Automated evaluation

1.

Scrape: `genocat`, `awesome-biological-visualizations`, and `awesome-tools-visualization` for web-based data visualization tools

2.

– Save web links to combined CSV
– Clean the combined CSV

3.

– For each URL, run an automated accessibility checker, such as AXE.

Codebase

```
scraper % tree .
.
├── README.md
├── Untitled.ipynb
├── keyboard-test.js
├── main.js
├── node_modules
│   ├── ...
├── outputs
│   ├── awesome-biological-visualizations_results.csv
│   ├── awesome-tools-visualization_results.csv
│   ├── combined.csv
│   ├── genocat_results.csv
│   ├── impact_levels_doughnut_chart.html
│   ├── keyboard-accessibility-results.json
│   ├── uniques_by_url.csv
│   ├── uniques_by_url_manually_pruned.csv
│   ├── violation_heatmap.html
│   ├── violation_histogram.html
│   ├── violation_types_chart.html
│   ├── violations_chart.html
│   └── ...
├── package-lock.json
├── package.json
└── scrapers
    ├── scrape-awesome-biological-visualizations.js
    ├── scrape-awesome-tools-visualization.js
    └── scrape-genocat.js
```

Scrapers

```
root
├── main.js
└── scrapers
    ├── scrape-awesome-biological-visualizations.js
    ├── scrape-awesome-tools-visualization.js
    └── scrape-genocat.js
```

```
$ node main.js
```

Saved data

```
root
└── outputs
    ├── [DATASource].csv
    └── ...
```

Scraper output

```
// genocat_results.csv

Name,Source,Internal URL,External URL
"3D Genome Browser","genocat","http://genocat.tools/tools/3d_genome_brows-
er/","http://3dgb.cs.mcgill.ca/"
"3dViewer","genocat","http://genocat.tools/tools/3dviewer/","http://bioin-
fo.au.tsinghua.edu.cn/member/nadhir/HiC3DViewer/"
"ABrowse","genocat","http://genocat.-
tools/tools/abrowse/","http://www.abrowse.org/"
"Apollo","genocat","http://genocat.tools/tools/apollo/","https://github.-
com/GMOD/Apollo"
"Alvis","genocat","http://genocat.tools/tools/alvis/","https://bitbuck-
et.org/rfs/alvis/src/master/"
...
```

Keyboard accessibility measurements

```
root
└── keyboard-test.js
```

```
$ node keyboard-test.js
```

Saved data

```
root
└── outputs
    └── keyboard-accessibility-results.json
```

Output (Axe)

```
[
  {
    "url": "http://3dgb.cs.mcgill.ca/",
    "violations": [
      {
        "id": "nested-interactive",
        "impact": "serious",
        "tags": [
          "cat.keyboard",
          "wcag2a",
          "wcag412",
          "TTv5",
          "TT6.a",
          "EN-301-549",
          "EN-9.4.1.2"
        ],
        "description": "Ensure interactive controls are not
        nested as they are not always announced by screen
        readers or can cause focus problems for assistive
        technologies",
        "help": "Interactive controls must not be nested",
        "helpUrl": "https://dequeuniversity.com/rules/axe/
        4.10/nested-interactive?application=playwright",
        "nodes": [ ... ]
  }]},
  ...
]
```

Analysis

```
root
└── Untitled.ipynb
```

Generate Graphs

```
root
└── outputs
    ├── [Graph].html
    └── ...
```

Common types of errors found so far ...
- – region
  - – "Ensure all page content is contained by landmarks"
- – nested interactive
  - – "Ensure interactive controls are not nested as they are not always announced
    by screen readers or can cause focus problems for assistive technologies"
- – scrollable-region-focusable
  - – "Ensure elements that have scrollable content are accessible by keyboard"
- – tabindex
  - – "Ensure tabindex attribute values are not greater than 0"
  - – note this won't catch tabindex=-1 issues
- – skip-link
  - – "Ensure all skip links have a focusable target"