

Preface

Real measurements involve errors and uncertainties. Dealing with data imperfections and imprecisions is one of the modern data mining challenges. The term “robust” has been used by different disciplines such as statistics, computer science, and operations research to describe algorithms immune to data uncertainties. However, each discipline uses the term in a, slightly or totally, different context.

The purpose of this monograph is to summarize the applications of robust optimization in data mining. For this we present the most popular algorithms such as least squares, linear discriminant analysis, principal component analysis, and support vector machines along with their robust counterpart formulation. For the problems that have been proved to be tractable we describe their solutions.

Our goal is to provide a guide for junior researchers interested in pursuing theoretical research in data mining and robust optimization. For this we assume minimal familiarity of the reader with the context except of course for some basic linear algebra and calculus knowledge. This monograph has been developed so that each chapter can be studied independent of the others. For completion we include two appendices describing some basic mathematical concepts that are necessary for having complete understanding of the individual chapters. This monograph can be used not only as a guide for independent study but also as a supplementary material for a technically oriented graduate course in data mining.

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