On a mathematical curve that shapes the world: From WW2 to generative AI

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Abstract

In this talk, I will offer a quick overview on the history of the ROC (Receiver Operating Characteristic) curve, along with a biased personal account of some selected developments on the topic that I have made with co-authors so to define priors on the space of ROC curves. Roughly speaking, the ROC curve is a mathematical and statistical object that can be used for comparing two probability measures so to assess the degree of overlap between their density functions. A prior on the space of ROC curves can be defined by resorting to pairs of random probability measures, which can then be used for learning about ROC curves from data by resorting to Bayes theorem. Regression versions of this approach can be devised, so to define priors on the space of conditional ROC curves.

The historical outlook will showcase that the ROC curve was born out of World War II—for detecting enemy objects in battlefields—and that it was fundamental over the COVID 19 pandemic—for examining the accuracy of COVID tests.

Finally, I will make some remarks on how ROC curves are being fundamental at the moment in the field of generative Artificial Intelligence (AI), for answering questions such as:

"Was this abstract written by a human or by AI?"

References

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