



TRIPODS DISTINGUISHED TUTORIAL



Functional and Shape Data Analysis

Functional data has a growing presence in all branches of science and engineering, partly due to advances made in data collection (imaging) and storage technologies. Such data is often analyzed using the classical Hilbert structure of square-integrable functions, but that setup ignores shapes of functions and leads to counterintuitive results. Informally, shapes of function relate to sequences of peaks and valleys, but are flexible on their exact locations. To focus on shapes of functions, we have introduced "Elastic functional data analysis" that allows time warpings of functions in order to register functional data, i.e. match their peaks and valleys. This, in turn, utilizes elastic Riemannian metrics that enable comparisons and testing of shape data modulo warping group action. The resulting framework has been utilized for studying shapes of functions, 2D curves, 3D surfaces, tree-like objects, and graphs. I will demonstrate these ideas using a variety of examples from life-science data.

This tutorial workshop consists of a two-hour lecture, followed by a 45-minute practical session with a short break in between. For attending the practical session, audiences are advised to be familiar with MATLAB and to download an elastic functional data analysis package (link will be provided latter in advance of the tutorial). Registration is not required.

Background knowledge advisable: Participants should have at least a basic understanding of undergraduate level of probability, statistics, and linear algebra.

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Date: Friday, September 18

Time: 1:00 – 4:00 p.m. US Central Time

Zoom Meeting ID: 998 4499 3279

Password: 724615

Faculty host: Bani Mallick, STAT

Biography

Dr. Anuj Srivastava is a Professor in the Department of Statistics and a Distinguished Research Professor at the Florida State University. His research interests include statistical analysis on nonlinear manifolds, statistical computer vision, functional data analysis, and shape analysis. He is a fellow of the International Association of Pattern Recognition (IAPR), Institute for Electrical and Electronic Engineers (IEEE), and American Statistical Association (ASA). He has held several visiting positions at European universities, including INRIA, France, the University of Lille, France, and Durham University, UK. He has graduated 30+ PhD students so far in his career, with placements in academia, industry, and government labs. He has coauthored more than 230 papers in peer-reviewed journals and top-tier conferences, and also several books, including the 2016 Springer textbook on "Functional and Shape Data Analysis".

