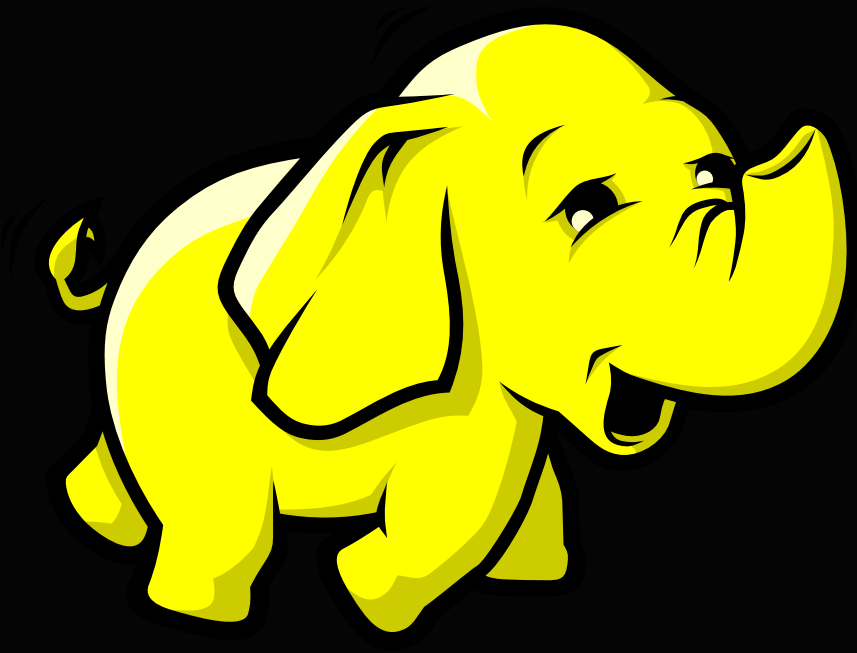
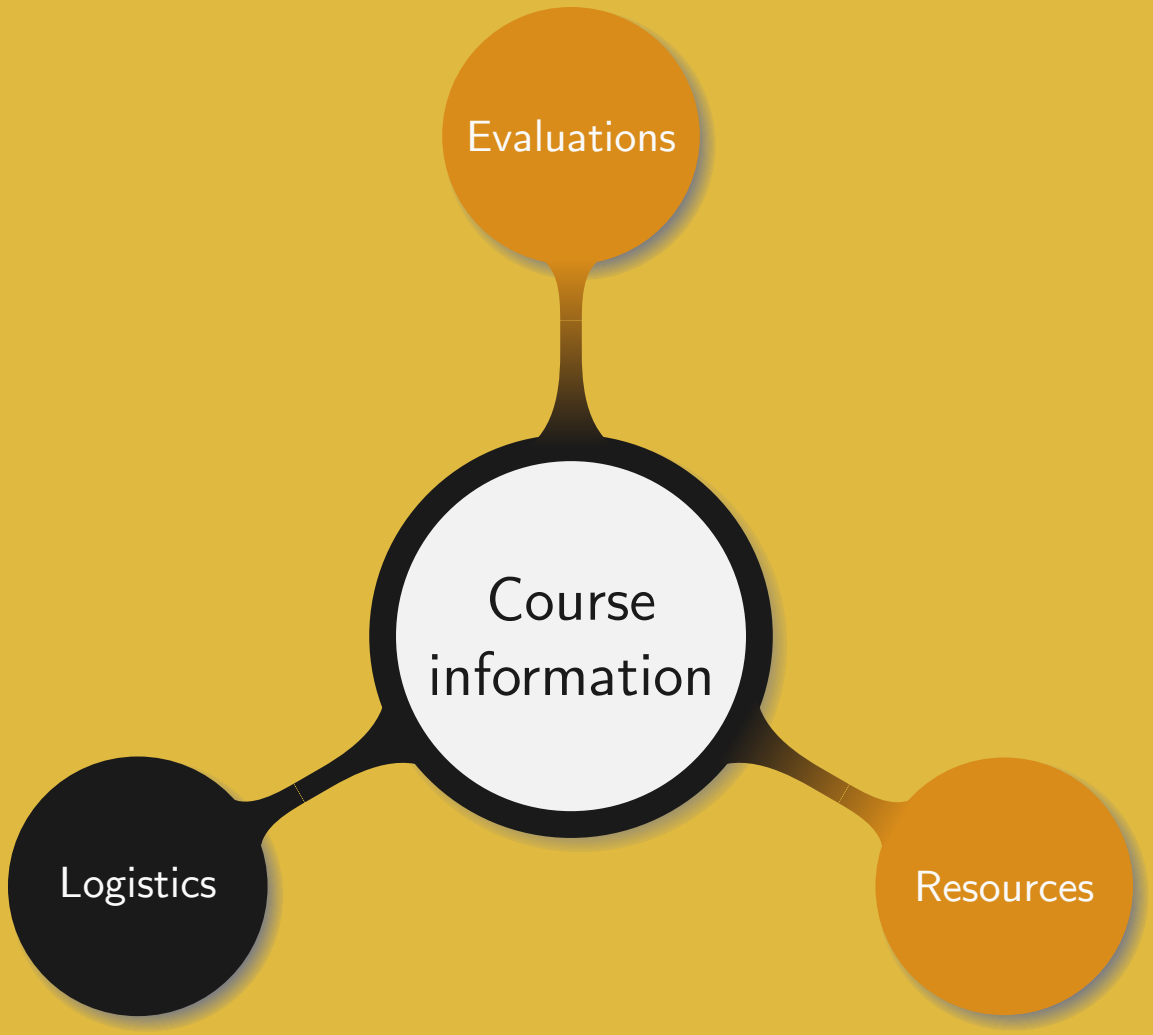


Methods and tools for big data

0. Course information

Manuel – Summer 2021

Chapter organisation



Basic information

Teaching team:

- Instructor: Manuel (charlem@sjtu.edu.cn)
- Teaching assistants:
  - Zhenhao (guzhenhao1@sjtu.edu.cn)
  - Jinglei (xie_jinglei@sjtu.edu.cn)

Important rules:

- When contacting a TA for an important matter, `CC` the instructor
- Prepend [VE472] to the subject, e.g. `Subject: [VE472] Grades`
- Use SJTU jBox service to share large files ($>$ 2 MB)

Never send large files by email

Course schedule

Course arrangements:

- Lectures:
  - Tuesday 16:00 – 17:40
  - Thursday 16:00 – 17:40 (week 1-6)
- Labs: Wednesday 18:20 – 20:40

Office hours:

- Anytime on Piazza
- On appointment

Course objectives

Primary goals:

- Understand how big data sets are analysed in practice
  - Be able to use Hadoop
  - Learn how to work in the Hadoop ecosystem
- Be able to performed advanced data analysis on large data sets
  - Get good foundations on big data analysis
  - Be able to design, implement, and use advanced algorithm in Spark

Be able to analyse any given dataset, regardless of there size

Course workflow

Learning strategy:

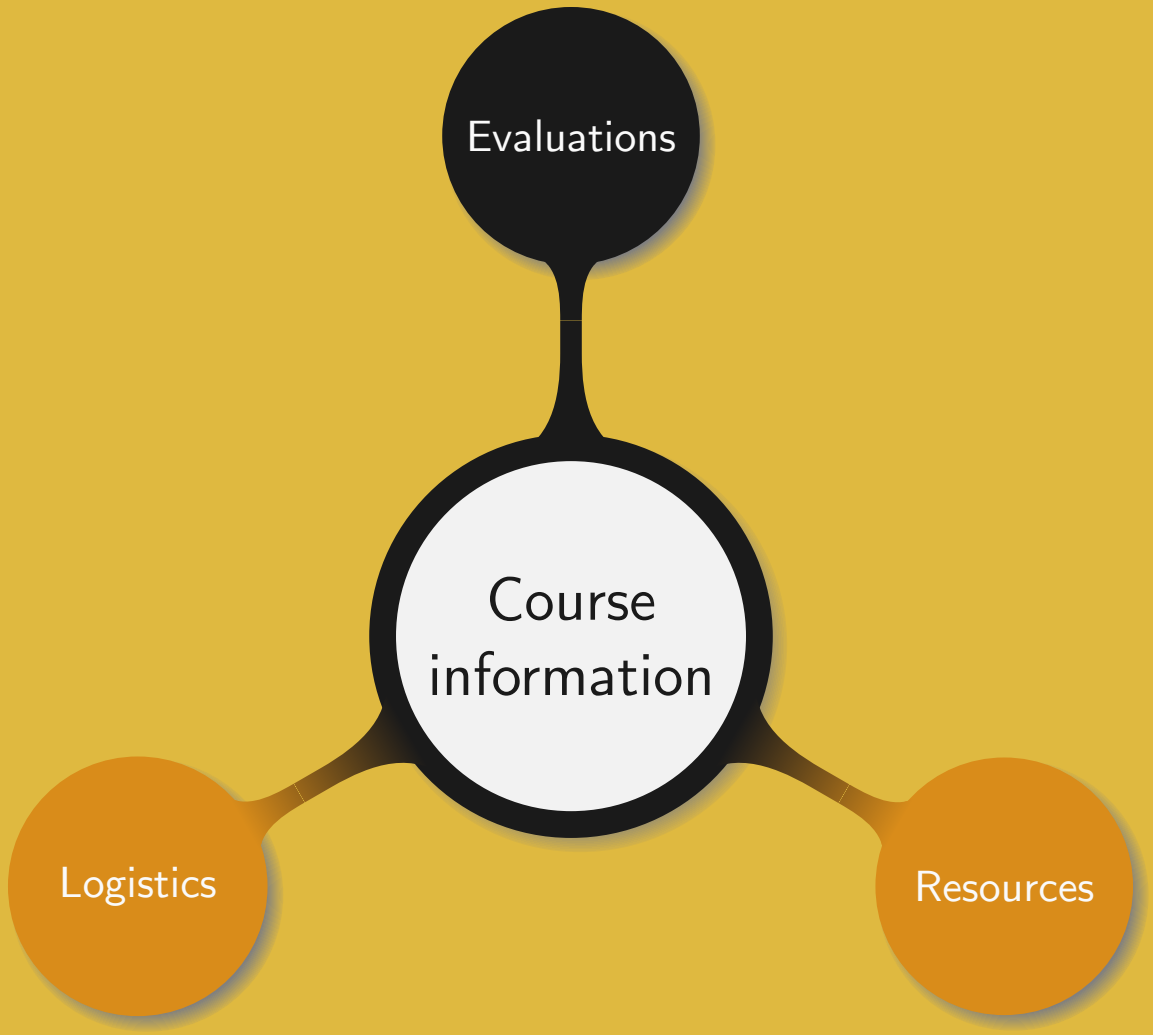
- Course side:
  1. Understand the new issues appearing as datasets grow
  2. Be able to setup a Hadoop cluster and use it
  3. Understand why traditional algorithms fail on big data
  4. Be able to implement advanced algorithms for big data
- Personal side:
  1. Derive algorithms for big data
  2. Use and work "inside" Hadoop, Drill, and Spark
  3. Relate known strategies to new problems
  4. Perform extra research

Course outcomes

Detailed goals:

- Understand the basic logic behind Hadoop
- Have a general knowledge of the Hadoop ecosystem
- Be familiar with the basic Hadoop components: HDFS, YARN, and MapReduce
- Understand the structure of Drill and Spark
- Be able to work in Hadoop and "extend" its functionalities
- Know what tool to use for common specific purposes related to the study of big data
- Be familiar with common dimension reduction techniques
- Understand the limitations when facing "real" big data
- Be able to run basic data analysis on big data

Chapter organisation



Assignments

Homework:

- Total: 5 or 6
- Content: basic Hadoop, algorithms, Spark

Labs:

- Total: 12
- Content: guided sessions to setup and work with Hadoop, and Spark

Projects:

- Total: 1
- Content: analysis of some big dataset

Challenge:

- Total: 1
- Content: compare theory and practice in Hadoop and Spark implementations

Grading policy

Grade weighting:

- Midterm: 20%
- Final: 20%
- Projects: 30%
- Homework: 20%
- Labs: 10%

Assignment submissions: -10% per day, not accepted after 3 days

Grades will be curved with the median in the range $[\![B, B+]\!]$

Honor Code

General rules:

- Not allowed:
  - Reuse the code or work from other students or groups
  - Reuse the code or work from the internet
  - Share too many details on how to complete a task
- Allowed:
  - Reuse part the course or textbooks and quoting the source
  - Share ideas and understandings on the course
  - Provide hints on where or how to find information

Honor Code

Documents allowed during the exams:

- Midterm: none
- Final: a single A4 paper sheet with original handwritten notes

Group works:

- Every student in a group is responsible for his group's submission
- If a student breaks the Honor Code, the whole group is guilty

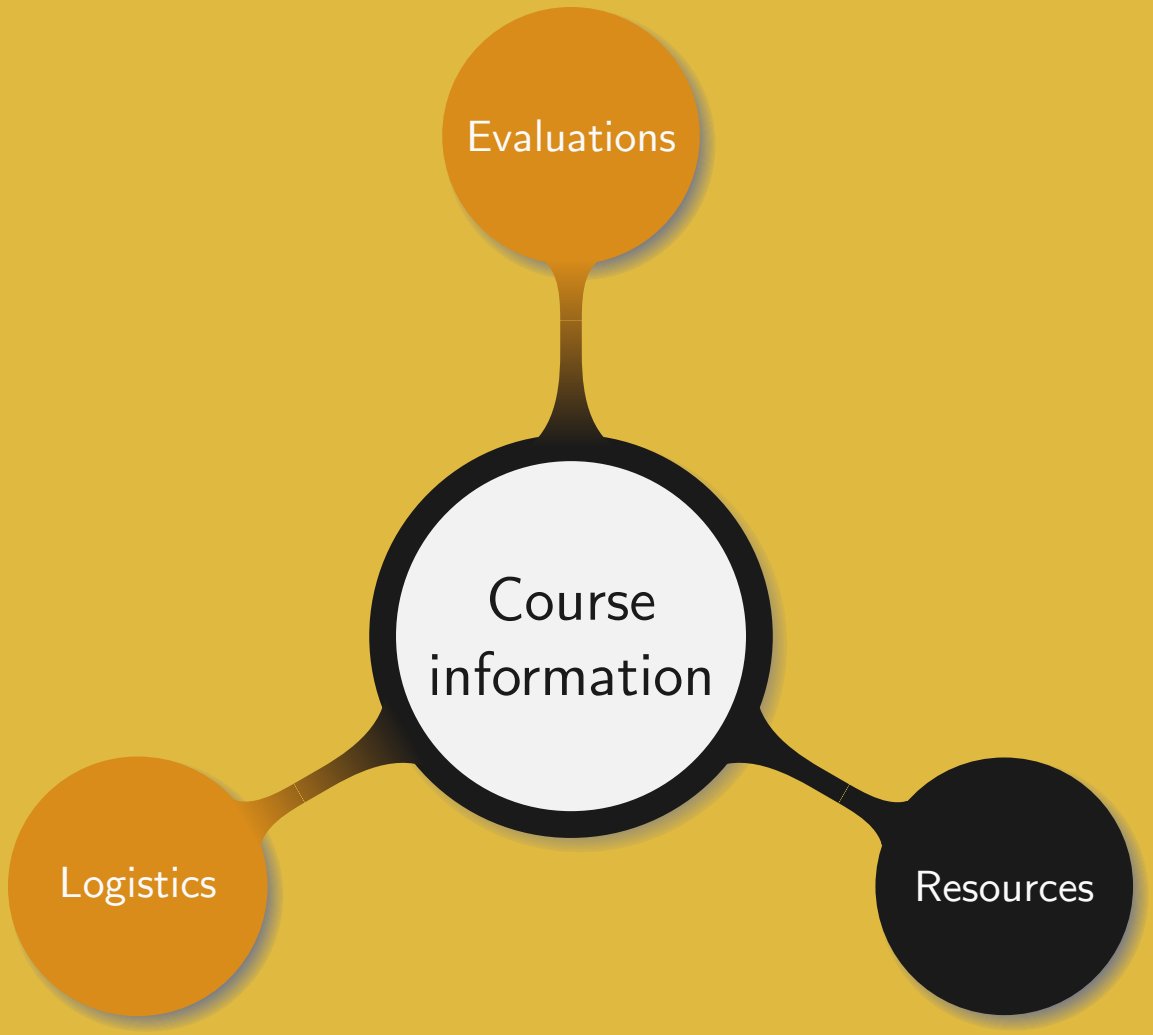
Special circumstances

Contact us as early as possible when:

- Facing special circumstances, e.g. full time work, illness
- Feeling late in the course
- Feeling to work hard without any result

Any late request will be rejected

Chapter organisation



Canvas

Information and documents available on the Canvas platform:

- Course materials:
  - Syllabus
  - Lecture slides
  - Homework
  - Labs
  - Projects
- Course information:
  - Announcements
  - Notifications
  - Grades
  - Polls

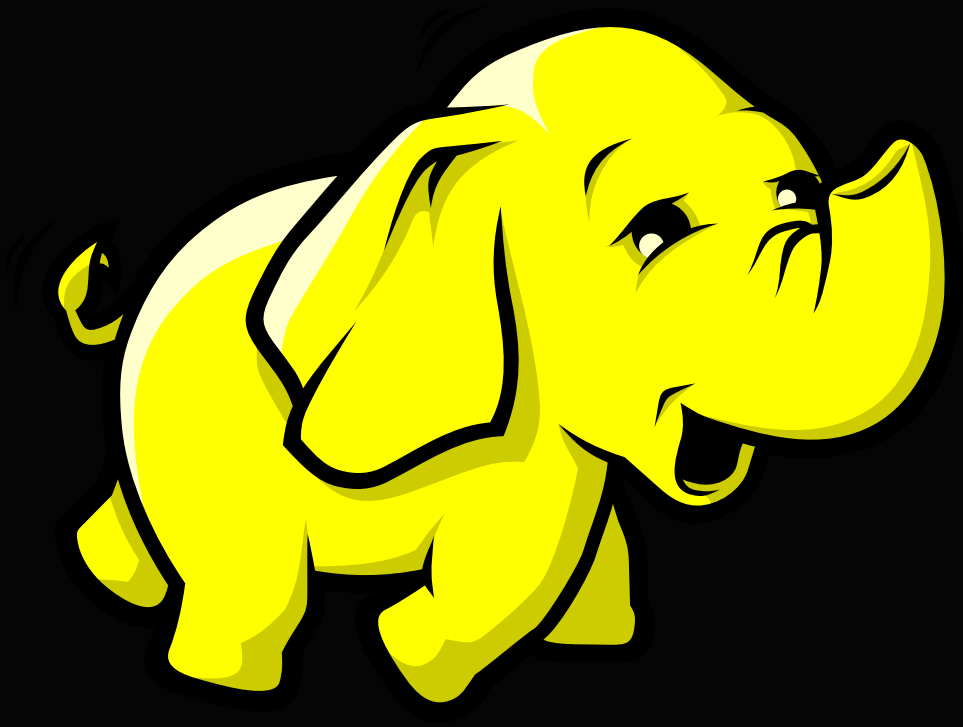
References

Useful places where to find information:

- *Hadoop the definitive guide*
- *Spark the definitive guide*
- *Machine learning, an algorithmic perspective*
- *Introduction to Data Mining*, by Tan et al..
- *Mining of Massive Datasets*, by Leskovec et al.. by White
- Search information online, i.e. $\{websites \setminus \{non\text{-}English\ websites\}\}$

Key points

- Work regularly, do not wait the last minute/day
- Respect the Honor Code
- Go beyond what is taught
- Do not learn, understand
- Keep in touch with us
- Advice and suggestions are always much appreciated



Thank you!