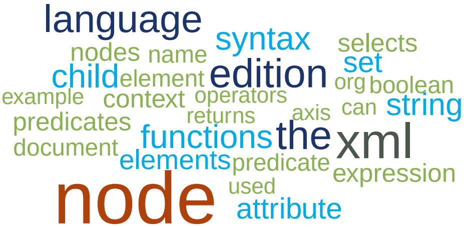
Introduction to Web Scraping with R

The Scraping Workflow



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4. you are able to apply XPath expressions with `rvest`
5. you are able to tidy web data with your R skills and regular expressions

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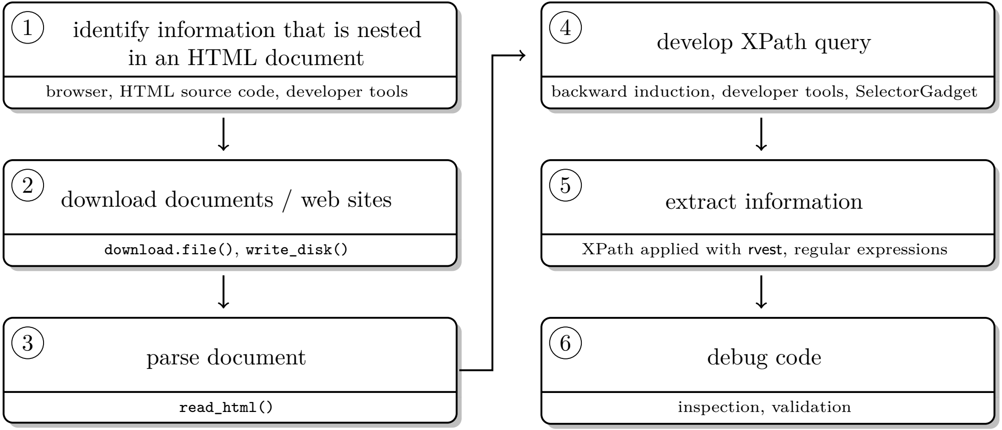

1 identify information that is nested in an HTML document

browser, HTML source code, developer tools

2 download documents / web sites

`download.file()`, `write_disk()`

3 parse document

`read_html()`

4 develop XPath query

backward induction, developer tools, SelectorGadget

5 extract information

XPath applied with `rvest`, regular expressions

6 debug code

inspection, validation

Downloading HTML files

Stay modest when accessing lots of data

- content on the web is publicly available, ...
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- stay polite by querying resources as sparsely as possible

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Two easy-to-implement practices

1. do not bombard the server with requests—and if you have to, do at a reasonable speed
2. download HTML files first, then parse

Downloading HTML files

R code

```r
for (i in 1:length(list_of_urls)) {
    if (!file.exists(paste0(folder, file_names[i]))) {
        download.file(list_of_urls[i], destfile = paste0(folder, file_names[i]))
        Sys.sleep(runif(1, 1, 2))
    }
}
```

end

The code snippet explained

- loop over a list of urls
- `!file.exists()` checks whether a file does not yet exist in the local folder
- `download.file()` downloads the file to a folder; file name has to be specified
- `Sys.sleep()` suspends the execution of R code for a given time interval. Here: random interval between 1 and 2 seconds

Staying identifiable

Don’t be a phantom

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Two easy-to-implement practices

1. personally get in touch with website owners
2. use HTTP header fields `From` and `User-Agent` to provide information about yourself

Staying identifiable

R code

```r
url <- "http://a-totally-random-website.com"
session <- html_session(url, add_headers(From = "my@email.com", `User-Agent` = R.Version()$version.string))
headlines <- session %>% html_nodes(xpath = "p//a") %>%  html_text()
```

end

The code snippet explained

- `rvest`'s `html_session()` creates a session object that responds to HTTP and HTML methods
- here, we provide our email address and the current R version as User-Agent information
- this will pop up in the server logs—the webpage adminstrator has the chance to easily get in touch with you

Summary

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- the basic scraping workflow with R is straightforward
- with great power comes great responsibility: stay polite on the web when scraping lots of data!
- more complexity is added when you want to gather data from multiple websites, or when dynamic elements such as forms or JavaScript content is involved
- we will consider such cases in upcoming sessions