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information theory is the mathematical study of the quantification storage and communication of information 1 the field was originally established by the works of harry nyquist and ralph hartley in the 1920s and claude shannon in the 1940s information theory a mathematical representation of the conditions and parameters affecting the transmission and processing of information most closely associated with the work of the american electrical engineer claude shannon in the mid 20th century information theory is chiefly of interest to information theory de nes de nite unbreachable limits on precisely how much information can be communicated between any two components of any system whether this system is man made or natural the theorems of information theory are so important that they deserve to be regarded as the laws of information 2 3 4 the basic idea is to use the information and knowledge we do possess about a complex system as constraints and then use well established mathematical procedures to infer additional knowledge by maximizing a certain objective decision function subject to these constraints 2 introduction to information theory p x a z x a dpx x z i x a dpx x 1 3 where the second form uses the indicator function i s of a logical statement s which is defined to be equal to 1 if the statement sis true and equal to 0 if the statement is false the expectation value of a real valued function f x is given by starts apr 26 financial aid available 18 102 already enrolled course gain insight into a topic and learn the fundamentals instructor prof raymond w yeung included with coursera plus 4 7 127 reviews 33 hours to complete 3 weeks at 11 hours a week flexible schedule learn at your own pace about modules recommendations testimonials information theory holds the exciting answer to these questions it s an idea over 3 000 years in the making but before we can understand this we must step back and explore perhaps the most powerful invention in human history douglas hamilton follow published in towards data science 12 min read apr 28 2021 this is the first in a series of articles about information theory and its relationship to data driven enterprises and strategy originally developed by claude shannon in the 1940s information theory laid the foundations for the digital revolution and is now an essential tool in telecommunications genetics information theory field of mathematics that studies the problems of signal transmission reception and processing information theory overview reference work entry first online 01 january 2022 pp 58 60 cite this reference work entry alexander dimitrov 46 accesses download reference work entry pdf definition information theory started with shannon s seminal paper a mathematical theory of communication shannon 1948 information theory a tutorial introduction february 2015 doi 10 13140 2 1 1633 8240 edition first publisher sebtel press editor what is information theory origins of written language history of the alphabet the rosetta stone source encoding visual telegraphs case study decision tree exploration electrostatic telegraphs case study the battery and electromagnetism morse code and the information age morse code exploration modern information theory course description this is a graduate level introduction to mathematics of information theory we will cover both classical and modern topics including information entropy lossless data compression binary hypothesis testing channel coding and lossy data compression course info instructor prof yury polyanskiy departments originally developed by claude shannon in the 1940s information theory laid the foundations for the digital revolution and is now an essential tool

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