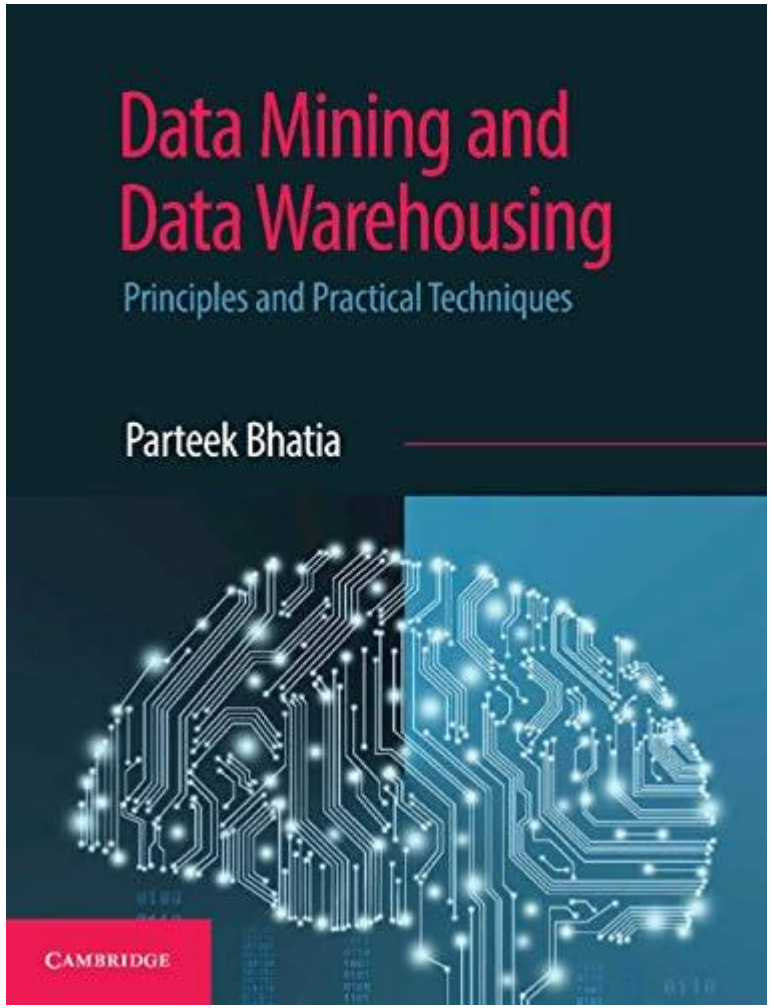
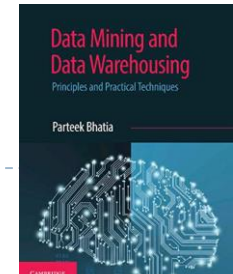
Chapter 2
Introduction to Data Mining



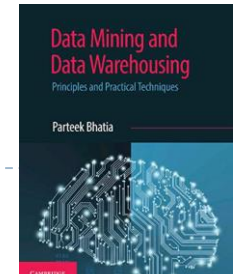
Chapter Objectives

1. **To learn about the concepts of data mining.**
2. **To understand the need for, and the applications of data mining**
3. **To differentiate between data mining and machine learning**
4. **To understand the process of data mining.**
5. **To understand the difference between data mining and machine learning.**



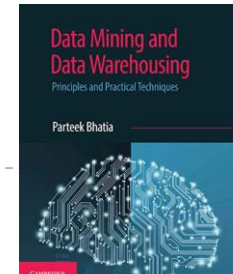
Defining Data Mining

- Data mining is a collection of techniques for efficient automated discovery of previously unknown, valid, novel, useful and understandable patterns in large databases. The patterns must be actionable so they may be used in an enterprise's decision making.'



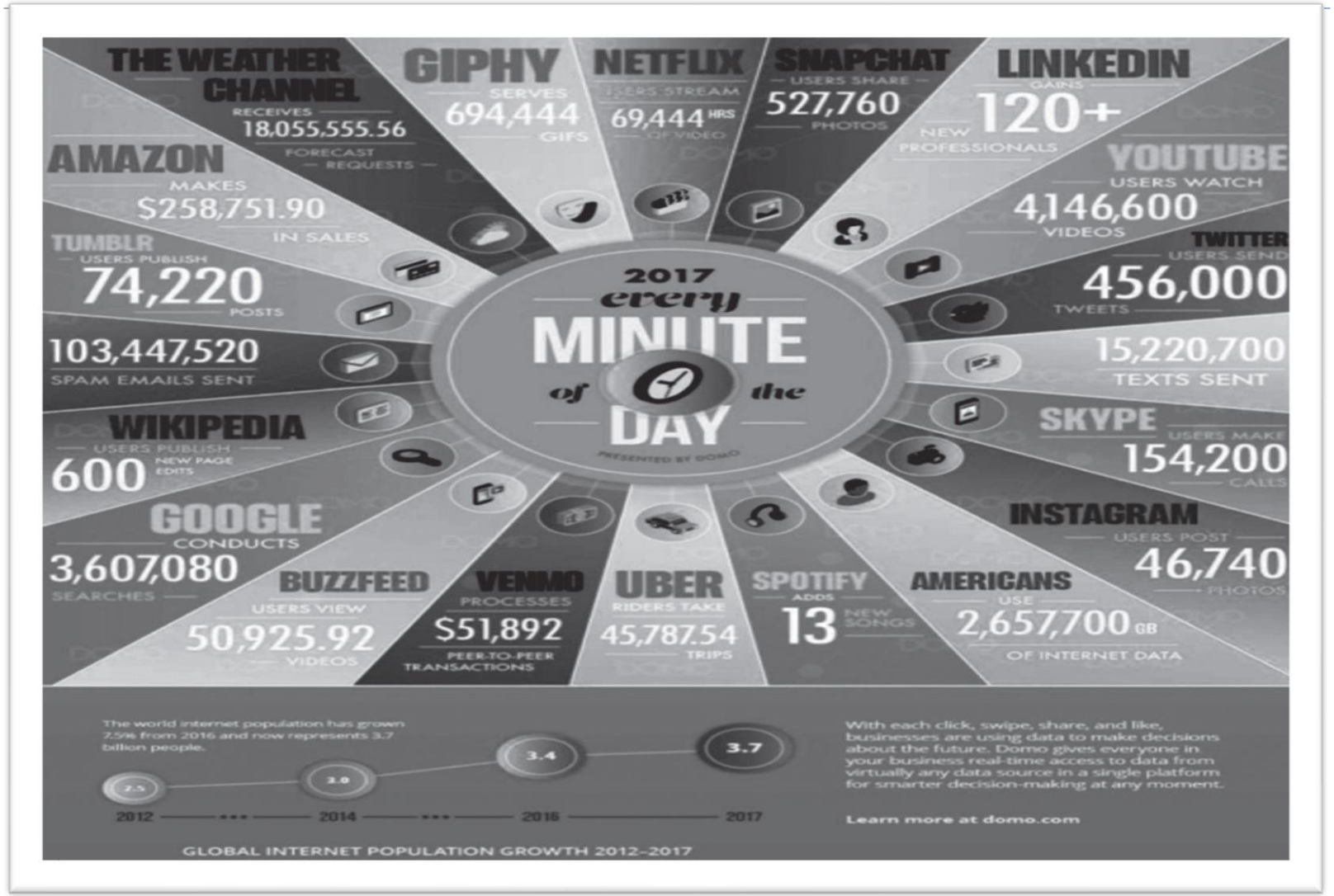
Introduction to Data Mining

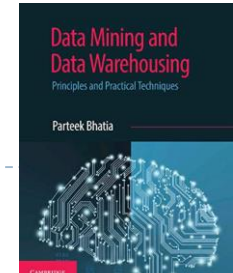
- From this definition, the important takeaways are:
- Data mining is a process of automated discovery of previously unknown patterns in large volumes of data.
- This large volume of data is usually the historical data of an organization known as the data warehouse.
- Data mining deals with large volumes of data, in Gigabytes or Terabytes of data and sometimes as much as Zetabytes of data (in case of big data).
- Data mining allows businesses to determine historical patterns to predict future behavior.



Need of Data Mining

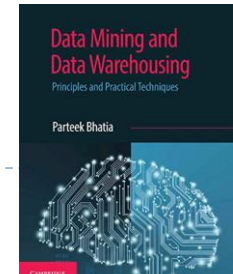
Per Minute Generation of Data over Internet





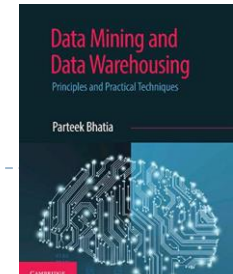
Need of Data Mining

- Growth in generation and storage of corporate data
- Need for sophisticated decision making
- Evolution of technology
- Availability of much cheaper storage, easier data collection and better database management for data analysis and understanding
- Decline in the costs of hard drives
- Growth in worldwide disk capacities

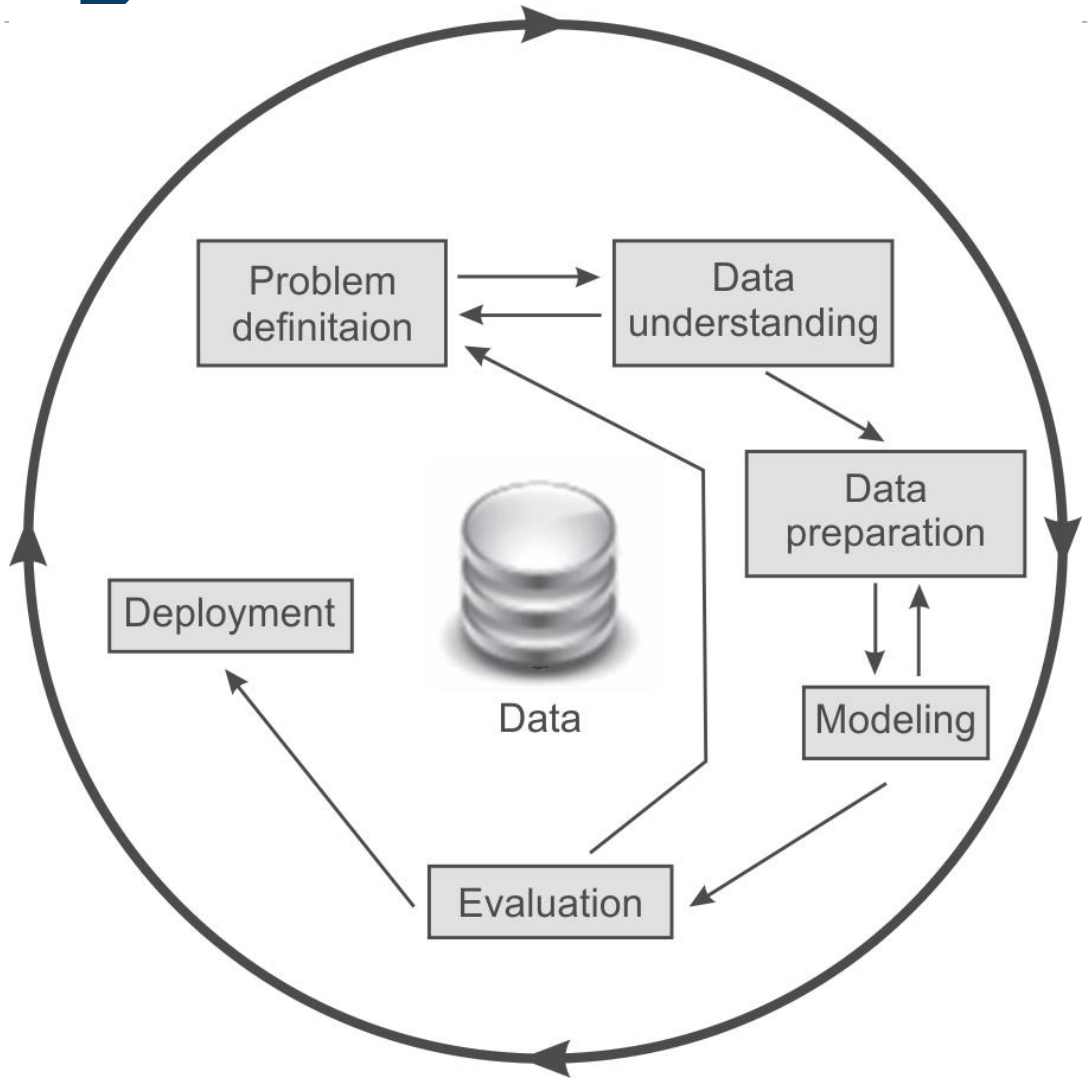


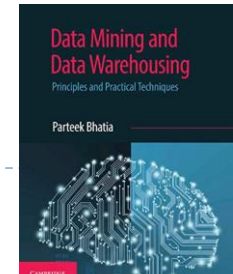
Applications of Data Mining

- **Loan/Credit card approvals**
- **Market segmentation**
- **Fraud detection**
- **Better marketing**
- **Trend analysis**
- **Market basket analysis**
- **Customer churn**
- **Website design**
- **Corporate analysis and risk management**

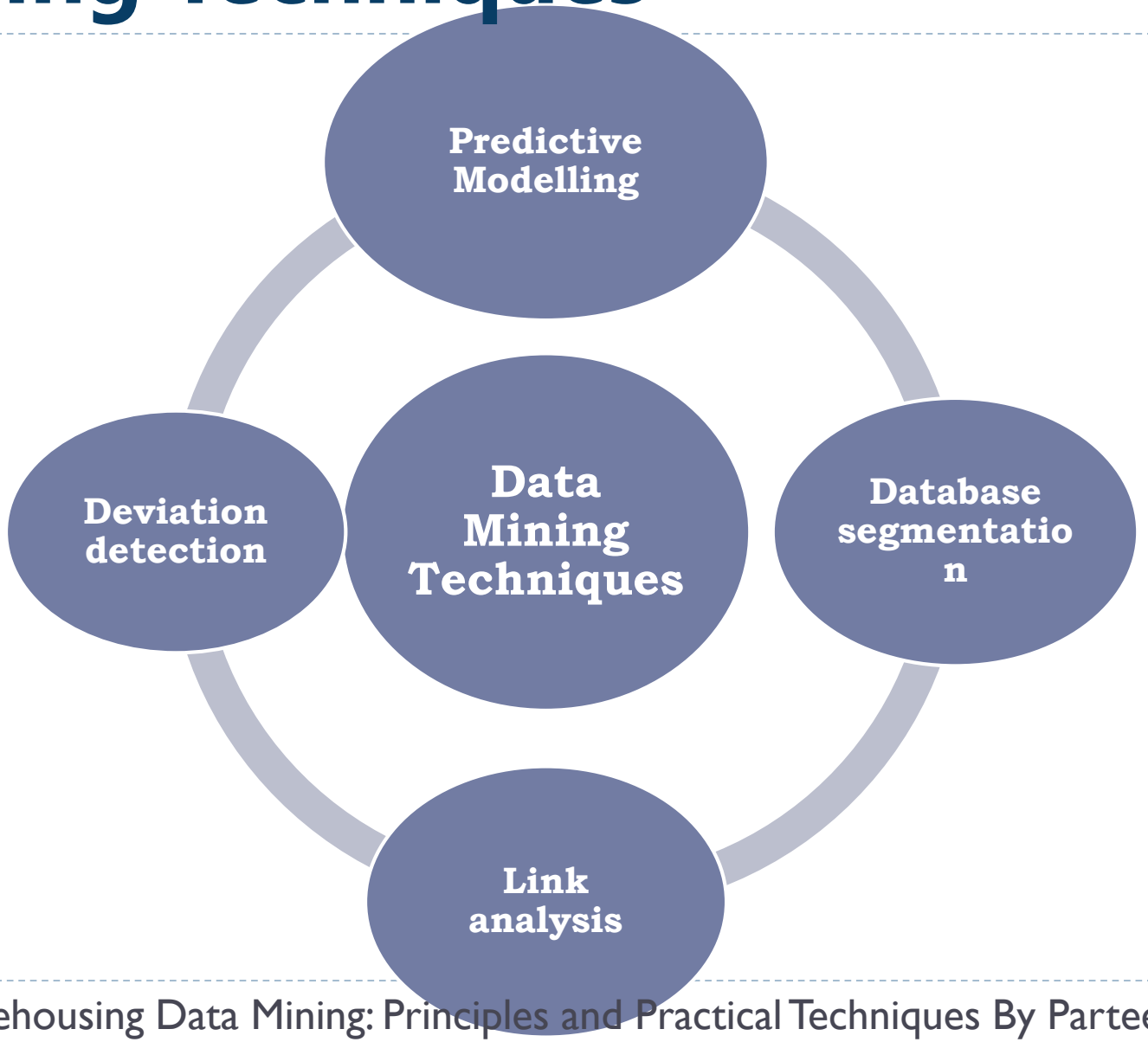


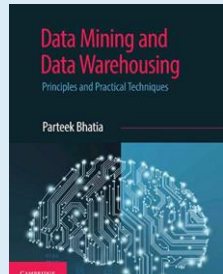
Data Mining Process





Data Mining Techniques

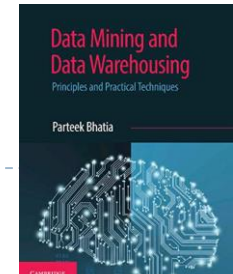




Difference between Data mining and ML

Table 2.1 Tabular comparison of data mining and machine learning

Basic for comparison	*Data mining*	*Machine learning*
Meaning	It involves extracting useful knowledge from a large amount of data.	It introduces new algorithm from data as well as past experience.
History	Introduced in 1930 it was initially called knowledge discovery in databases.	It was introduced in 1959.
Responsibility	Data mining is used to examine patterns in existing data. This can then be used to set rules.	Machine learning teaches the computer to learn and understand the given rules.
Nature	It involves human involvement and intervention.	It is automated, once designed it is self-implementing and no or very little human effort is required.



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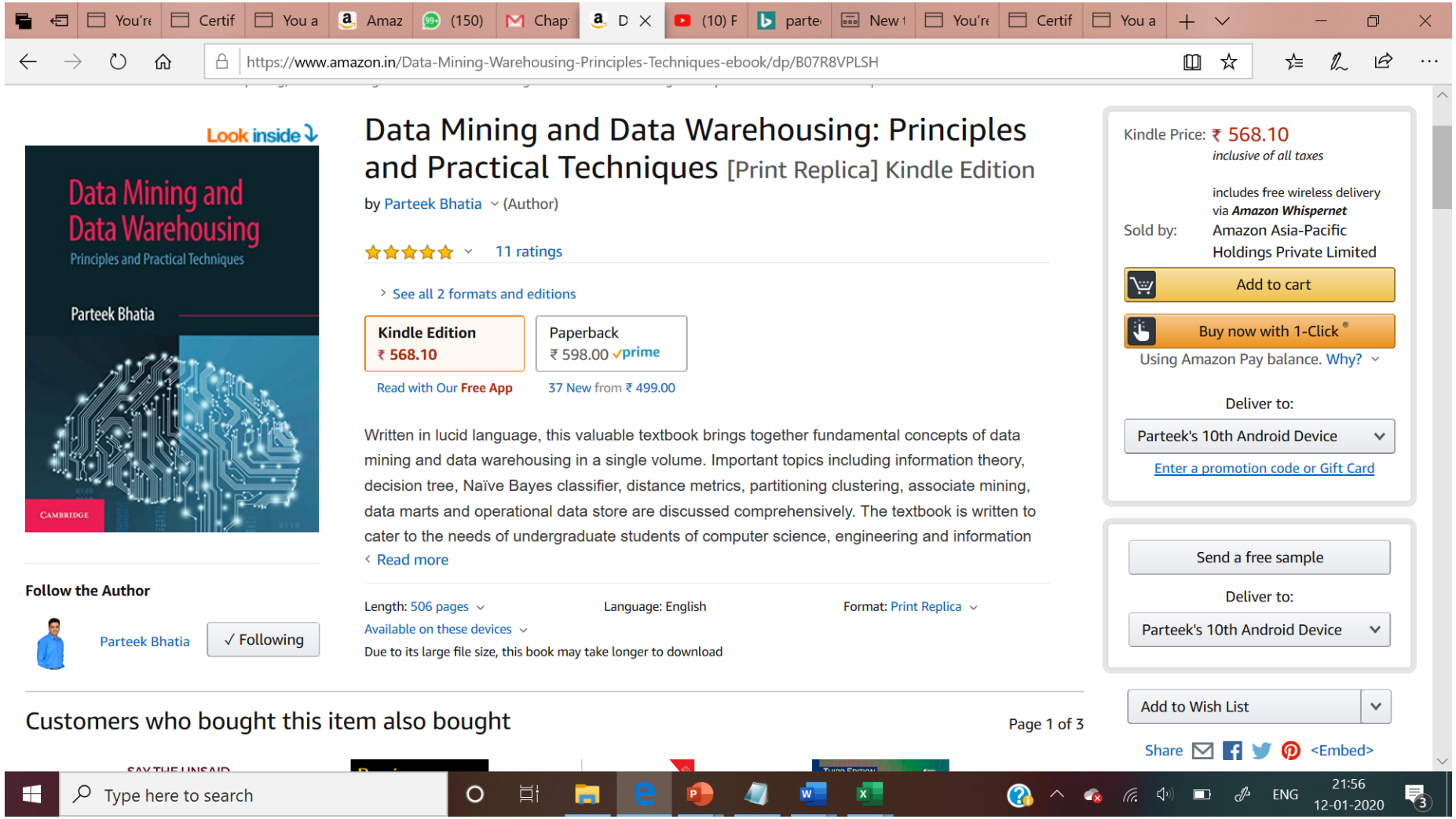
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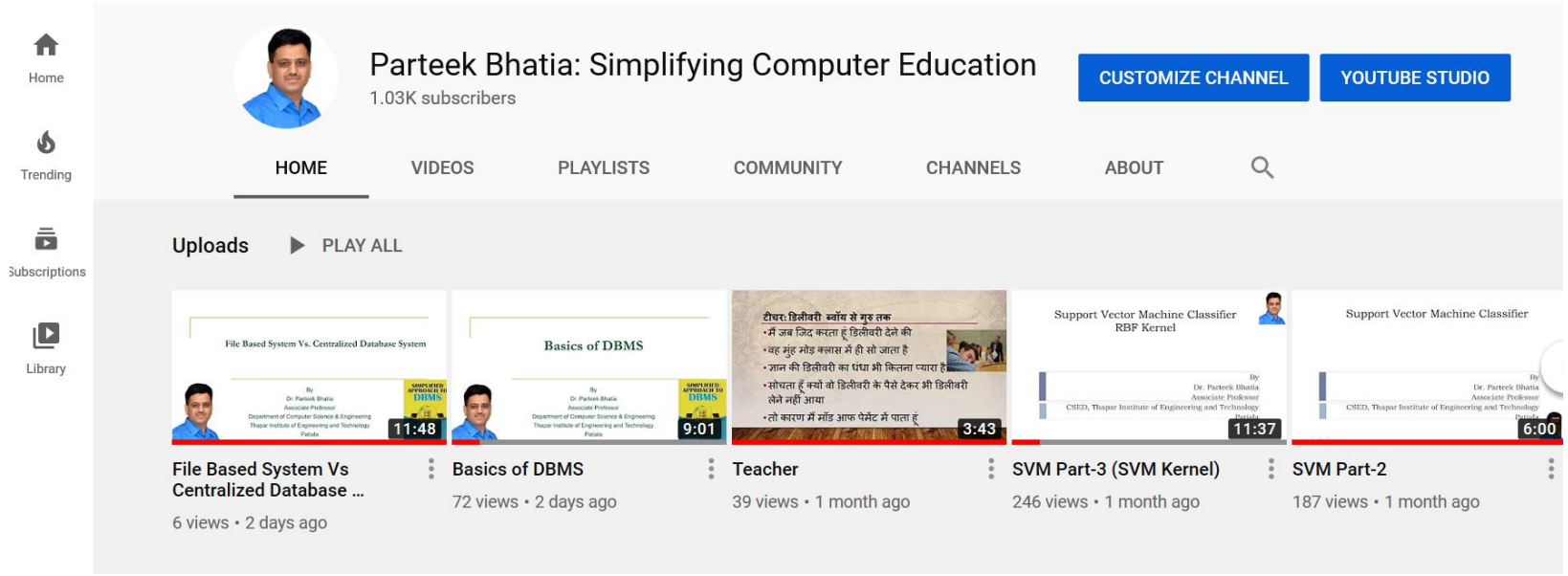

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ABOUT THE INSTRUCTOR

Dr. Parteek Bhatia is Associate Professor in the Department of Computer Science and Engineering at Thapar Institute of Engineering and Technology, Patiala. He has more than 18 years of academic experience.He has authored several books in various areas of computer science. His book - Simplified approach to DBMS is one of the bestseller. Currently, he is working on plethora of Projects which are funded by Department of Science and Technology, CSIR and other funding agencies of India.

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ABOUT THE AUTHOR

Dr. Bhatia is an Associate Professor in the Department of Computer Science and Engineering at Thapar Institute of Engineering and Technology, Patiala. He has more than twenty years of teaching experience and has published papers in journals. His current research includes natural language processing, machine learning and human-computer interface. He has taught courses including data mining and data warehousing, big data analysis and database management system at undergraduate and graduate levels. He also runs online courses on the Udemy portal.

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