



Analytic Pattern Matching: From DNA to Twitter

By Philippe Jacquet, Wojciech Szpankowski

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How do you distinguish a cat from a dog by their DNA? Did Shakespeare really write all of his plays? Pattern matching techniques can offer answers to these questions and to many others, from molecular biology, to telecommunications, to classifying Twitter content. This book for researchers and graduate students demonstrates the probabilistic approach to pattern matching, which predicts the performance of pattern matching algorithms with very high precision using analytic combinatorics and analytic information theory. Part I compiles known results of pattern matching problems via analytic methods. Part II focuses on applications to various data structures on words, such as digital trees, suffix trees, string complexity and string-based data compression. The authors use results and techniques from Part I and also introduce new methodology such as the Mellin transform and analytic depoissonization. More than 100 end-of-chapter problems help the reader to make the link between theory and practice.

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Editorial Review

About the Author

Philippe Jacquet is a Research Director at INRIA, a major public research lab in computer science in France. He has been a major contributor to the Internet OLSR protocol for mobile networks. His research interests involve information theory, probability theory, quantum telecommunication, protocol design, performance evaluation and optimization, and the analysis of algorithms. Since 2012 he has been with Alcatel-Lucent Bell Labs as head of the department of Mathematics of Dynamic Networks and Information. Jacquet is a member of the prestigious French Corps des Mines, known for excellence in French industry, with the rank of 'Ingenieur General'. He is also a member of ACM and IEEE.

Wojciech Szpankowski is Saul Rosen Professor of Computer Science and (by courtesy) Electrical and Computer Engineering at Purdue University, where he teaches and conducts research in analysis of algorithms, information theory, bioinformatics, analytic combinatorics, random structures, and stability problems of distributed systems. In 2008 he launched the interdisciplinary Institute for Science of Information, and in 2010 he became the Director of the newly established NSF Science and Technology Center for Science of Information. Szpankowski is a Fellow of IEEE and an Erskine Fellow. He received the Humboldt Research Award in 2010.

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Hazel Freese:

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