

A concise historical review of information geometry and its recent advances

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Abstract

We concisely review the key historical milestones of information geometry, mention its recent advances, and conclude with challenges awaiting ahead.

1 Introduction

List of dedicated monographs and textbooks [1, 2].

2 Fisher-Riemannian Information Geometry

Hotelling [3] (hand-written note, 1930) (see Appendix of [6] for typeset document), Rao [5, 4] (1945)

3 Parametric Information Geometry

4 Quantum Information Geometry

5 Non-parametric Information Geometry

6 Differential-Geometric Information Geometry

Finsler, Souriau, etc.

7 Information Geometry of Model Spaces Beyond Statistical Models

8 Challenges and Perspectives

References

- [1] S. Amari. *Information Geometry and Its Applications*. Applied Mathematical Sciences. Springer Japan, 2016.
- [2] Nihat Ay, Jürgen Jost, HV Lê, and Lorenz Schwachhöfer. Information geometry. *Ergebnisse der Mathematik und Ihrer Grenzgebiete/A Series of Modern Surveys in Mathematics*, Springer, 2017.

- [3] Harold Hotelling. Spaces of statistical parameters. *Bull. Amer. Math. Soc.*, 36:191, 1930.
- [4] Calyampudi Radhakrishna Rao. Information and the accuracy attainable in the estimation of statistical parameters. In *Breakthroughs in statistics*, pages 235–247. Springer, 1992.
- [5] Radhakrishna C. Rao. Information and the accuracy attainable in the estimation of statistical parameters. *Bull. Calcutta Math. Soc.*, 37:81–91, 1945.
- [6] Stephen M Stigler. The epic story of maximum likelihood. *Statistical Science*, 22(4):598–620, 2007.