

Data Science for Financial Applications

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ABSTRACT

Financial applications of data science provide a perfect illustration of the power of the shift from subjective decision-making to data- and evidence-driven decision-making. In the space of some fifty years, an entire sector of industry has been totally revolutionised. Such applications come in three broad areas: actuarial and insurance, consumer banking, and investment banking.

Actuarial and insurance work was one of the earliest adopters of data science ideas, dating from long before the term had been coined, and even before the computer had been invented. But these areas have fallen behind the latest advances in data science technology - which means there is considerable potential for applying modern data analytic ideas.

Consumer banking has been described as one the first and major success stories of the data revolution. Dating from the 1960s, when the first credit cards were launched, techniques for analysing the massive data sets of consumer financial transactions have driven much of the development of data mining and data science ideas. But new model types, and new sources of data, are leading to a rich opportunity for significant developments.

In investment banking the “efficient market hypothesis” of classic economics says that it is impossible to predict the financial markets. But this is false - though very nearly true. That means that there is an opportunity to use advanced data analytic methods to exploit the tiny gap between conventional theory and what actually happens.

Other data science issues, such as data quality, ethics, and security, along with the need to understand the limitations of models, become particularly pointed in the context of financial applications.

CCS Concepts/ACM Classifiers

• General and reference ~ Surveys and overviews

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BIOGRAPHY

David Hand is Emeritus Professor of Mathematics and Senior Research Investigator at Imperial College, London. He is a Chartered Statistician and Honorary Fellow of the Institute of Actuaries. He serves on the Board of the UK Statistics Authority, the European Statistical Advisory Committee, and the Advisory Board of the ONS Data Science Campus. He previously served for eight years as Chief Scientific Advisor to Winton Capital Management, chaired Imperial College’s Data Science Institute Research Board, and chaired the UK’s Administrative Data Research Network. He has received many awards for his work, including the Guy Medal of the Royal Statistical Society, the *Credit Collections and Risk* award for contributions to the credit industry, and the Box Medal from the European Network for Business and Industrial Statistics. His 29 books include *Principles of Data Mining*, *Intelligent Data Analysis*, and *The Improbability Principle*.



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