Chapter 1
Introduction

This book introduces the readers to recent research concerning diffusion in social networks and attempts bring together disparate lines of work on the topic from multiple fields. The availability of large social network datasets over nearly the past two decades have made it possible to explore network diffusion like never before. Having said that, the materials covered in this book is not limited to the online platforms, but rather are thought to be applicable to social networks from a variety of domains. Similar to other subjects in social network analysis, information diffusion has its roots in multiple field of study: biologists and physicists have done research in the field by studying evolutionary dynamics [2] and disease propagation models [3]; economist and Nobel Laureate Thomas Schelling introduced the idea of "tipping points" which now has become mainstream [4]; concurrently Mark Granovetter studied these ideas from a sociological perspective [5]. However, it wasn't until Kempe et al. article [1] in 2003 that information diffusion became a significant line of research in computer science.

In this volume, we look to provide an overview of the major diffusion models seen in multiple disciplines. First we examine the popular SIR model—which has been studied in biology and physics. This is followed by a chapter on the "tipping" model—which has its roots in economics and sociology and is prevalent in mathematics and some computer science venues. We then turn our attention to the independent cascade and linear threshold models that are often explored in data mining. Then we discuss the artificial intelligence community's logic programming based diffusion models. After that, we examine models based on evolutionary dynamics such as the voter model—which have become popular with theoretical biologists and the statistical physics community. Finally, we briefly examine some work related to observing and reasoning about diffusion processes in the real world.

To sum up, research in social network analysis in general, and information diffusion in social networks in particular is still in its early stages. We try to give a good overview of the work done so far. We hope that the reader finds the material useful and a good starting point for cutting-edge research in this area.

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