Monsoon 2022

# Information Retrieval

## - Introduction to IR Systems


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# > Focused Topics

- Recap
- Classical Search Engines
- Text Data
  - Structured vs Unstructured Text Data

- Keywords / User Information Needs
- Relevance / Irrelevance
- Personalization
- Words / Term Weighting

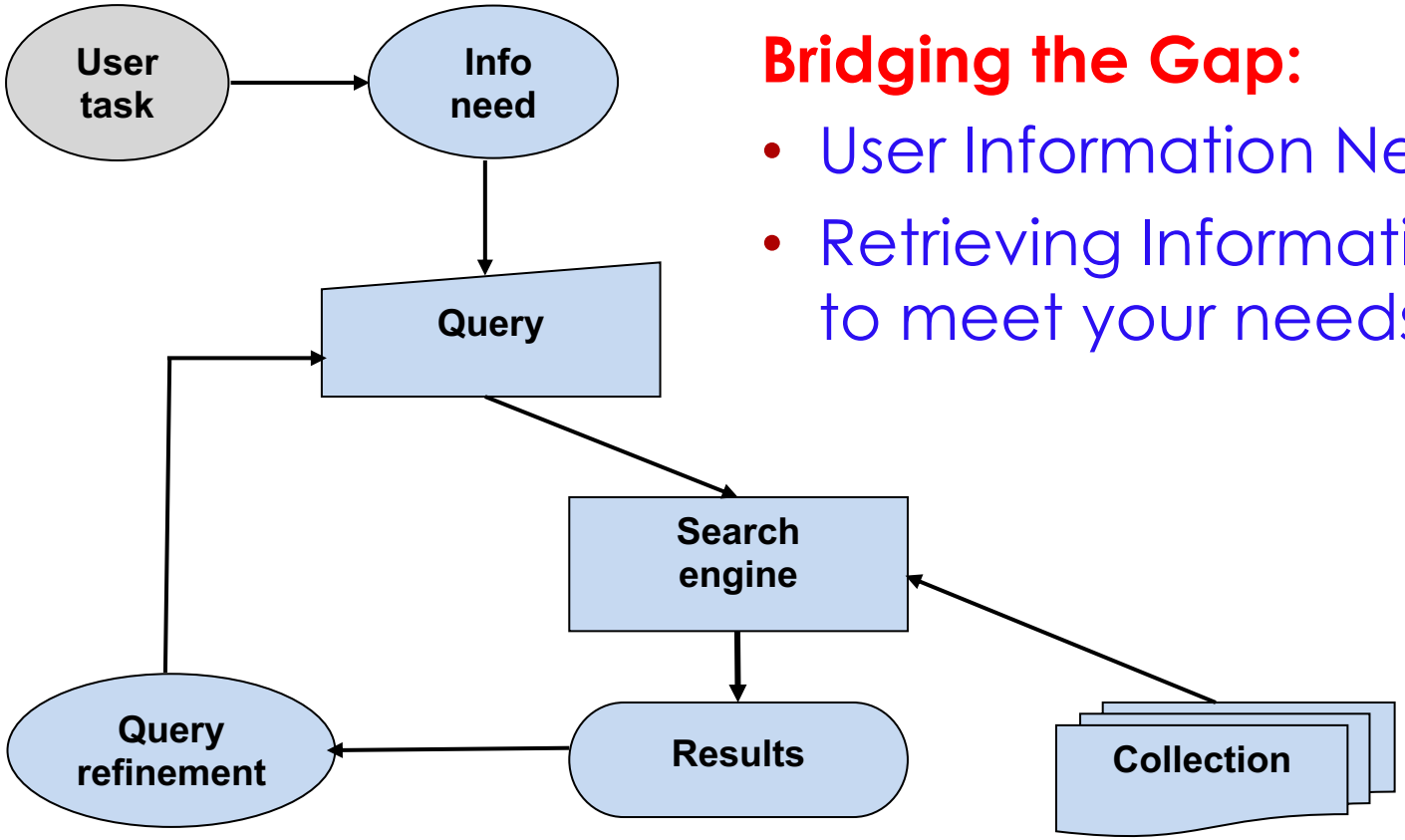
- Text Collection / Corpora
- Evaluation  Strategy
    - More topics to come up … Stay tuned …!!

# Recap: Information Retrieval

- **Information Retrieval (IR)** is finding material (usually documents) of an unstructured nature (usually text) that satisfies an information need from within large collections (usually stored on computers).

- These days we frequently think first of web search, but there are many other cases:
  - **E-mail Search**
  - **Search Your Files in Laptop / Desktop**
  - **Corporate knowledge bases**
  - **Legal information retrieval**
  - **News Retrieval Systems**
  - **World Wide Webs / Forums / Blogs**
  - **and so on . . .**

# Recap: Classical Search Engines




**Bridging the Gap:**

- User Information Needs
- Retrieving Information to meet your needs

# Data

## How do we define Data?

- Look at the following data:

| | | |
|---|---|---|
| 80.32 | 80.32 | **91.54** |
| 76.23 | 76.23 | 80.32 |
| 54.24 | **54.24** | 76.23 |
| 64.96 | 64.96 | 64.96 |
| 91.54 | **91.54** | **54.24** |

- What do these numbers refer to?
  - Marks or Heights or Weights or . . .

# Structured Data

- Look at the following data:

| Export Item | 13 – 17 Jan 2018* |
|---|---|
| Turmeric | 80.32 |
| Turmeric | 76.23 |
| Turmeric | **54.24** |
| Turmeric | 64.96 |
| Turmeric | **91.54** |

*** In metric tons**

| Usage | 13 – 17 Jan 2018* |
|---|---|
| Turmeric | 80.32 |
| Turmeric | 76.23 |
| Turmeric | **54.24** |
| Turmeric | 64.96 |
| Turmeric | **91.54** |

*** Average usage of a nuclear family in Hyd (in milligrams)**

- Does it make any sense now?

# Structured Data (contd)

- Let us look into the details

| | |
|---|---|
| Rahul | 80.32 |
| Priya | 76.23 |
| Sowmya | 54.24 |
| Lucky Vogel | 64.96 |
| Rohan | 91.54 |

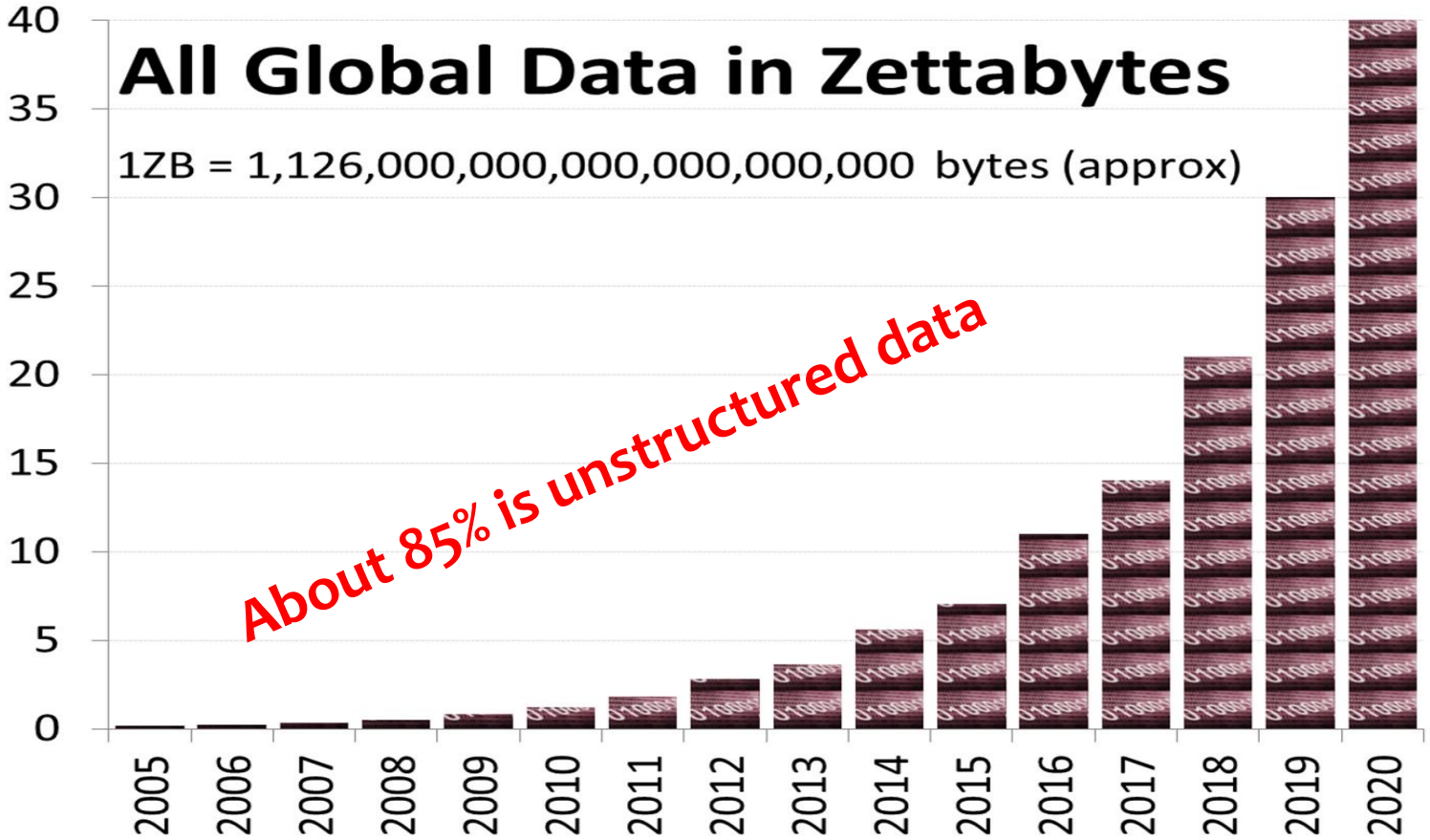
| Name | Weight |
|---|---|
| Rohan | **91.54** |
| Priya | 80.32 |
| Rahul | 76.23 |
| Lucky Vogel | 64.96 |
| Sowmya | **54.24** |

| Name | 2018 (25 Dec) |
|---|---|
| **Rohan** | **91.54** |
| **Priya** | 80.32 |
| **Rahul** | 76.23 |
| **Lucky Vogel** | 64.96 |
| **Sowmya** | **54.24** |

- More Data … More Features … More Value(s)
- More Value → More Money (?!)

# Size – Scaling of Text data

**Huge Data → mind – blowing size (1ZB = $10^{21}$bytes)**



# Text Data

**No Free Meals: Transaction Fees are not the**
13 Jan 2018

**Mumbai:** Manhattan FinS vices Inc. has ana
mobile payment products. per RBI analyti
facts that includes the highest and lowest trans
payments products. PayGO ranks top in the lis
Rupay is charging the lowest transaction fee o
online seller Amazon charges 64.96 paise per t
services. The transaction fee of Paypal and Pay
respectively. We also observed that PayPaise is
transaction fee as compared with PayGO.

Many interesting facts revealed in this report w
interested to opt for the specific payment service. With mess transaction fee.

| Product | 13 Jan 2018 * |
|---|---|
| Paytm | 80.32 |
| PayPal | 76.23 |
| Rupay | **54.24** |
| Amazon Pay | 64.96 |
| **PayGO** | **91.54** |

*** Fee in Paise(INR) per transaction in Mumbai**

- **Does this table give a better understanding?**

# What do you understand?

Non-Banking Financial Companies (NBFC) are establishments that provide financial services and banking facilities without meeting the legal definition of a Bank. The top 10 companies are listed by The Banking Finance Post on November 17, 2018 says that Power Finance Corporation Limited ranks topper with INR 267377.40 in terms of annual turn over which is measure in millions of rupees. The second and third places are held by Rural Electrification Corporation Limited (INR 224403.10 millions) and Bajaj Finance Limited (INR 133292.20 millions). The remaining companies in the top 12 list are given as follows with their annual turnover in the brackets respectively: Shriram Transport Finance Company Limited (122768.30), Indian Railway Finance Corporation Limited (110202.32) Mahindra & Mahindra Financial Services Limited (72061.20) HDB Financial Services Limited (70619.90) Muthoot Finance Limited (62432.00) Cholamandalam Investment and Finance Company Limited ((54257.60) L&T Finance Limited (52460.00) Shriram City Union Finance Limited (51015.70), and Tata Capital Financial Services Limited (45553.70).

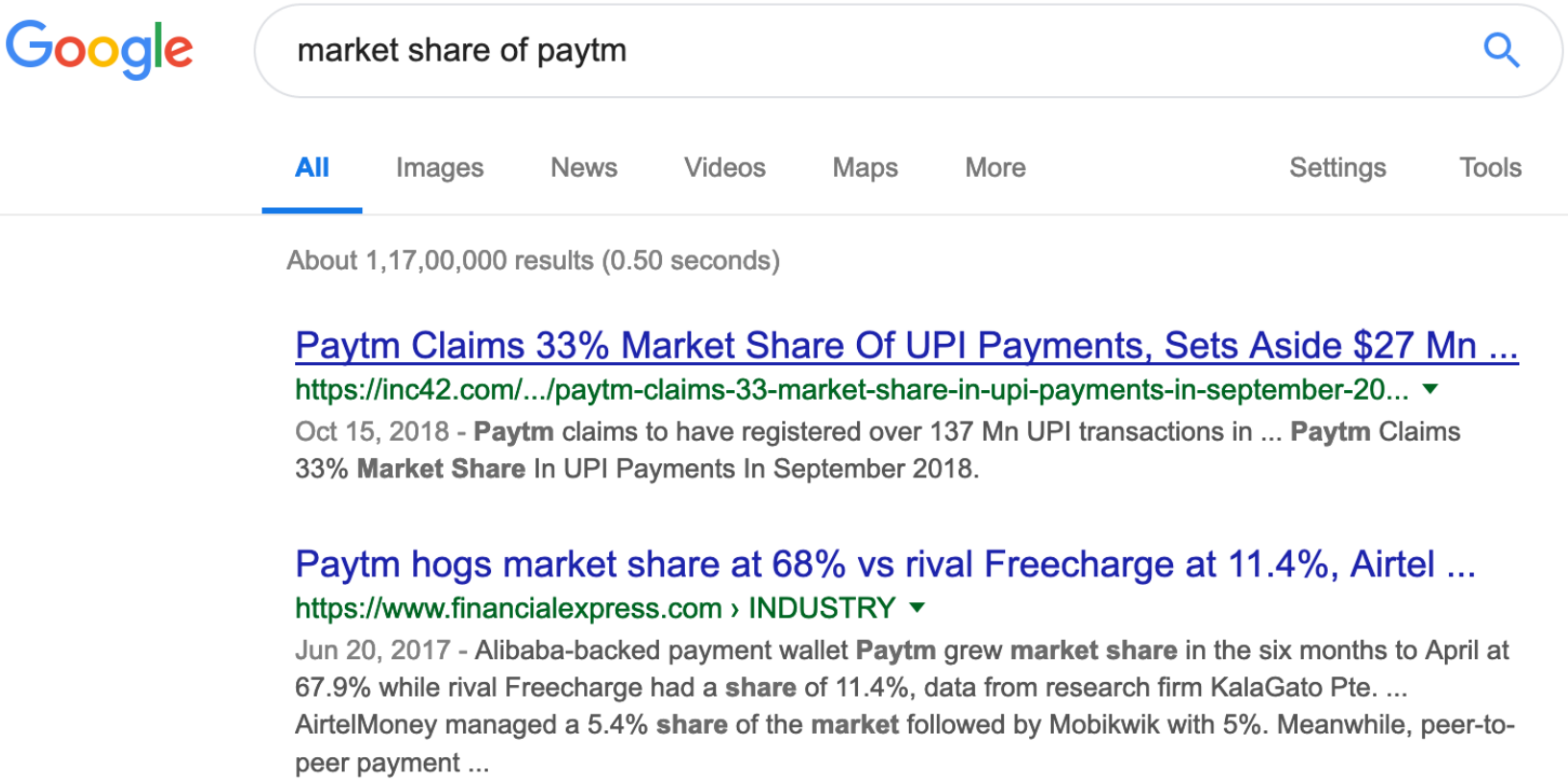
# Try with this!!

## Top 50 NBFCs' Ranking Based on Annual Turnover

| NBFCs List | Total Income | Rank |
|---|---|---|
| Power Finance Corporation Limited | 267377.40 | 1 |
| Rural Electrification Corporation Limited | 224403.10 | 2 |
| Bajaj Finance Limited | 133292.20 | 3 |
| Shriram Transport Finance Company Limited | 122768.30 | 4 |
| Indian Railway Finance Corporation Limited | 110202.32 | 5 |
| Mahindra & Mahindra Financial Services Limited | 72061.20 | 6 |
| HDB Financial Services Limited | 70619.90 | 7 |
| Muthoot Finance Limited | 62432.00 | 8 |
| Cholamandalam Investment and Finance Company Limited | 54257.60 | 9 |
| L&T Finance Limited (erstwhile Family Credit Limited) | 52460.00 | 10 |
| Shriram City Union Finance Limited | 51015.70 | 11 |
| Tata Capital Financial Services Limited | 45553.70 | 12 |

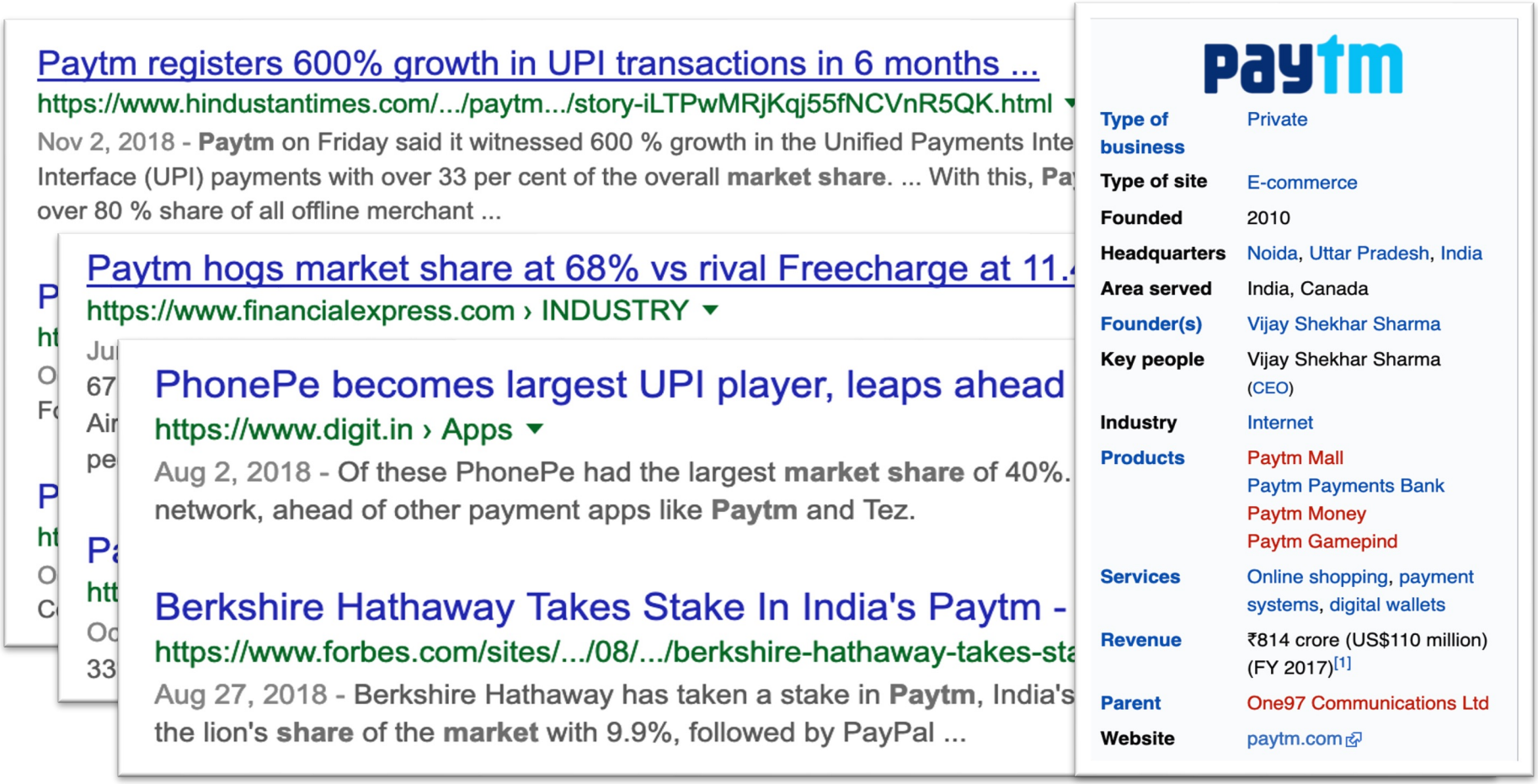
# Words, Relevance & Personalization

- Market Share of **paytm**



# Words and Knowledge Bases

✧ Make your judgments on relevance



# Text Collections

- **Structured data**
  - Information stored DB
  - Strict format
  - Limitation
  - Not all data collected is structured
- **Semi-structured data**
  - Data may have certain structure but not all information collected has identical structure
  - Some attributes may exist in some of the entities of a particular type but not in others
- **Unstructured data**
  - Very limited indication of data type
  - For example, look into a simple text document

# Words and their occurrences

- Consider any city:
- Check with Wikipedia
  - For e.g, search for **Darjeeling** (English Version)
  - **https://en.wikipedia.org/wiki/Darjeeling**
  - How many times Darjeeling comes up in the document?
  - Does it mean the following?
    - more it occurs … more it is important?

# Look at Text Segment

- Darjeeling is a city and a municipality in the Indian state of West Bengal. It is located in the Lesser Himalayas at an elevation of 6,700 ft. It is noted for its tea industry, its views of Kangchenjunga, the world's third-highest mountain, and the Darjeeling Himalayan Railway, a UNESCO World Heritage Site. Darjeeling is the headquarters of the Darjeeling District which has a partially autonomous status within the state of West Bengal. It is also a popular tourist destination in India.

# Word Count – How do you get it?

- **Darjeeling** is a city and a municipality in the Indian state of West Bengal. It is located in the Lesser Himalayas at an elevation of 6,700 ft. It is noted for its tea industry, its views of Kangchenjunga, the world's third-highest mountain, and the **Darjeeling** Himalayan Railway, a UNESCO World Heritage Site. **Darjeeling** is the headquarters of the **Darjeeling** District which has a partially autonomous status within the state of West Bengal. It is also a popular tourist destination in India.

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# Term Statistics: Text Data

- How do we extract the term statistics?

Tokenization

**Darjeeling** | is | a | city | and | a | municipality

in | the | Indian | state | of | West | Bengal .

**All TERMs (WORDs)**

| | |
|---|---|
| Darjeeling – 1 | in – 1 |
| is – 1 | the – 1 |
| a – 1 | Indian – 1 |
| city – 1 | state – 1 |
| and – 1 | of – 1 |
| a – 1 | west – 1 |
| municipality – 1 | Bengal – 1 |

**Unique TERMs (WORDs)**

| | |
|---|---|
| Darjeeling – 1 | the – 1 |
| is – 1 | Indian – 1 |
| **a – 2** | state – 1 |
| city – 1 | of – 1 |
| and – 1 | West – 1 |
| municipality – 1 | Bengal – 1 |
| in – 1 | |

# Words – Counts

✧ A subset of words and their counts are given below:

| | |
|---|---|
| **7** the | **2** its |
| **5** of | **2** and |
| **5** is | **2** West |
| **5** a | **2** Bengal |
| **4** Darjeeling | **1** world's |
| **3** in | **1** within |
| **3** It | **1** which |
| **2** state | **1** views |
| | **1** tourist |
| | . . . |

# Look at 3 documents

$d_1$ - **Darjeeling** is a city and a municipality in the Indian state of West Bengal. It is located in the Lesser Himalayas at an elevation of 6,700 feet

$d_2$ - **Darjeeling** is noted for its tea industry, its views of Kangchenjunga, the world's third-highest mountain, and the **Darjeeling** Himalayan Railway, a UNESCO World Heritage Site

$d_3$ - **Darjeeling** is the headquarters of the **Darjeeling** District which has a partially autonomous status within the state of West Bengal. It is also a tourist destination in India

# Summary

## Focused on exploring the following:

- Fundamentals of an Information Retrieval Systems
- Handling Structured and Unstructured Data
- Collecting Term Statistics
  - From Unstructured Text Data
- How to Create an Index / Inverted Index?
  - Many more to come up … stay tuned in …

# Help among Yourselves?

- **Perspective Students** (having CGPA above 8.5 and above)
- **Promising Students** (having CGPA above 6.5 and less than 8.5)

- **Needy Students** (having CGPA less than 6.5)
  - Can the above group help these students? (Your work will also be rewarded)

- You may grow a culture of **collaborative learning** by helping the needy students

# How to reach me?

➔ Please leave me an email:

rajendra [DOT] prasath [AT] iiits [DOT] in

➔ Visit my homepage @

➔ https://www.iiits.ac.in/people/regular-faculty/dr-rajendra-prasath/

(OR)

➔ http://rajendra.2power3.com

# Assistance

- You may post your questions to me at any time
- You may meet me in person on available time or with an appointment
- You may ask for one-to-one meeting

## Best Approach

- You may leave me an email any time
  (email is the best way to reach me faster)

# Questions
# It's Your Time



Contact Information

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