University of Dayton

Course Overview

CPS 563 – Data Visualization

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Instructor

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Computer Vision Machine Learning Multimedia Content Analysis Deep Learning

	All	Since 2017
Citations	1930	1332
h-index	23	18
i10-index	41	35

- Office Location
  - JHH, 141
- Office Hours
  - By Appointment
- Email: tamnguyen@udayton.edu

Welcome

- You probably have questions:
  - How much work is this course?
  - Will I get an A?
  - What is data visualization?
  - What am I going to learn?
- Hope to answer these questions in today's lecture

How much work?

- Lectures
- Lab Tutorials
- 3 Assignments (45%)
- 2 Exams (55%)
- Pop-up quizzes and bonus points

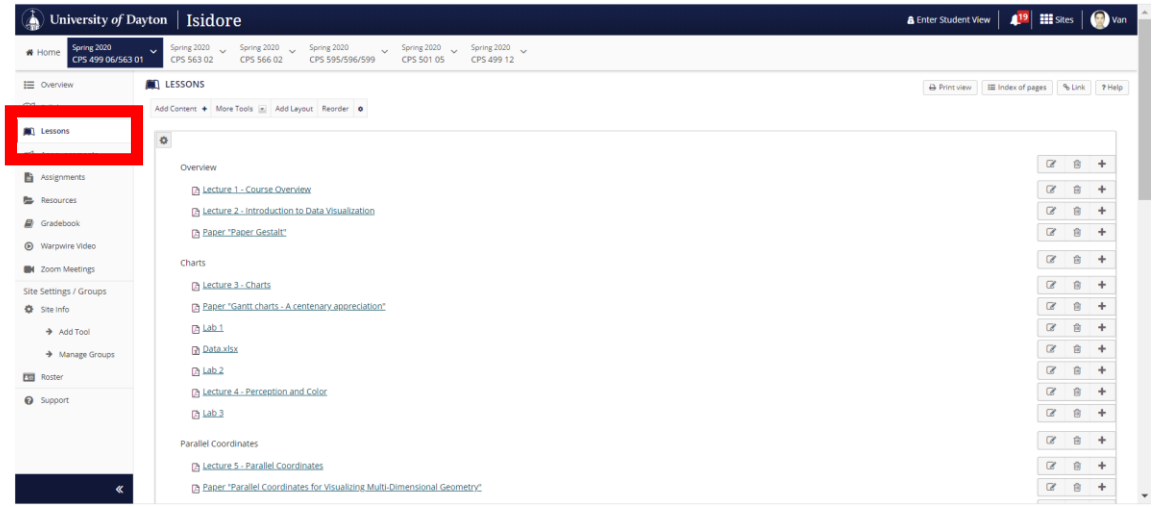
Class Materials

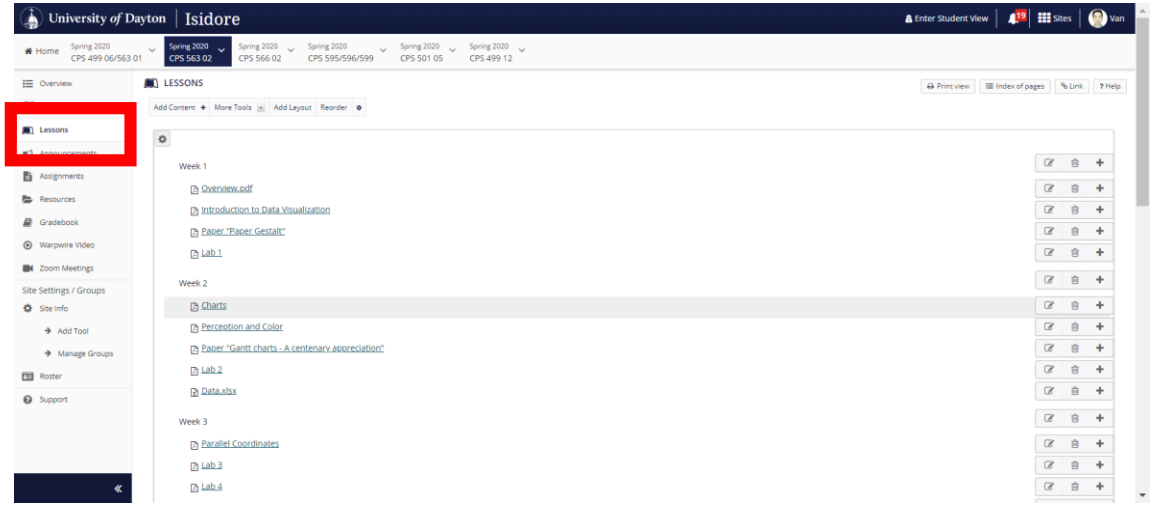
- All lectures/lab tutorials will be posted on isidore (https://isidore.udayton.edu/portal)

University of Dayton

Isidore

Isidore is UD's open-source Learning Management System or LMS built from a local instance of the Sakai LMS. Isidore is named after St. Isidore of Seville, the patron saint of students and recommended for patronage of computers and the Internet. The University of Dayton has been using Isidore since the Fall semester in 2008.





Class Materials

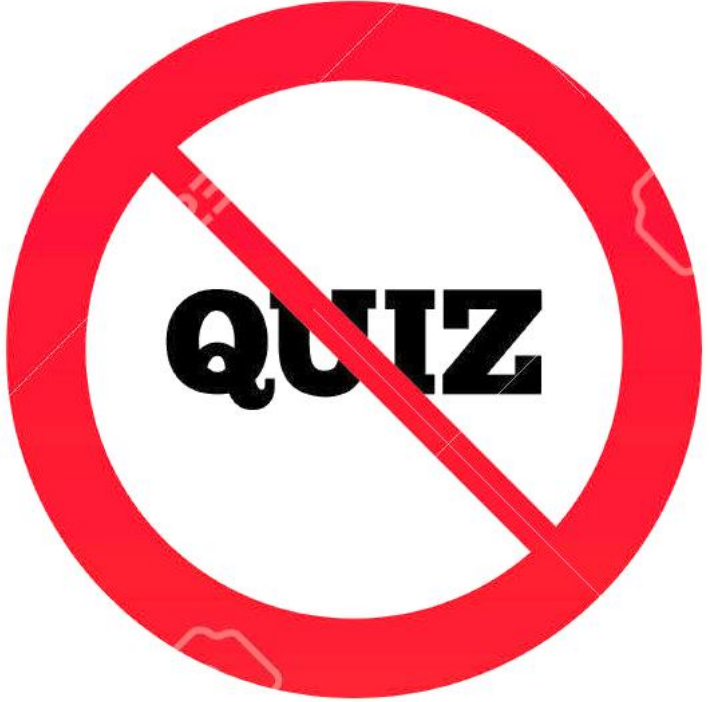
- Lecture slides and lab tutorials will be uploaded onto isidore after the class meetings.

Assignments done in team

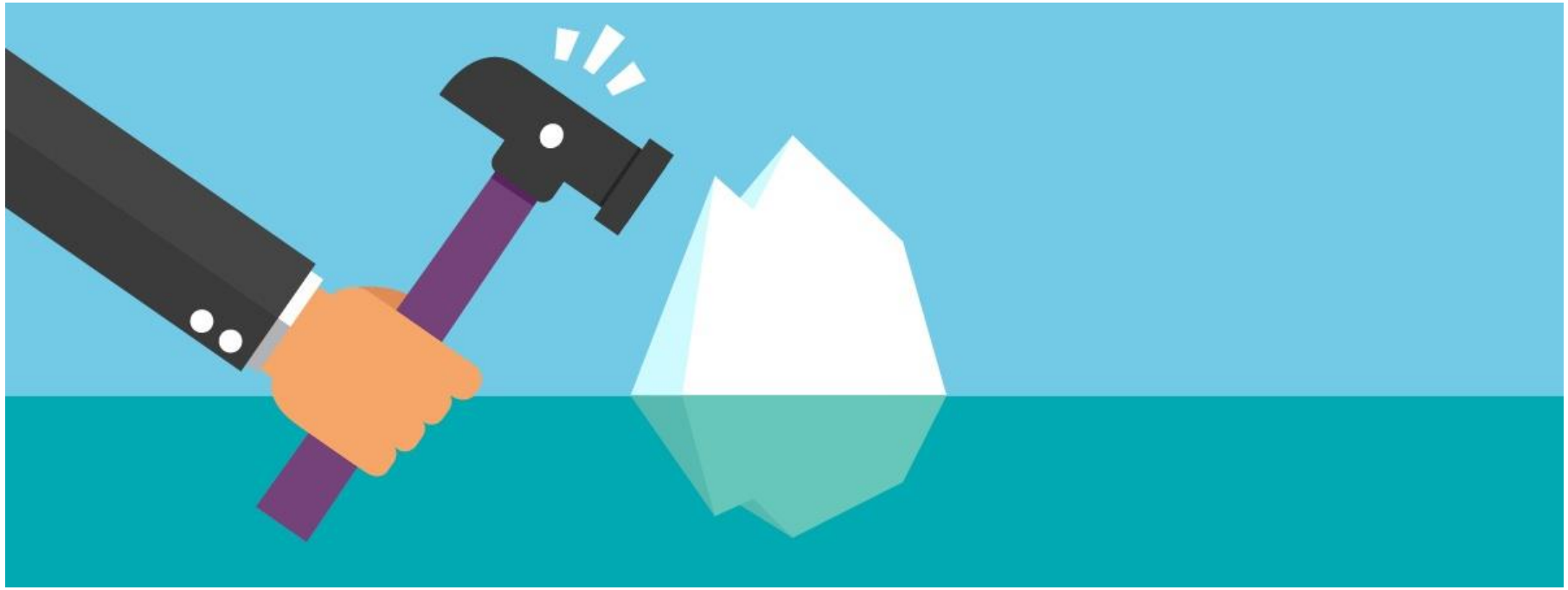
Group of 5 students

Class Exams

- **No teamwork in the class exams.**



Little Ice Breaker



Will I get an A?

http://www.wikihow.com/Get-Straight-%22A%22s

Some notes

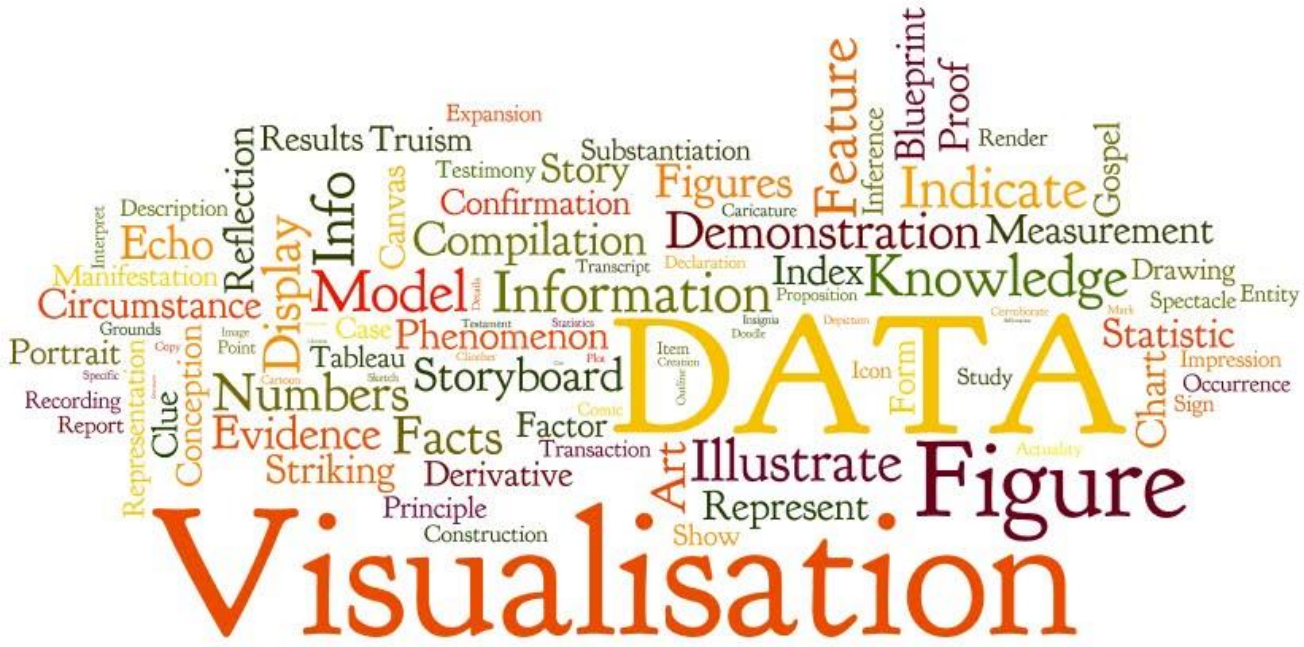
- Start the assignments early
- Arrange Zoom meetings with instructor via email
- Please include the course number in the subject line of any email
- Always follow **proper academic conduct.**

Some notes

- Your health and safety are very important
- Please inform the instructor if you cannot make it for class meetings or tests.

What is data visualization?

- Visualization is the representation of data graphically as a means of gaining understanding and insight into the data. It is sometimes referred to as visual data analysis.
- This allows the researcher to gain insight into the system that is studied in ways previously impossible



What is not data visualization?

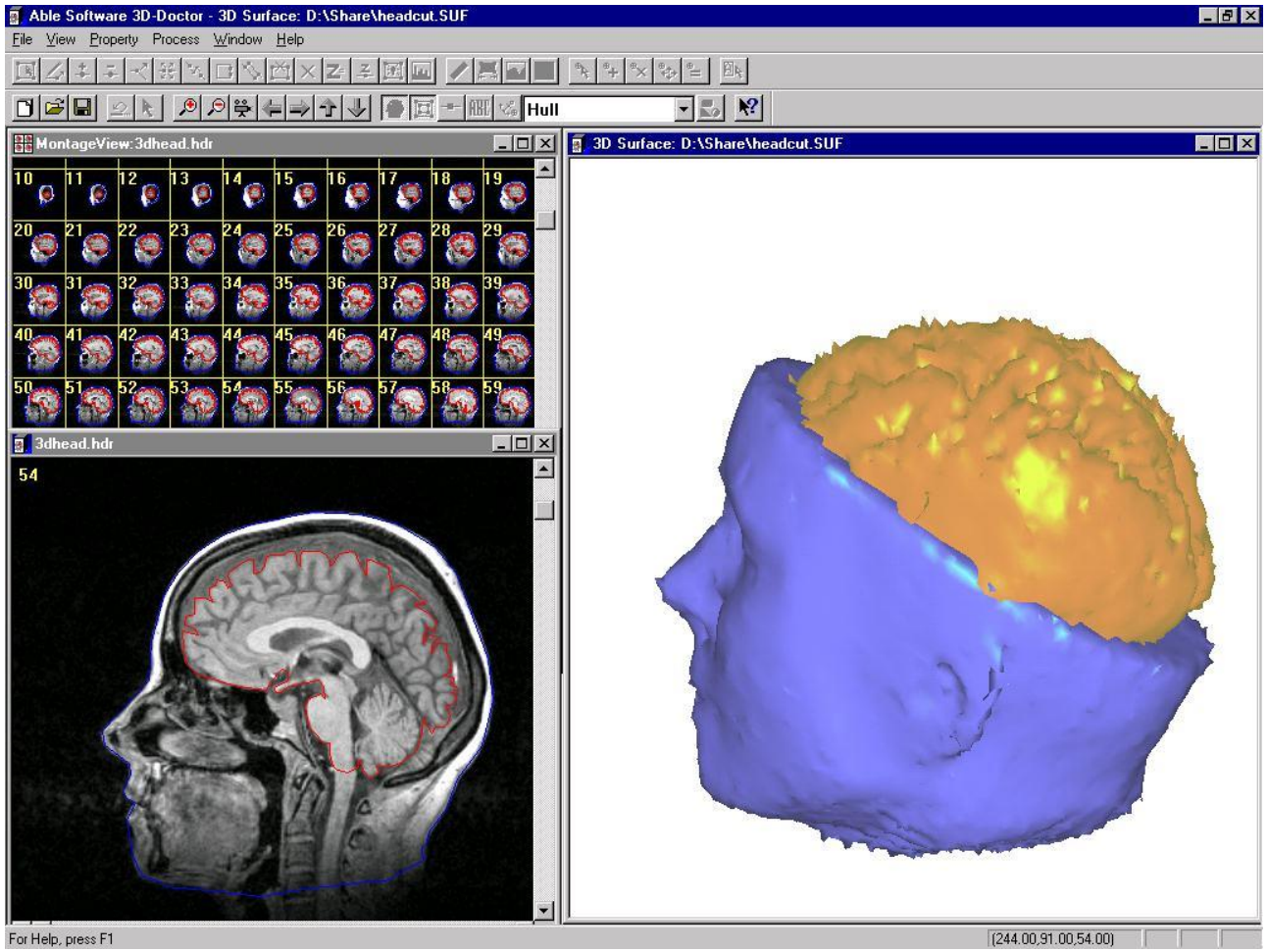
- It is important to differentiate between visualization and presentation graphics.
  - Presentation graphics is primarily concerned with the communication of information and results in ways that are easily understood.
  - In visualization, we further seek to understand the data.

Application Examples

- Engineering
- Computational Fluid Dynamics
- Finite Element Analysis
- Electronic Design Automation
- Simulation
- Medical Imaging
- Geospatial
- RF Propagation
- Meteorology
- Hydrology
- Data Fusion
- Ground Water Modeling
- Oil and Gas Exploration and Production
- Finance
- Data Mining
- Cyber Security

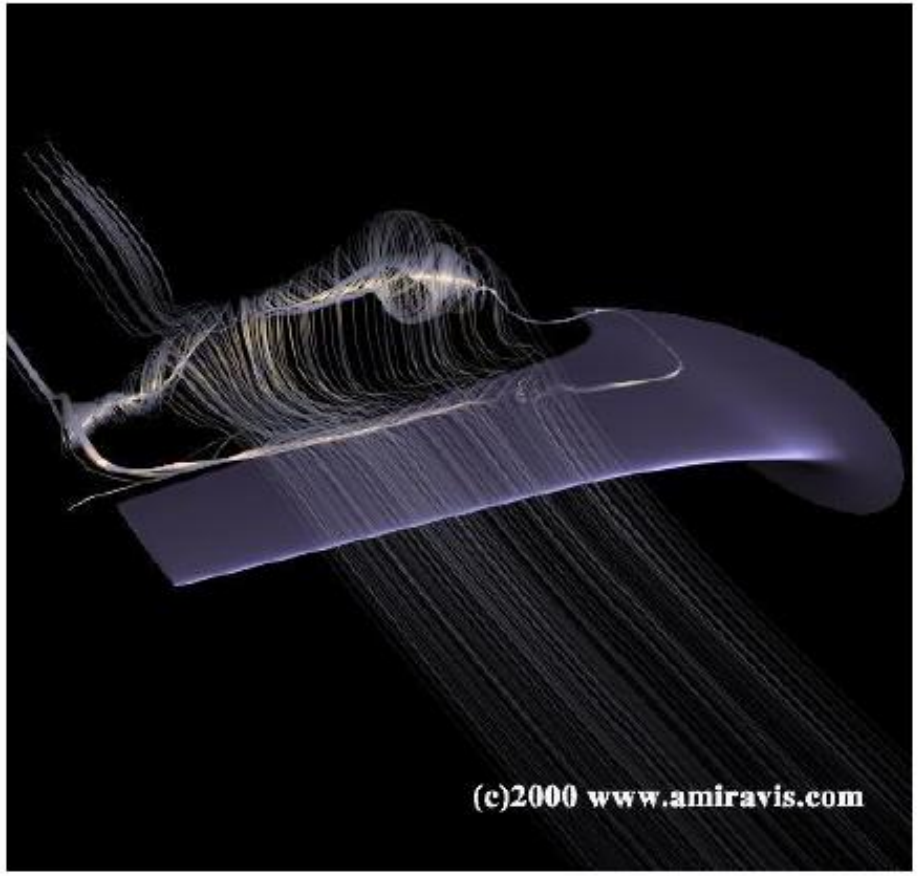
Examples

- Volume visualization of an MRI scanned brain data set



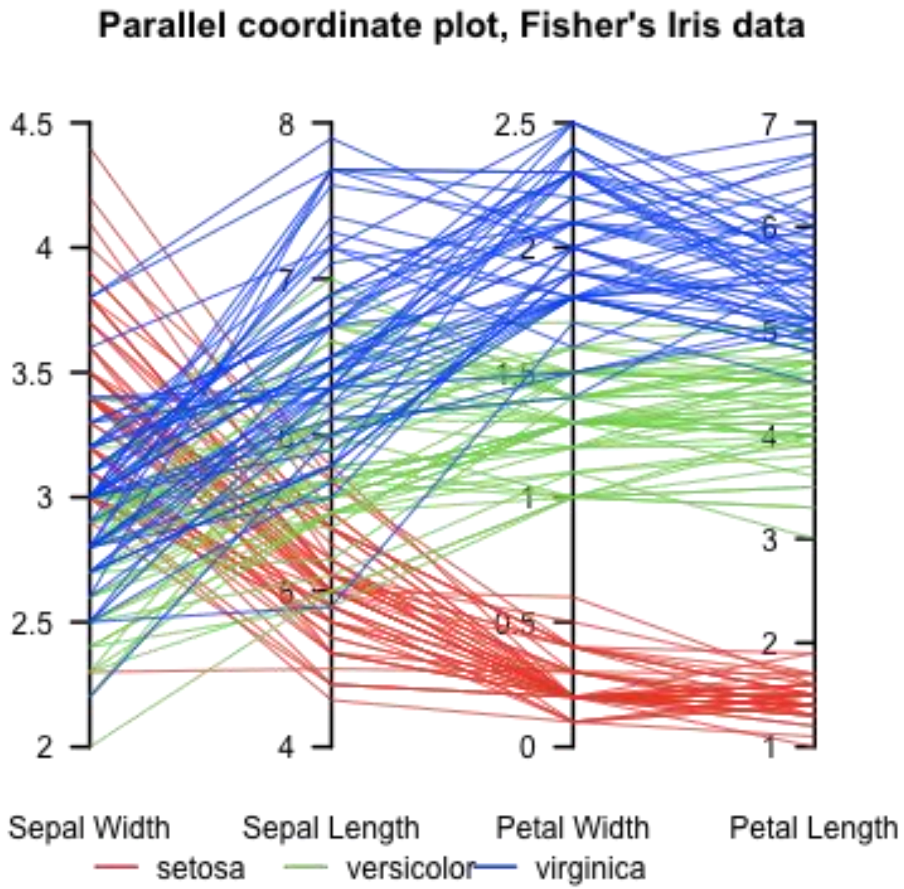
Examples

- Simulation of the air flow around a wing. Visualized using Amira's illuminated field line module.

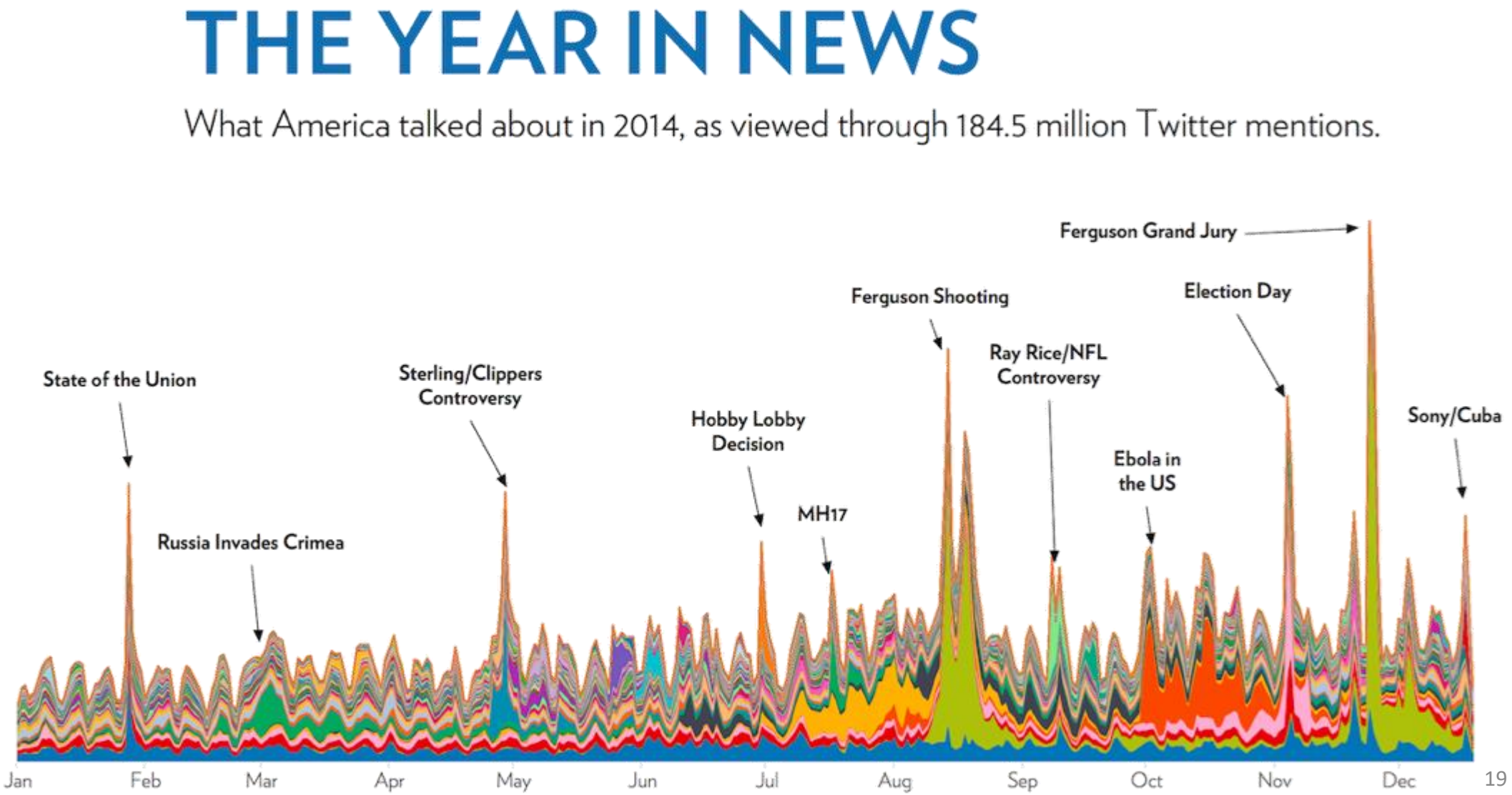


Examples

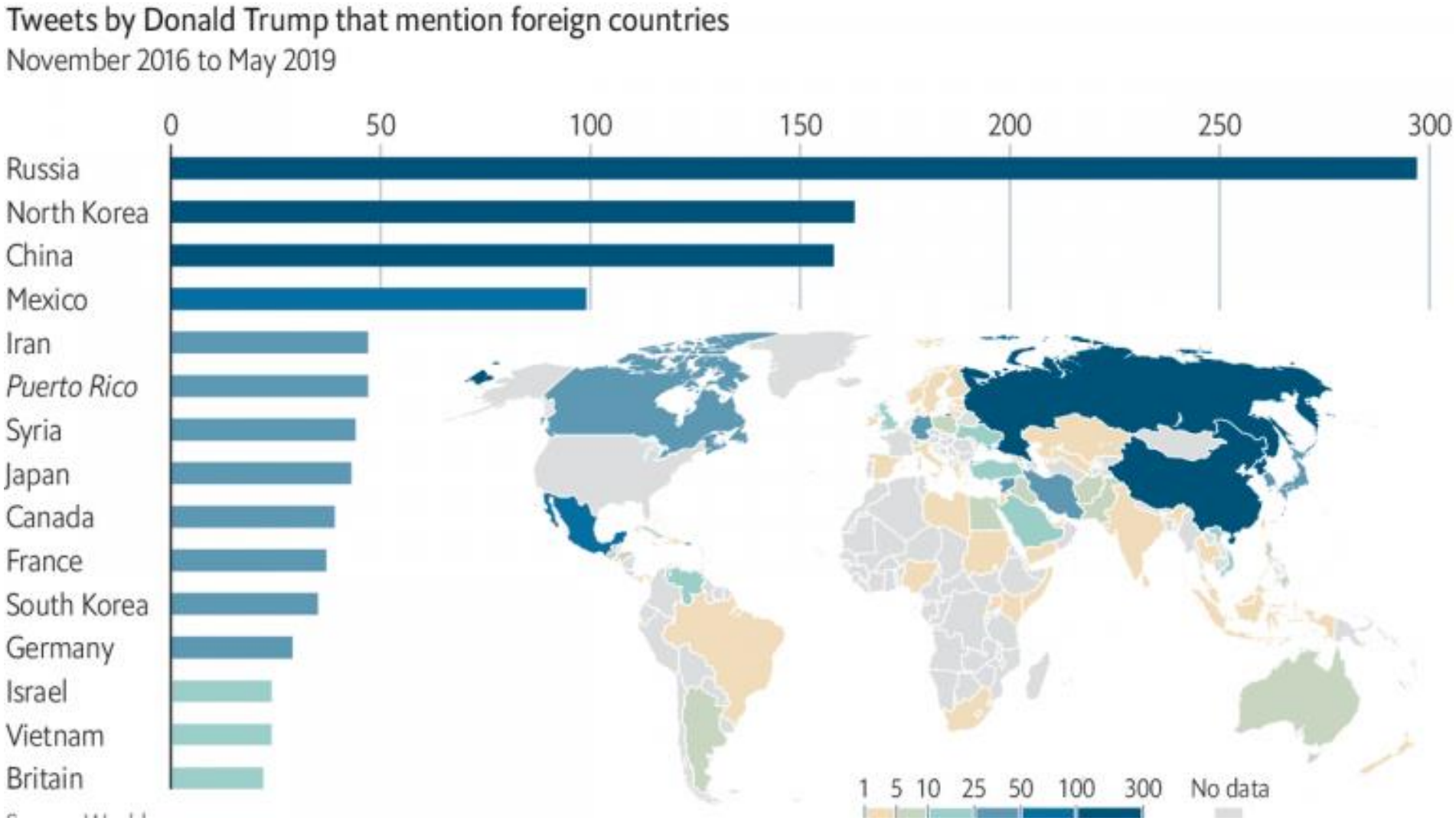
- Information visualization: parallel coordinates



Examples


THE YEAR IN NEWS
What America talked about in 2014, as viewed through 184.5 million Twitter mentions.
State of the Union
Russia Invades Crimea
Sterling/Clippers Controversy
Hobby Lobby Decision
MH17
Ferguson Shooting
Ray Rice/NFL Controversy
Ebola in the US
Election Day
Ferguson Grand Jury
Sony/Cuba
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

Examples

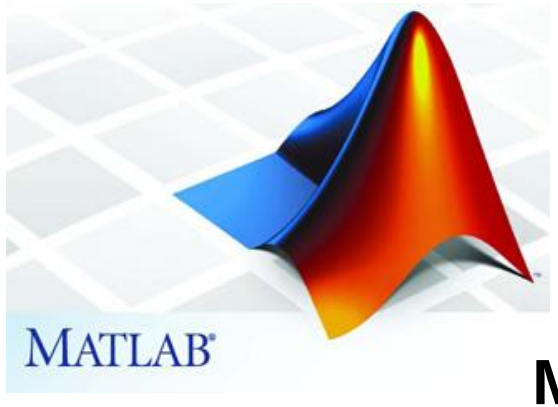

Tweets by Donald Trump that mention foreign countries
November 2016 to May 2019
0
50
100
150
200
250
300
Russia
North Korea
China
Mexico
Iran
Puerto Rico
Syria
Japan
Canada
France
South Korea
Germany
Israel
Vietnam
Britain
1 5 10 25 50 100 300 No data

Example

What am I going to learn?

- Data Visualization Tools
  - Tools to layout and display relational data
  - Understand a visualization dashboard that connects to the appropriate data and provides the user with the vital information needed to make the right decision
- Data Visualization – How to do
  - Understanding how the computer displays data and how the user perceives and processes it
  - Different kinds of charts, which chart to use for which kind of data, and how to design charts effectively

Software to be installed



Microsoft Excel

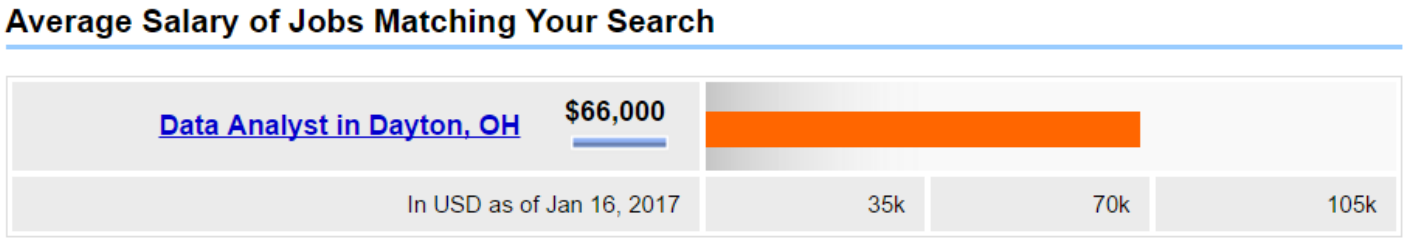
PyCharm

Programming Language: MATLAB (main), Python

After the course

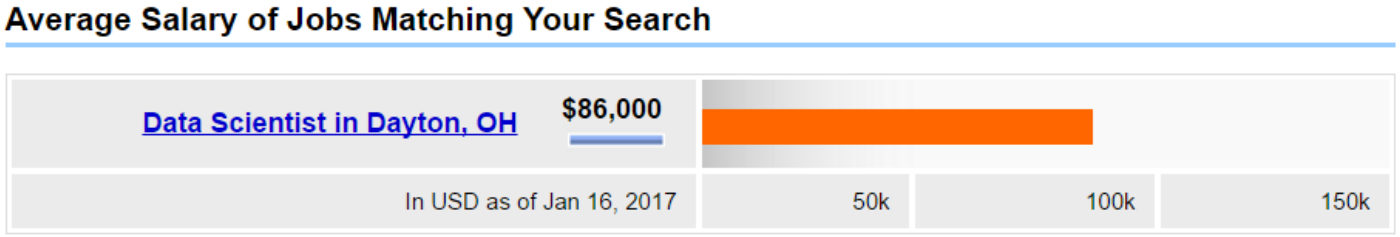
- Doctoral studies in Data Science, Data Visualization
- Data Analysts, Data Scientists in these fields get good pay

https://www.indeed.com/salary?q1=Data+Analyst&l1=Dayton,+OH



Average Data Analyst salaries for job postings in Dayton, OH are 8% higher than average Data Analyst salaries for job postings nationwide.

https://www.indeed.com/salary?q1=Data+Scientist&l1=dayton



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Q&A