The Power of Networks: Six Principles That Connect Our Lives. Christopher G. Brinton and Mung Chiang. Princeton, NJ: Princeton University Press, 2016. ISBN: 978-1400884070

We see networks everywhere; they are the essentials of our lives. The main questions are - how do they work and why is it necessary to understand them? These are the initial remarks in Christopher G. Brinton and Mung Chiang's brand new book. Christopher G. Brinton is the Head of Advanced Research at Zoomi Inc., where he works on big-data analytics, social learning networks, and personalized learning. He holds a PhD in electrical engineering from Princeton University. Mung Chiang is the Arthur LeGrand Doty Professor of Princeton, where he serves as chairman of the Princeton Entrepreneurship Council and director of the Keller Center for Innovation in Engineering Education. In their new book they show the most important six principles that connect people's lives. The main purpose of this book, besides entertainment and being a popular science book, is to be a basis for a network introductory course in college or high school.

The book contains two big parts. In the first part (1-2 principle), they showed how the networks work technically, how systems connect to each other. In the second part (3-6 principle), they wrote the theoretical background of networks, the different networks of people and the usage of internet. The first principle, *Sharing is hard*, refers to the development of three different methods (cellular system, WiFi and pricing network), that helps one share network media. Whereas cellular system has stringent power control algorithms, WiFi relies on random access to manage interference among users in the same location. In case of pricing network, they suggest the usage-based system (pay as much, as you used) to avoid the "tragedy of the commons".

The second principle of networks is about *ranking*. Ranking is the basis of search engines and ad spaces. Through the example of Google, they introduce two different case studies (PageRank and AdWords), that help to find an appropriate ranking of set of items. Whereas AdWords use generalized second-prize auctions, where Google is the only seller. In case of PageRank, Google orders importance and relevance scores from large web graphs to determine the ranking system.

The main users of the internet are the people who are shopping, watching movies, taking classes through the internet. They often rely on other's opinion. This is the third principle, the "*crowds are wise*", that helps people find the advantages and disadvantages of products or services. The "wisdom of crowds" can help one to use the aggregate knowledge of the many to outperform the ability of the individual or the few. From the reviews of the others, one can decide which product they want to buy, or which movies they will enjoy. Moreover, the power of networks can be useful even in learning, where the students can help each other and the teacher see unclear topic.

However, *the crowds are not always wise,* which is the fourth principle. With the system of networks, it is very easy to influence others. The exposure of public opinion can break the independence of the individuals. They wrote about how information cascade can work in case of video clips viralization and how important it is to be aware of the effects of social media sites and other webpages.

The last two principles (*divide and conquer; end to end)* of the networks are about the internet, which is the network of networks. They wrote very deeply about the design of the internet, how it is built and how it is managed in a way that scales. Scalability and the division of management responsibility are the main expectations for the internet.

End to end control helps one to understand how it is possible for the internet to infer and manage congestion in the networks. To share how people can be connected through the internet even if they are in the opposite side of the world and how small word theory can be tested in case of the usage of internet.

I recommend this book to anybody who is interested in this topic but with some limitations. In my opinion, they could not find balance between science and entertainment. In the first three chapters, they mentioned a lot of good examples and situations that helped the readers to understand the complicated issues. Nevertheless, in the end, most of the illustrations were mathematical issues. The result of the missed balance that this book is too easy to read for an expert of the topic. On the other hand, this book is not so good reading for an average person, because it contains too much mathematics (even if they promised, it will not) and complicated explanations. Nevertheless, this book is perfect for student/researcher, who has some background about

networks and wants broaden his/her knowledge.

On the other hand, the book has some positives as well. It contains many illustrations that can help to understand the main messages. The best part of the book, that I really liked, is its own webpage, where one can read more about the topics and can check more details about the issues.

What I did not gather from this book was the inclusion on other principles of networks, or even at least the mentioning of them. It is not a problem, but there can be more principles as well, like understand the user need, flexibility, status queries, etc. My examples were not as evident and indiscriminate as the principles were in the book. In my opinion, they could have structure the book better and wrote in a wider approach.

All in all, I still recommend this book because it can provide new knowledge for everybody about networks and it can help readers understand the world of networks more deeply. I do not recommend this book as a science book. I recommend it as an informative book or a course book for the ones, who have some basic knowledge about networks.