ElasticVis Tutorial

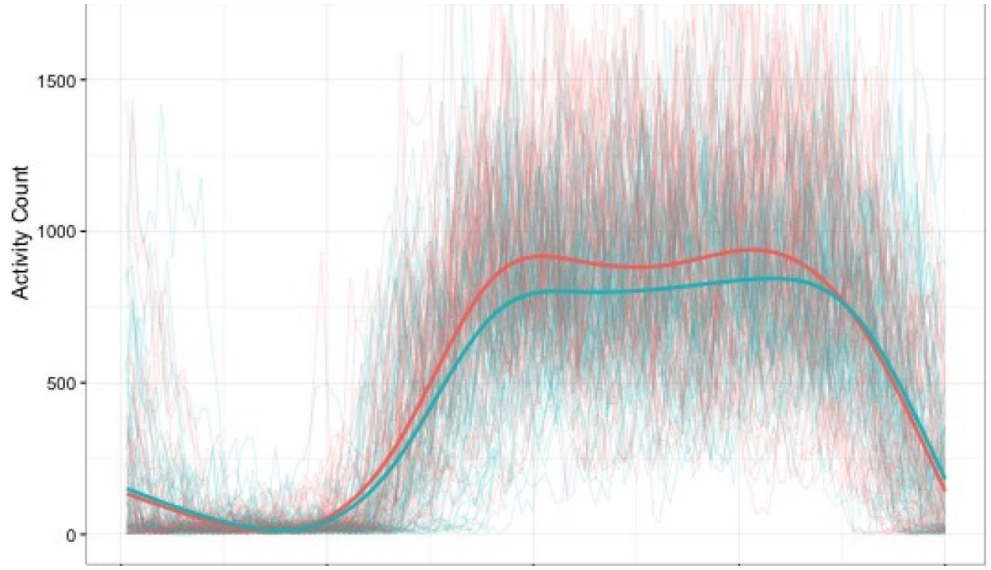
This study investigates the effectiveness of a visualization tool for detecting outliers in different time series data

You will be shown brief tutorials on time series analysis and depth measures as well as a short video on how to use the visualization

Questions?

What is FDA?

In statistics, functional data analysis (FDA) allows us to understand the nature of data by studying collections of observations (time series) as functions or curves



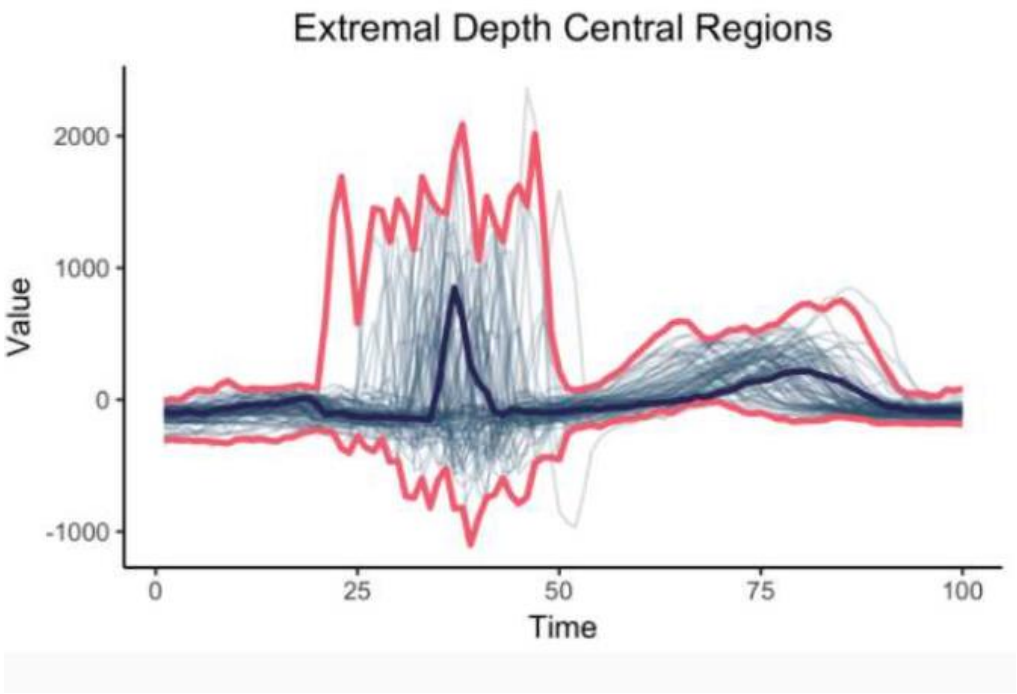
But how can we determine outliers in functional data?

Depth measures

One method of detecting outliers in time series is with depth measures

Depths rank functions from center outwards

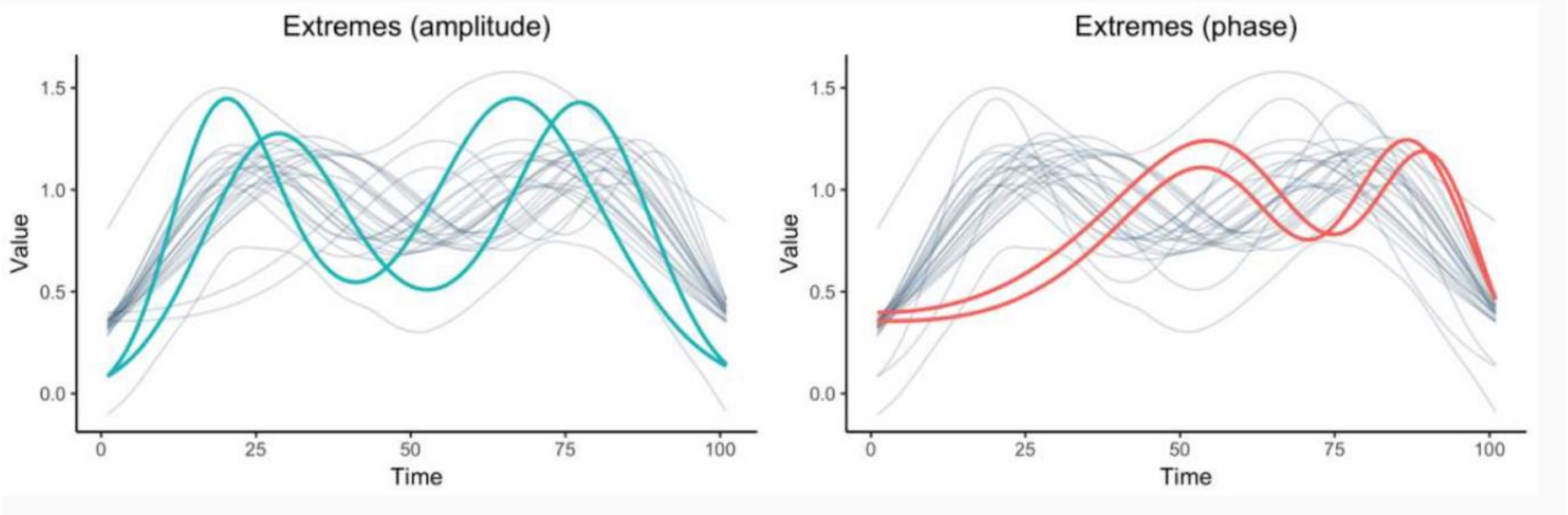
- Example with (dark blue=central region, red=outlying)



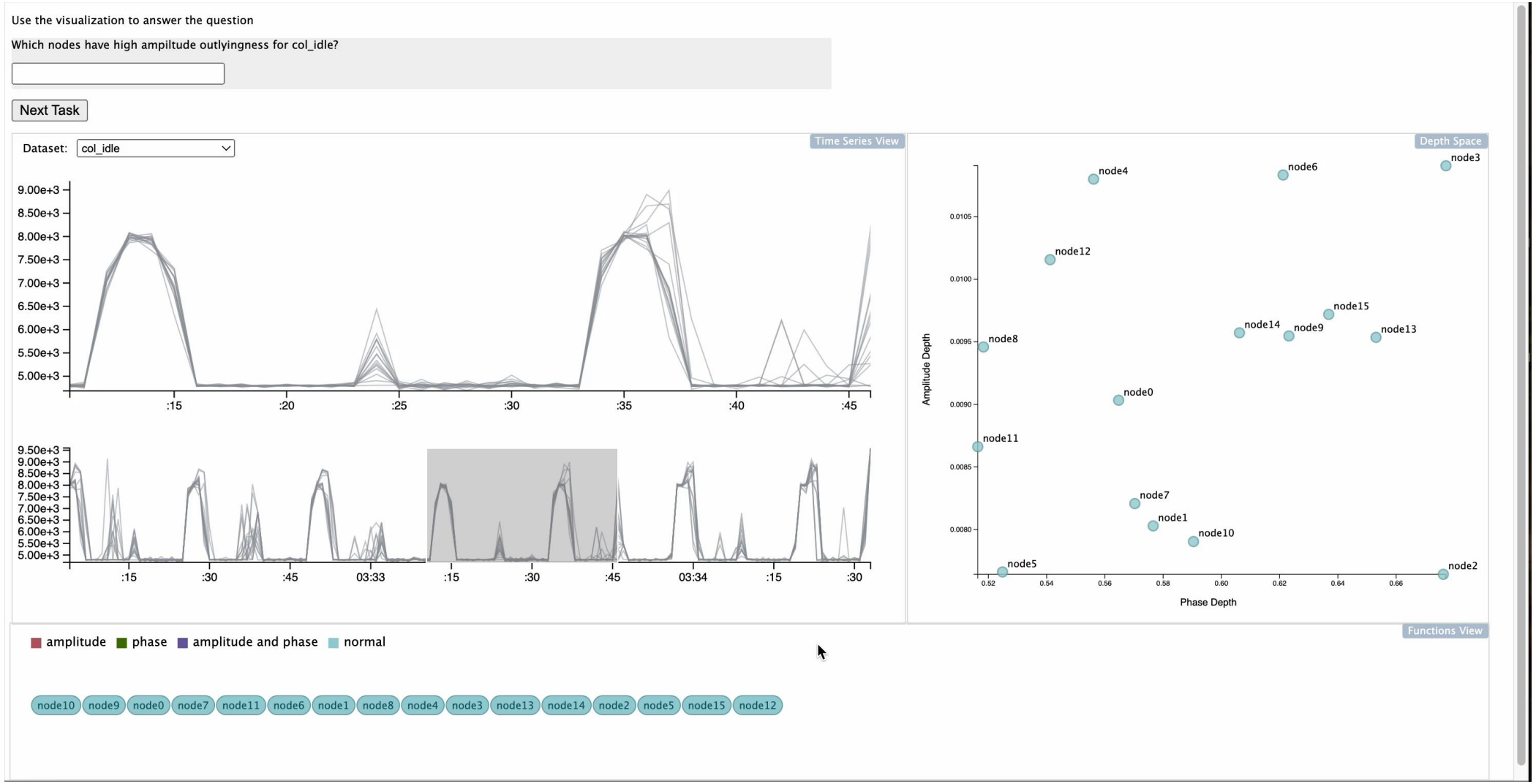
Elastic depth

Elastic depth uses two types of depth measures to classify time series:

1. Phase depth – horizonal displacements in curve features
2. Amplitude depth – variation in curve height



Visualization tutorial



Task Instructions

- You will be using a tool to analyze amplitude and phase depths for two different datasets; one that contains CPU data from a supercomputer and one that contains activity data (walking and jogging) from wearable devices.
- You will be answering five questions from each dataset (ten questions total)
- You are encouraged to use the visualization interactions to complete the tasks
- Do not interact with any component in the browser except for the display window (i.e., please don’t use the refresh button, forward/back buttons, address bar, etc). If you have any issues, please let the researcher know

Task Instructions

- For each question, type in your answers by listing the function(s)/variable(s) separated by commas:

Use the visualization to answer the question

Which nodes have high ampiltude outlyingness for col_idle?

node9,node11

Next Task

Use the visualization to answer the question

Given nodes 6, 7, and 11, which variable(s) contributed most to the amplitude and/or phase outlyingness labels for these nodes?

col_idle,col_system

Finish

Task Instructions

- Please be careful when clicking “Next Task” when you are done answering, as there is no way to go back
- Once you begin a task, you are not allowed to communicate with the researcher until you have completed all the tasks
- Questions?

Begin tasks

Good luck!

Feedback

You will now be asked to share your experience by completing three questionnaires

Q1 - https://forms.gle/T7bQZPUVJkxKswQC7

Q2 - https://forms.gle/qwKXzqnqXLFb4ydt8

Q3 - https://forms.gle/caP78ayGrJLFa5p4A