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## EXPLAINING BAYESIAN INFERENCE PRINCIPLES NONVERBALLY: HOW TO HELP NON-MATHEMATICIANS UNDERSTANDING THE WEIGHT OF EVIDENCE

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Thanks to its great potential and sheer versatility, Bayesian inference has become the most progressive tool of the modern era of data science and it is used to deal with various problems in more and more areas of practical life. However, Bayesian inference should not be seen as a mere statistical tool, but rather as one of the fundamental components of general logic and, as such, it should be properly understood by experts in many different fields. Collaboration between mathematicians and non-mathematicians is therefore crucial if the potential of this instrument is to be fully exploited, but this collaboration is often limited by the mathematical anxiety of non-mathematicians. We find ourselves in a situation where many of the people on whom it depends whether the whole process is successful (i.e. lawyers, doctors) are not able to adopt Bayesian inference through classical theoretical mathematics.

Fortunately, there are very effective non-verbal ways to explain Bayesian inference that work with visual models built on well-known and intuitively easy-to-understand objects. The lecture presents two of them. First, a WATERFALL MODEL that works with a basic form of Bayes rule and explains the principles of classical test parameters, such as sensitivity, specificity and prior probability, while illustrating the impact of changing these parameters on the test predictive values and the weight of evidence. Second, a SCALES-OF-JUSTICE MODEL, that illustrates an odds form of Bayes rule and it allows for an intuitive understanding of the effect of combining priors and weight of evidence.

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