



Scottish Graduate School  
of Social Science  
*Sgoil Cheumnaichean Saidheans*  
*Sòisealta na h-Alba*

## Collecting Digital Data

The Role of Web-scraping and APIs

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Braw Data Ltd · Gradel Institute of Charity, University of Oxford

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## About the Instructor

### Dr Diarmuid McDonnell

- Director, **Braw Data Ltd**
- Visiting Fellow, **Gradel Institute of Charity**, University of Oxford
- Research: geographic distribution of civil society activity
- Background in quantitative social science and data science

 <https://www.brawdata.co.uk>

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# Course Outline

Time	Session	Format
10:00–10:30	Welcome & How the Web Works	Lecture
10:30–11:15	Practical 1: Web Scraping	Colab notebook
11:15–11:30	Break	
11:30–11:45	What Are APIs?	Lecture
11:45–12:45	Practical 2: UK Police API	Colab notebook
12:45–13:30	Lunch	
13:30–13:45	API Landscape Survey	Lecture
13:45–14:45	Practical 3: API Challenge	Colab notebook
14:45–15:00	Break	
15:00–15:15	LLMs as Coding Assistants	Lecture
15:15–15:50	Practical 4: LLM Showdown	Colab notebook
15:50–16:00	Wrap-up & Q&A	

# Getting Set Up

## What you need

- A **Google account** (for Google Colab)
- A web browser (Chrome recommended)

## How to access the notebooks

1. Go to the course **README** (link shared on Teams/email)
2. Click the **Open in Colab** badge for your chosen language
3. Sign in with your Google account
4. You're ready to go!

 No software installation required — everything runs in the browser.

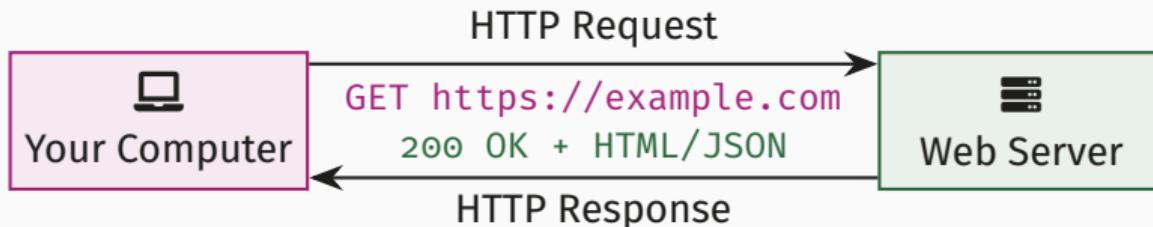
## Why Collect Digital Data?

- **Government open data** – policy evaluation, freedom of information, public spending
- **Social media** – opinion analysis, political discourse, misinformation
- **Organisational websites** – third-sector research, corporate governance, labour markets
- **Administrative records** – health, education, justice system data via APIs

### Key idea

The web is a vast, continuously updated source of social science data – but accessing it requires the right tools and techniques.

# How the Web Works

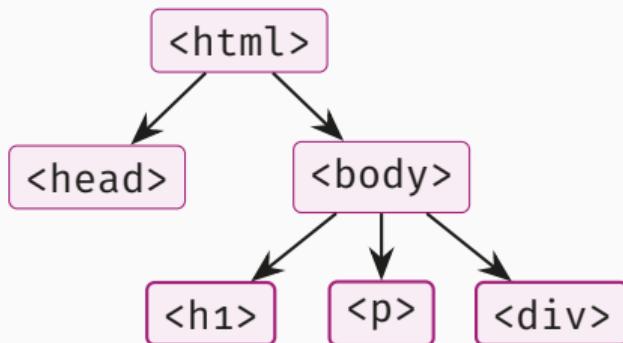


## Common HTTP status codes:

200 OK · 301 Moved Permanently · 302 Found (Redirect) · 400 Bad Request · 401 Unauthorised ·  
403 Forbidden · 404 Not Found · 429 Too Many Requests · 500 Server Error

# HTML Basics

## HTML tree structure



Tags define structure and meaning

## Example HTML

```
<html>
  <head>
    <title>My Page</title>
  </head>
  <body>
    <h1>Welcome</h1>
    <p>Hello, world!</p>
  </body>
</html>
```

# Structured vs Unstructured Data

## Unstructured (HTML)

```
<div class="person">
  <h2>Jane Smith</h2>
  <p>Age: 34</p>
  <p>City: Edinburgh</p>
</div>
```

- Designed for **human** reading
- Structure can change without notice
- Requires parsing to extract data

## Structured (JSON)

```
{
  "name": "Jane Smith",
  "age": 34,
  "city": "Edinburgh"
}
```

- Designed for **machine** reading
- Consistent, documented format
- Easy to convert to tables

## Ethics and Legality

-  **Check robots.txt** — websites specify what can be crawled
-  **Read Terms of Service** — some sites explicitly prohibit scraping
-  **Respect rate limits** — don't overwhelm servers with requests
-  **Consider personal data** — GDPR applies to identifiable information
-  **Prefer APIs when available** — structured, legal, reliable
-  **Web scraping as last resort** — use only when no API exists

### Note

We will discuss ethical and legal considerations throughout the day as they arise in each practical.

### Practical 1: Web Scraping

- Extract text from a simple web page
- Scrape data across multiple pages
- Save structured data to a file

Open the **Practical 1** notebook in Google Colab  
(Python or R – your choice!)