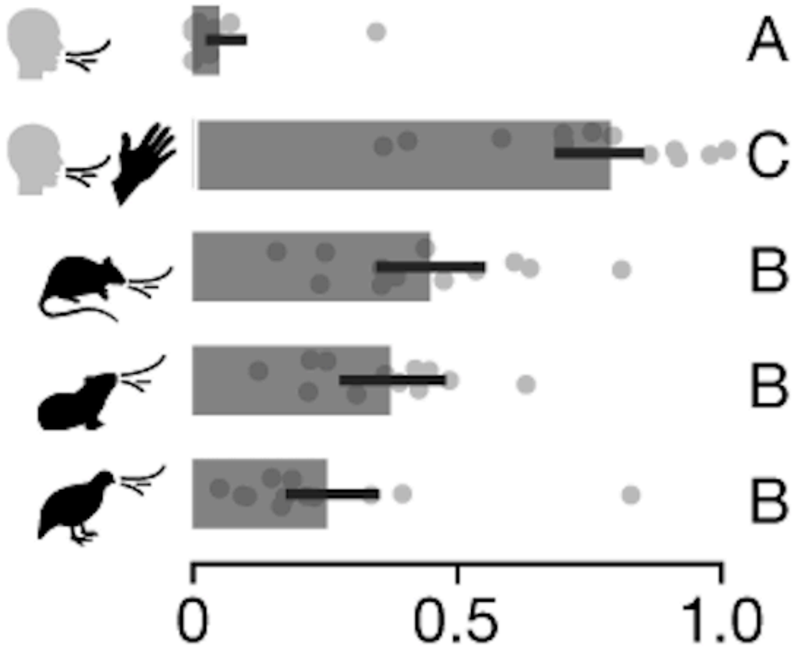
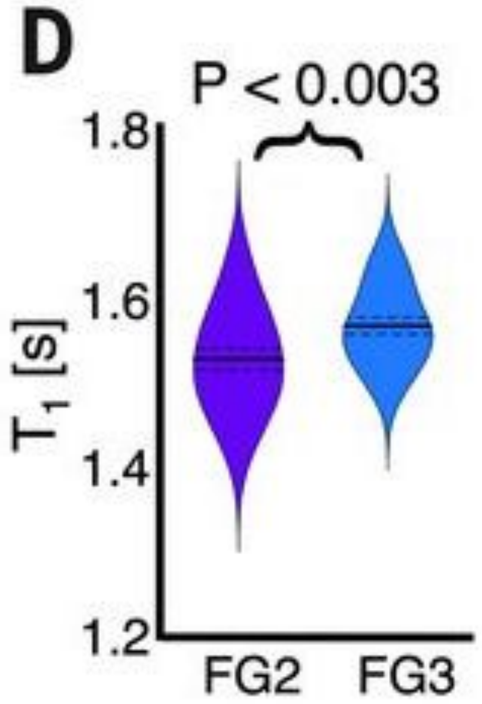
- Our 2 friends:
  - matplotlib
  - seaborn

Plots we are plotting today

- Bar / violin plots
  - Compare one measurement from groups of data



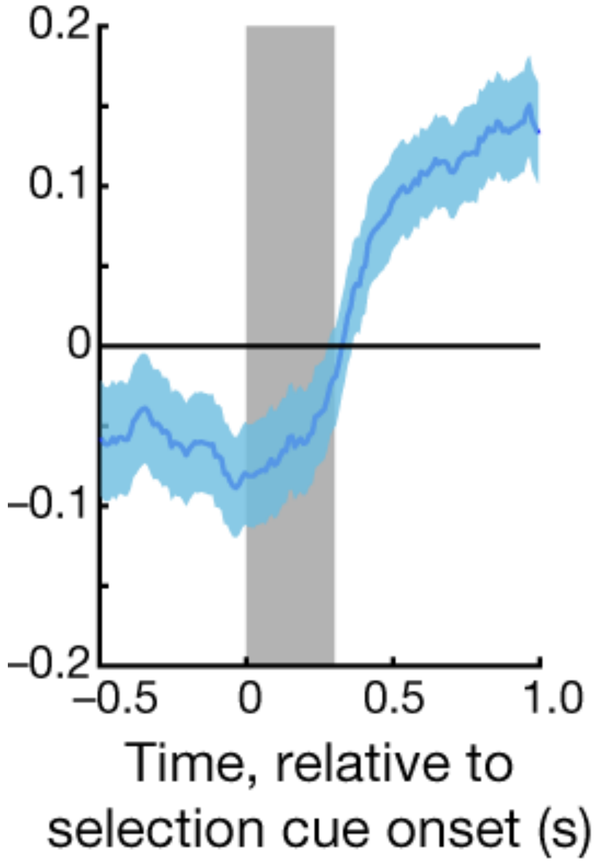
(McBride group)



(Gomez group)

Plots we are plotting today

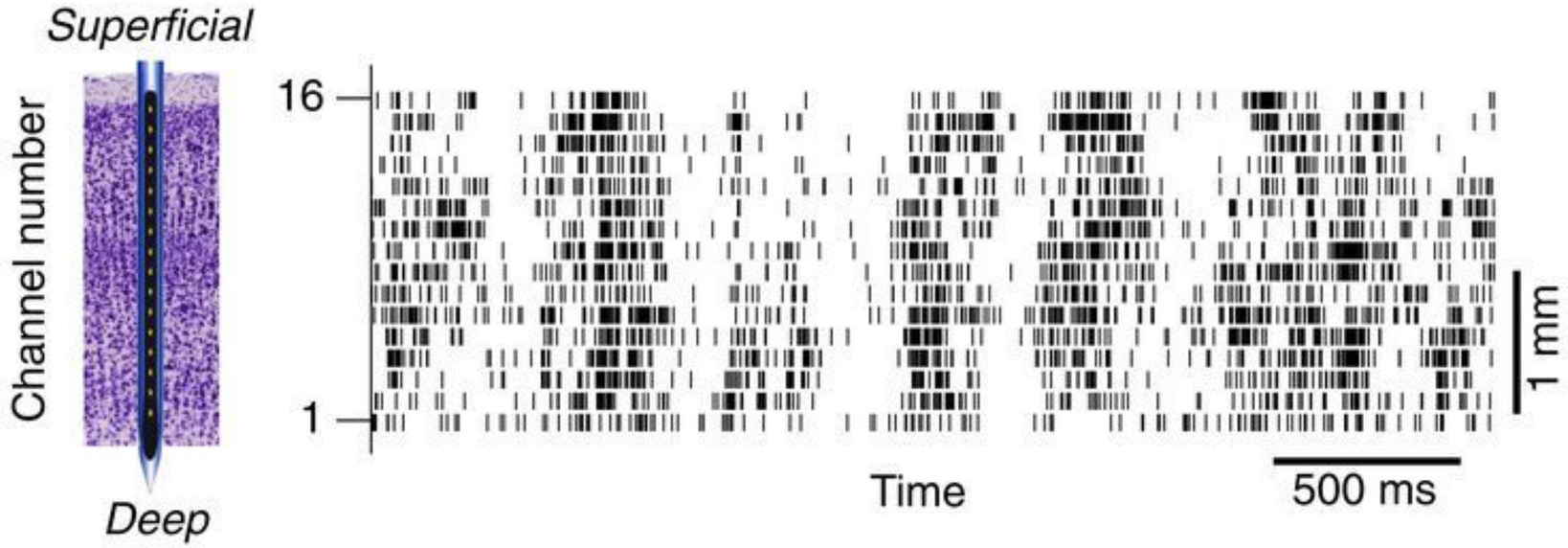
- Bar / violin plots
- Line plots
  - Time series data (LFP, fMRI voxel)



(Buschman group)

Plots we are plotting today

- Bar / violin plots
- Line plots
- Raster plots



Let’s get started!

- https://github.com/bichanw/AdvancedPython2022