Hierarchical Data

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DATASCI 11 2

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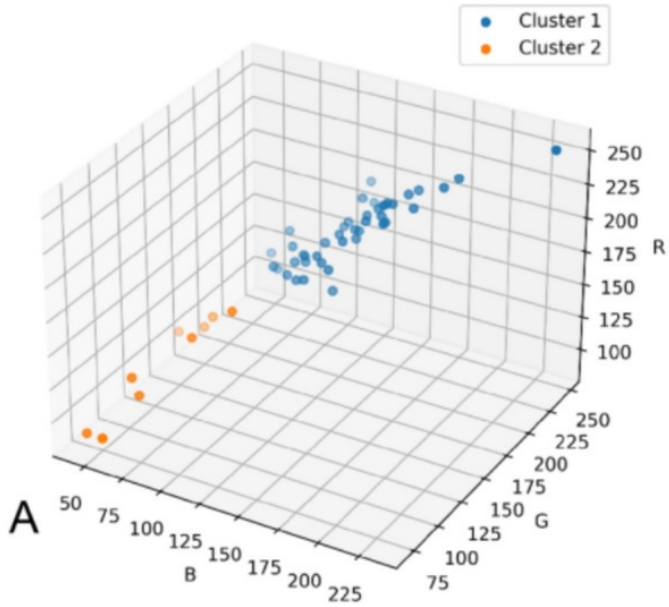


Source: “Revolutionizing Chinese medicine granule placebo with a machine learning four-color model”

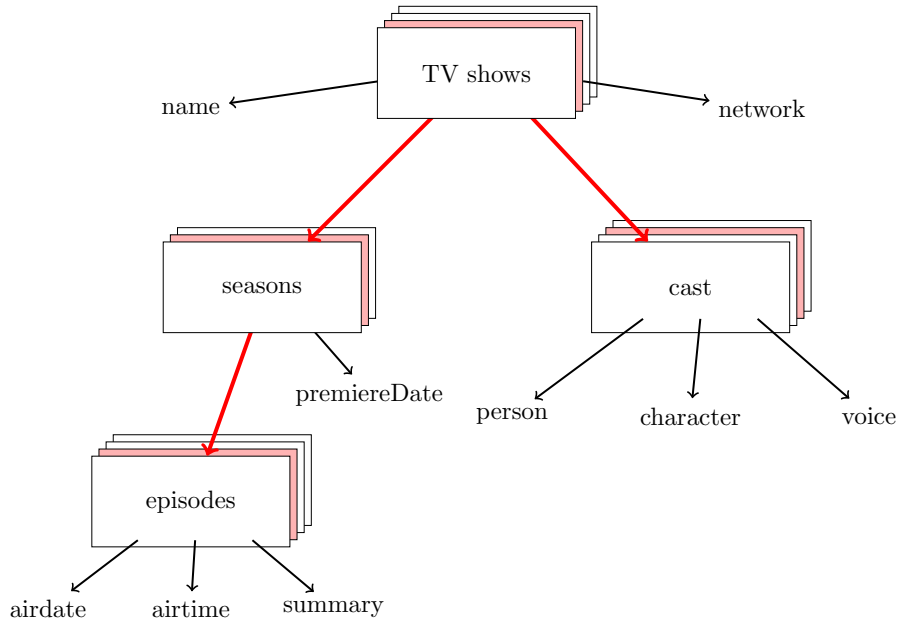
Hierarchical Data

Consider a data set of TV shows.

Each show has…

- a name
- a network
- …
- multiple seasons, each of which has…
  - a number
  - a premiere date
  - an end date
  - …
  - multiple episodes, each of which has…
    - a name
    - an airdate
    - …
- a cast of multiple actors.

We can think of this data as a *tree*.



But how would we represent this data as a file on disk?

1 What is Hierarchical Data?

2 JSON

3 XML

4 Recap

JavaScript Object Notation (JSON)

JSON is one way to represent hierarchical data. In Python, JSON is represented as a `dict`.

```
[{'name': 'Girls',
  'network': {'name': 'NBC', ...},
  ...,
  'cast': [{'person': {'name': 'Lena Dunham', ...},
            'character': {'name': 'Hannah Horvath', ...},
            'voice': False},
           ...
          ],
  'seasons': [{'premiereDate': '2012-04-15',
               ...,
               'episodes': [{'name': 'Pilot',
                             'number': 1,
                             'runtime': 30,
                             ...},
                            ...
                            ]
               }],
 },
 ...
]
```

Working with JSON

Let's work with this JSON data in a Colab.

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eXtensible Markup Language (XML)

XML is another way to represent hierarchical data.

- Fields are represented by named *tags*.
- Each tag has an open `<tag>` and a close `</tag>`.
- Children are represented by nested tags.
- Repeated fields are represented by repeated tags.

Technical details:

- XML documents must begin with the declaration `<?xml ... ?>`.
- XML documents must have a `<root>` tag.

```
<?xml version="1.0" encoding="UTF-8"?>
<root>
  <show>
    <name>Girls</name>
    <network>
      <name>NBC</name>
      ...
    </network>
    <cast>
      <person>...</person>
      <character>....</character>
      <voice>...</voice>
    </cast>
    <cast>
      ...
    </cast>
    <season>
      <episode>...</episode>
      <episode>...</episode>
      ...
    </season>
    <season>
      ...
    </season>
  </show>
</root>
```

Working with XML

Let's work with the same data, as an XML, in a Colab.

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JSON vs. XML

Which is better?

- JSON has largely won over XML.
- You can occasionally still find hierarchical data as XML, but it usually is JSON.
- XML is still relevant in data science for one reason: it is a generalization of HTML, the language used to specify webpages.

We'll leverage our knowledge of XML next time to scrape webpages.