ENBIS-26 Conference

Report of Contributions

Contribution ID: **3** Type: **not specified**

A Registration-free Approach for Shape and Color Monitoring of Functionally Graded Materials via 4D Point Clouds

Recent advances in additive manufacturing enable the fabrication of complex parts with intricate geometries and spatially-varying material composition. Data fusion integrates point cloud data with chromatic attributes, yielding 4D point clouds, a rich representation that jointly encodes shape and material information. We introduce a registration-free framework for jointly monitoring shape and surface color via 4D point clouds. The proposed approach leverages the Laplace-Beltrami operator to capture intrinsic spectral features. A combined monitoring scheme is developed to detect shape deformations and color anomalies, complemented by a spatially-aware post-signal diagnostic procedure to determine the source of change and localize color anomalies. Crucially, neither component requires point cloud registration or mesh reconstruction, thereby eliminating error-prone and computationally expensive pre-processing steps. The performance of the proposed framework is assessed through a Monte Carlo simulation study and a case study.

Special/ Invited session

Young Statisticians

Classification

Both methodology and application

Keywords

Statistical Process Monitoring; Post-signal diagnostic; Laplace-Beltrami operator

Primary author: PATALANO, Mariafrancesca (University of Padua)

Co-authors: CAPIZZI, Giovanna (Department of Statistical Sciences); PAYNABAR, Kamran (School of Industrial and Systems Engineering)

Presenter: PATALANO, Mariafrancesca (University of Padua)

Track Classification: Other/special session/invited session

Contribution ID: **14** Type: **not specified**

ENBIS-Live: Real Problems. Real Time. Real Stats.

Join us for one of the most dynamic and interactive sessions of the ENBIS conference —ENBIS-Live: Open Problem Solving in Action!

This is no ordinary talk. In this fast-paced, high-energy session, statisticians and data scientists roll up their sleeves to tackle real-world open problems —live and on the spot. Think of it as a collaborative brain trust powered by the collective wisdom and creativity of the ENBIS community.

Here's how it works: Got a tricky problem? Volunteer to present it in 7 minutes. Outline the background, the data science or statistical angle, and where you're stuck. Need clarity? The audience asks their burning questions. Have ideas? The floor opens to contributions, suggestions, and insights from the crowd. Wrap-up: The problem owner reflects on the input, and the session host ties it all together.

Each problem gets 20–30 minutes of focused, expert attention. We'll feature 2–3 open problems — so come ready to think, question, suggest, and be inspired!

This year we would like to take it one step further to test how AI fares as a collaborative problem solver.

Got a challenge you'd like to throw into the ring or want to use your AI skills for one or more problems? Contact Jennifer Van Mullekom (vanmuljh@vt.edu) and be part of this one-of-a-kind problem-solving spectacle.

Bring your brains. Bring your curiosity. And let's solve some problems —ENBIS-style!

Special/ Invited session

Classification

Mainly application

Keywords

Collaboration, Problem Solving, Teamwork

Primary author: Dr VAN MULLEKOM, Jennifer (Virginia Polytechnic Institute & State University)

Presenter: Dr VAN MULLEKOM, Jennifer (Virginia Polytechnic Institute & State University)

Track Classification: Other/special session/invited session

Contribution ID: **20** Type: **not specified**

The Irreducible Error: What Statistics and Management Have in Common

The truth is that some error, no matter how hard we try, simply can't be modelled away. That irreducible error that stubbornly remains, no matter how time we have spent selecting predictors, or agonising over parameter tuning. Accepting that there will always be some randomness in statistics goes a long way to helping manage a technical team.
In this talk, Sophie will draw on her own experience and lessons learned from mentors, friends and colleagues to argue the most important lesson in management (and statistics) is to embrace uncertainty and act wisely in its presence. In statistics, we learn to distinguish noise from signal, not to eliminate it. When managing a team, the aim should be to create conditions where people can confidently deliver their best work.
To achieve this, how can managers ensure that they resist the temptation to overfit measurable performance for what matters most (trust, motivation, and safety)? Perhaps more crucially, how can a manager have the honesty to say when their model is wrong and they need to refine their approach? Throughout, Sophie will ask and challenge if the habits and traits that make a great statistician, are also those that make a great statistician.
As a Bayesian statistician, Sophie would like you to know that no p-values were harmed in the preparation of her talk and significance is not guaranteed.

Special/ Invited session

Classification

Mainly application

Keywords

management, uncertainty, decision

Primary author: CARR, Sophie (Bays Consulting)

Presenter: CARR, Sophie (Bays Consulting)

Track Classification: Young Statistician/ Best Manager/ Greenfield