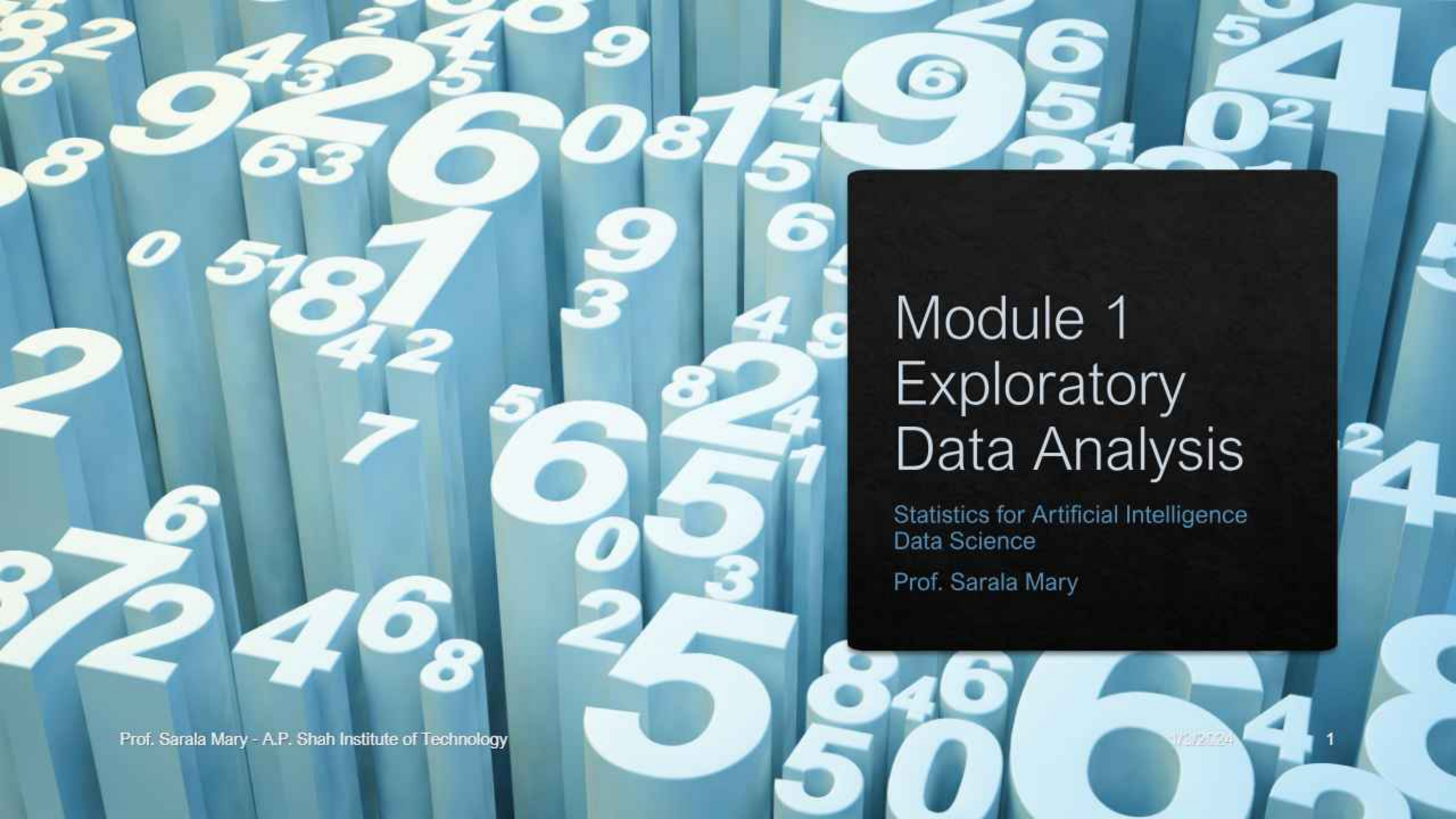
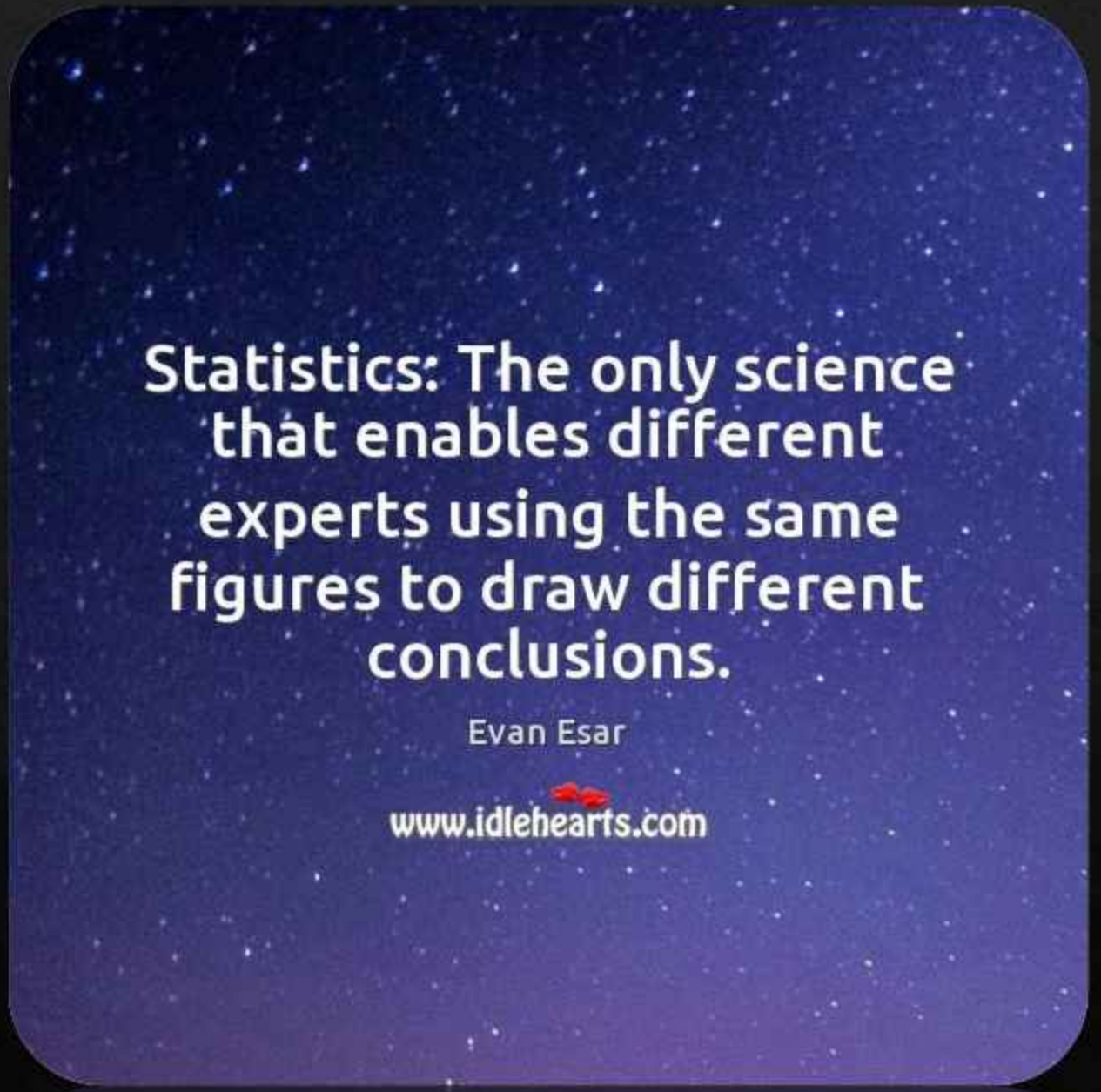


Module 1 Exploratory Data Analysis

Statistics for Artificial Intelligence Data Science

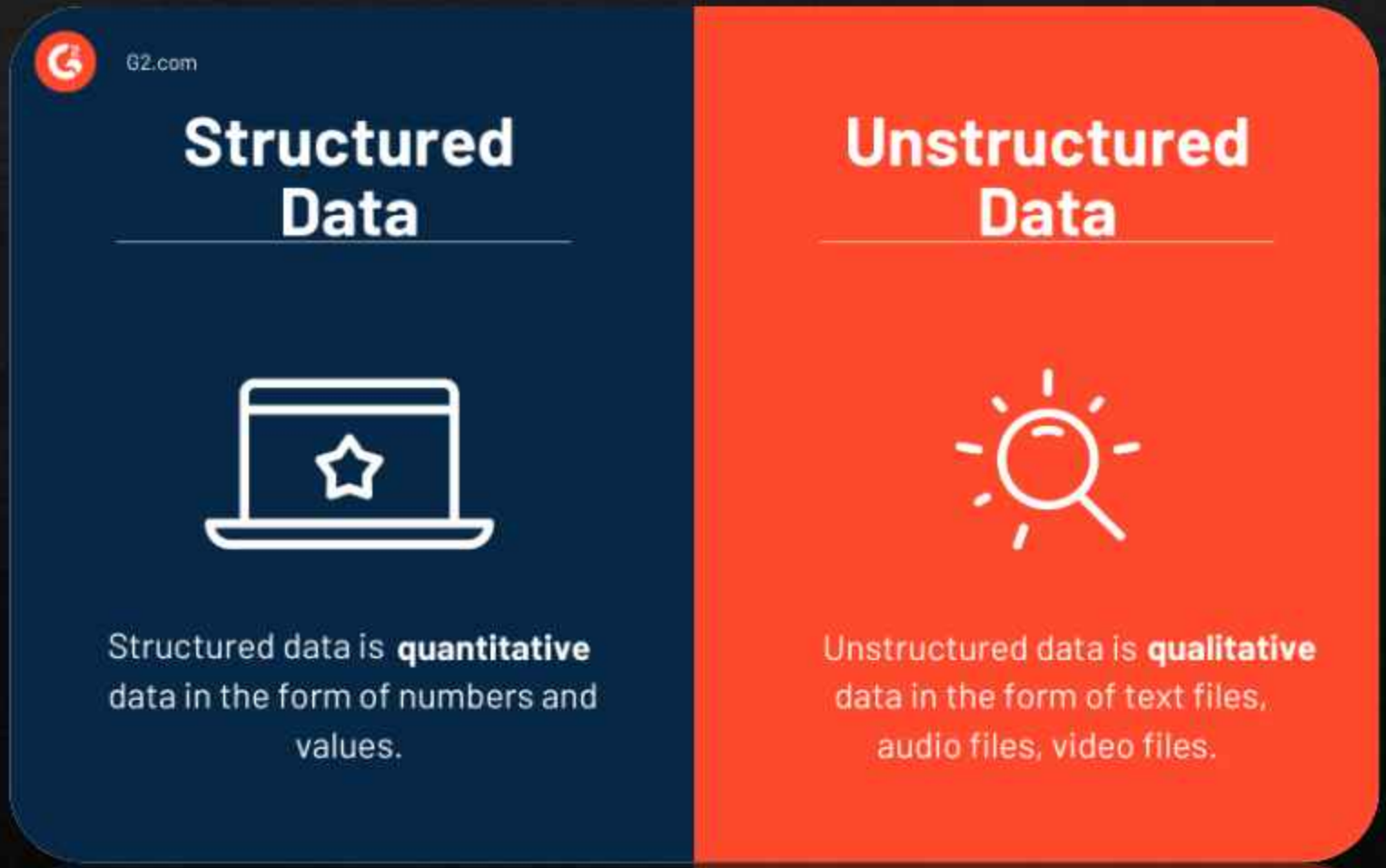
Prof. Sarala Mary


Statistics: The only science that enables different experts using the same figures to draw different conclusions.
Evan Esar
www.idlehearts.com

What is Data?

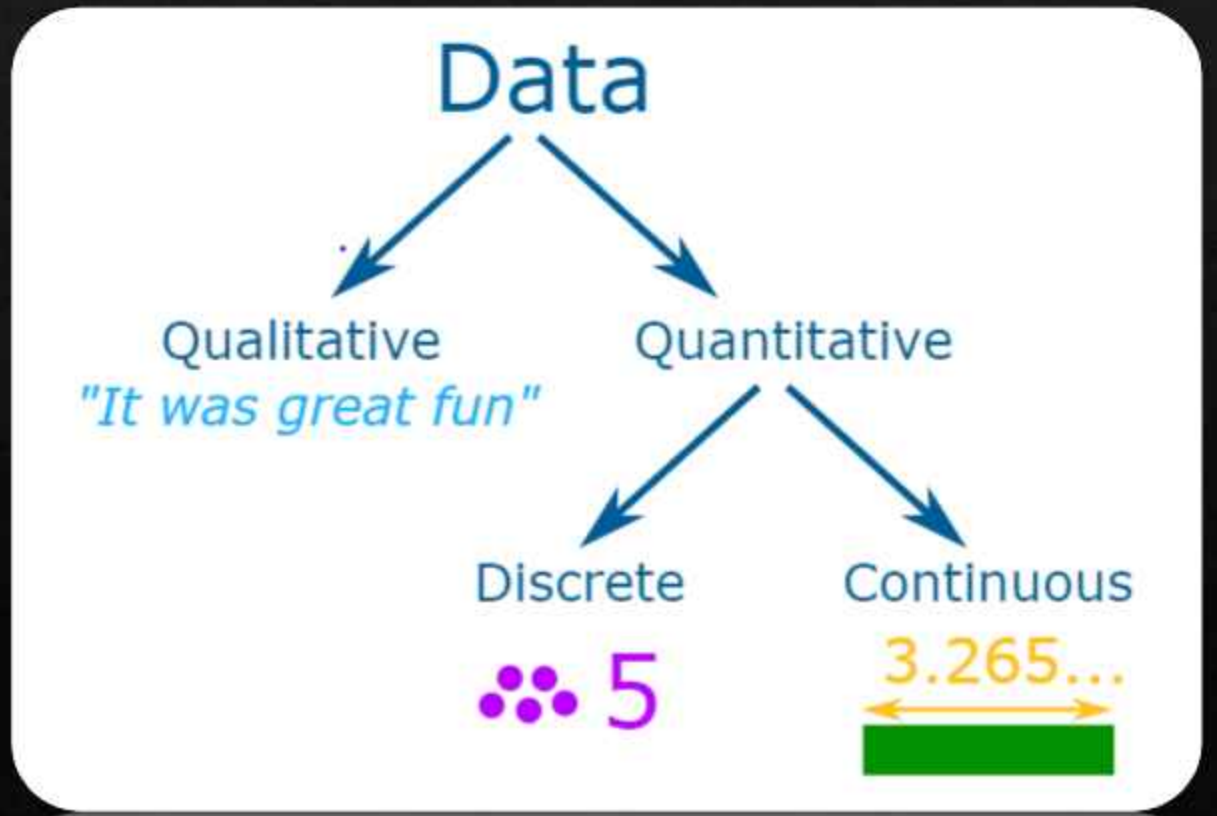
- Data is a collection of facts, such as numbers, words, measurements, observations, or just descriptions of things.

Structured Data and Unstructured Data



Qualitative vs Quantitative

- Qualitative data is descriptive information (it describes something)
- Quantitative data is numerical information (numbers)



Discrete Data

- Discrete Data can only take certain values.

Example: the number of students in a class

We can't have half a student!

Example: the result of rolling 2 dice

Only has the values 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12

Continuous Data

Continuous Data can take any value (within a range)

Examples:

- A person's height: could be any value (within the range of human heights), not just certain fixed heights,
- Time in a race: you could even measure it to fractions of a second,
- A dog's weight,
- The length of a leaf,

Example

Example: What do we know about Arrow the Dog?

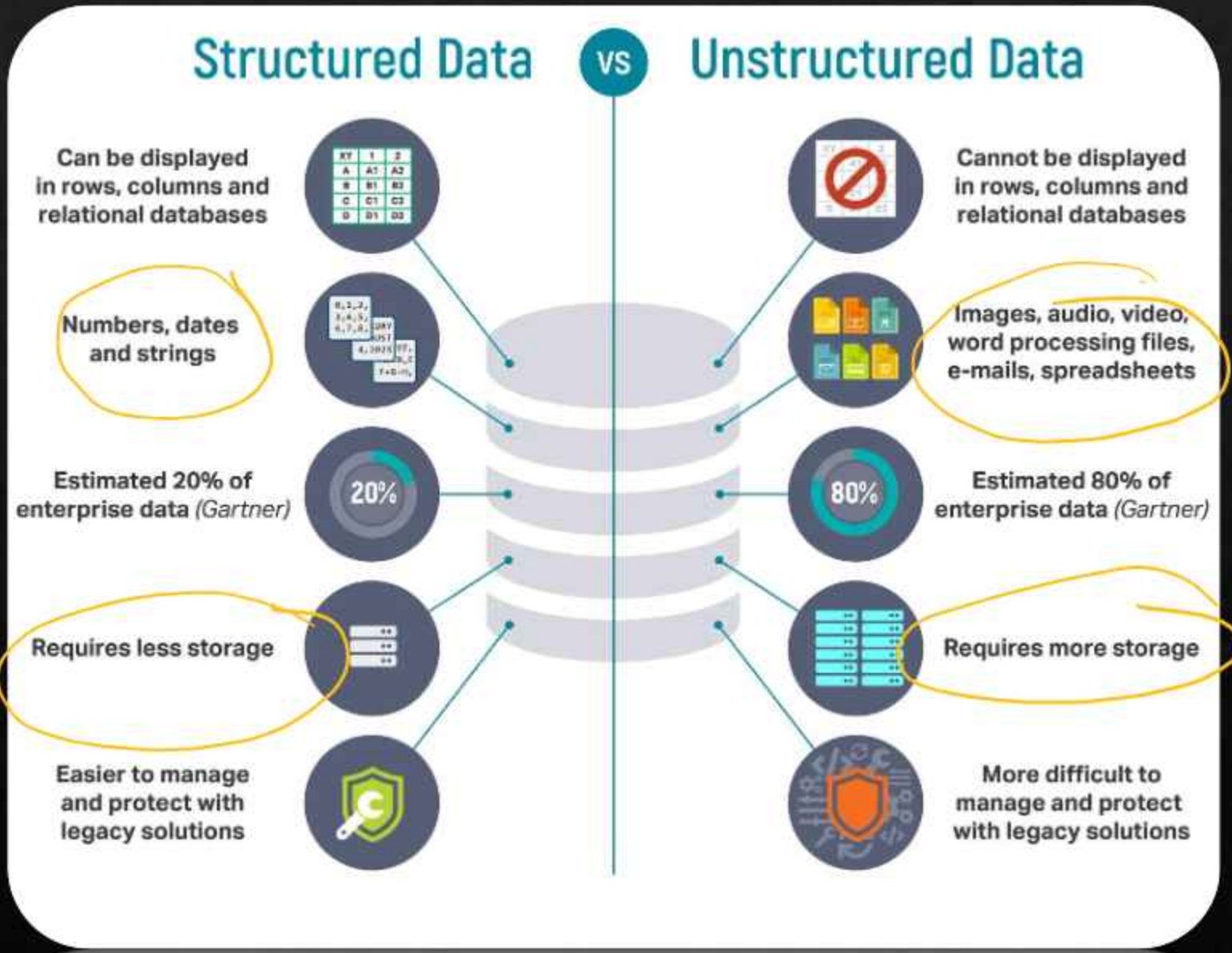
Qualitative:

- He is brown and black
- He has long hair
- He has lots of energy

Quantitative:

- Discrete:
  - He has 4 legs
  - He has 2 brothers
- Continuous:
  - He weighs 25.5 kg
  - He is 565 mm tall

Structured Data and Unstructured Data



Rectangular Data

- Rectangular data is the general term for a two-dimensional matrix with rows indicating records (cases) and columns indicating features (variables).

	A	B	C
1	name	gender	date
2	Dezik	Male	1951-07-22
3	Dezik	Male	1951-07-29
4	Tsygan	Male	1951-07-22
5	Lisa	Female	1951-07-29
6	Chizhik	Male	1951-08-15

CSV

```
name,gender,date
Dezik,Male,1951-07-22
Dezik,Male,1951-07-29
Tsygan,Male,1951-07-22
Lisa,Female,1951-07-29
Chizhik,Male,1951-08-15
```

Key terms of Rectangular Data

- Data frame - Rectangular data (like a spreadsheet) is the basic data structure for statistical and machine learning models.
- Feature - A column within a table is commonly referred to as a feature.
- Records - A row within a table is commonly referred to as a record.

Non – Rectangular Data

JSON

```
{
    "name": "Darth Vader",
    "species": "Human",
    "homeworld": "Tatooine",
    "films": [
        "Revenge of the Sith",
        "Return of the Jedi",
        "The Empire Strikes Back",
        "A New Hope"
    ]
}
```

XML

```
<note>
  <from>Teacher</from>
  <to>Student</to>
  <heading>Almost there</heading>
  <body>It's the final chapter!</body>
</note>
```