CS 215: Data Interpretation and Analysis

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Welcome!

What is the course about?

- Suppose you want to find reliable answers to questions:
  - Which minor should I opt for?
  - What are the types of future careers that IITB graduates favor lately?
  - How many students seats should IITB allocate to each department?
  - Which products are likely to be in high demand next month?
  - Is rainfall in Mumbai becoming more erratic lately?
  - Is inflation increasing at a faster pace in recent times?
  - How is supply of drinking water keeping pace with increasing population?
  - Is a flu vaccine useful to prevent frequent cold&fever?

How do you find the answers?

- Go by your existing vague impressions
- Ask your peer group, Ask older experienced people
- Do a websearch
- Ask ChatGPT
- …

The data scientists approach

- Go to an authentic source that has recorded correctly the observed values over time → This is your data
  - Public data: World bank datasets, Datacommons, National Data Analytics platform, Stock prices
  - Enterprise data: Student data in universities, sales and customer interaction data in enterprises
  - Scientific data: experiments, simulations and observations in lab
- Try to find answers from the data →How?
  - This course will teach you how to get answers to top-level questions from data in a scientific way.

Several sources of public data in India

State/UT-wise Funds Allocated under Samagra Shiksha during 2021-22

Created By: OGD Team

Created date : 6/4/2022

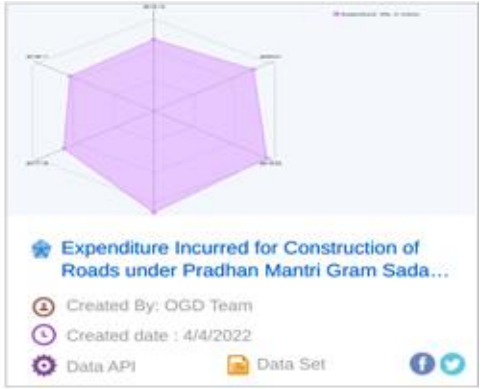
Data API Data Set

State-wise Total Allocation of Funds from State Disaster Risk Management Fund an…

Created By: OGD Team

Created date : 5/4/2022

Data API Data Set



Expenditure Incurred for Construction of Roads under Pradhan Mantri Gram Sada…

Created By: OGD Team

Created date : 4/4/2022

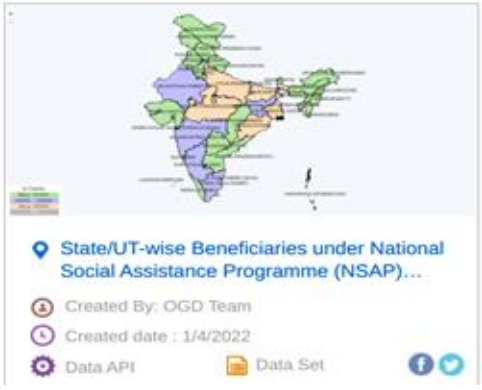
Data API Data Set

Year-wise LPG Refills Sold to PMUY Beneficiaries (14.2 kg & 5 kg) from 2019-…

Created By: OGD Team

Created date : 4/4/2022

Data API Data Set



State/UT-wise Beneficiaries under National Social Assistance Programme (NSAP)…

Created By: OGD Team

Created date : 1/4/2022

Data API Data Set

Export of Major Chemicals from 2013-14 to 2020-21

Created By: OGD Team

Created date : 30/3/2022

Data API Data Set

Image from data.gov.in

Some example studies on Indian Data

- Power consumption in India
- Health of Indian population
- Housing in India

Course contents

- Data analysis: gathering, summarizing, and visualizing data in intuitive ways
- Probability: Mathematical tool to represent uncertainty
- Statistical inference: Drawing probabilistic conclusions from limited data

Important pre-requisite for future courses in machine learning, image processing, computer vision, deep learning, AI, finance, etc..

Mode of running the course

- Three 55 minute slots per week:
- SAFE/Moodle/paper quizzes on the material covered in **prior** weeks
  - 20 minute duration at a pre-announced time or 55 minute quiz.
  - Grading will be done on top n-2 out of n quizzes for 20 minute quizzes.
  - No compensation for missed quizzes.
- All materials will be uploaded on Moodle, announcements via Moodle, questions on Moodle or cs215-ta@googlegroups.com
- Course webpage

Evaluation

Approximate credit structure

- 15% In-class Quizzes
- 25% Mid-semester exam
- 35% End semester exam
- 25% Programming and written homeworks: in teams (about 5 assignments)
- Attendance mandatory. Students with less than 80% may get a DX.

We will all adhere to principles of academic honesty. Penalties for violation will be severe and will be reported to DADAC. Givers and takers are equally responsible.