Accessible Charts With AChart Reader

Project Final

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G1
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Introduction

SVG Charts

Accessible Charts

ARIA

Example Chart

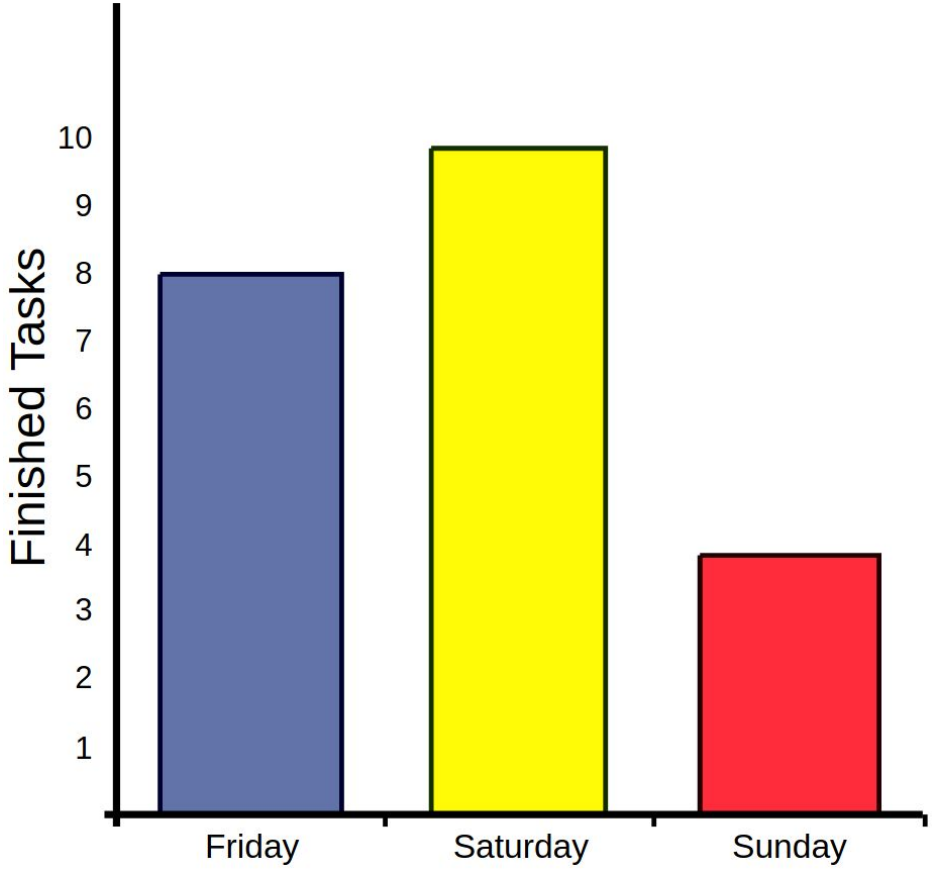
Accessible Charts

- Scalable Vector Graphics (SVG) charts are difficult for visually-impaired users.
- They can be made more accessible via additional internal markup.
  (Similar to `alt` text of images in HTML.)
- Accessible Rich Internet Applications (ARIA) provides the `role` property.
  (Among others)
- The role of an element signifies its use in the SVG chart.

Accessible Charts

- Different SVG elements can have their role marked:
  - Chart and data areas.
  - X and Y axes and labels.
  - Data set, series, points and values.
- Another property: `aria-labelledby`.
- Labels and related data points can be referenced via `aria-labelledby`.
- Some of these properties are not yet well-defined in standards.

Accessible Charts - Example Chart

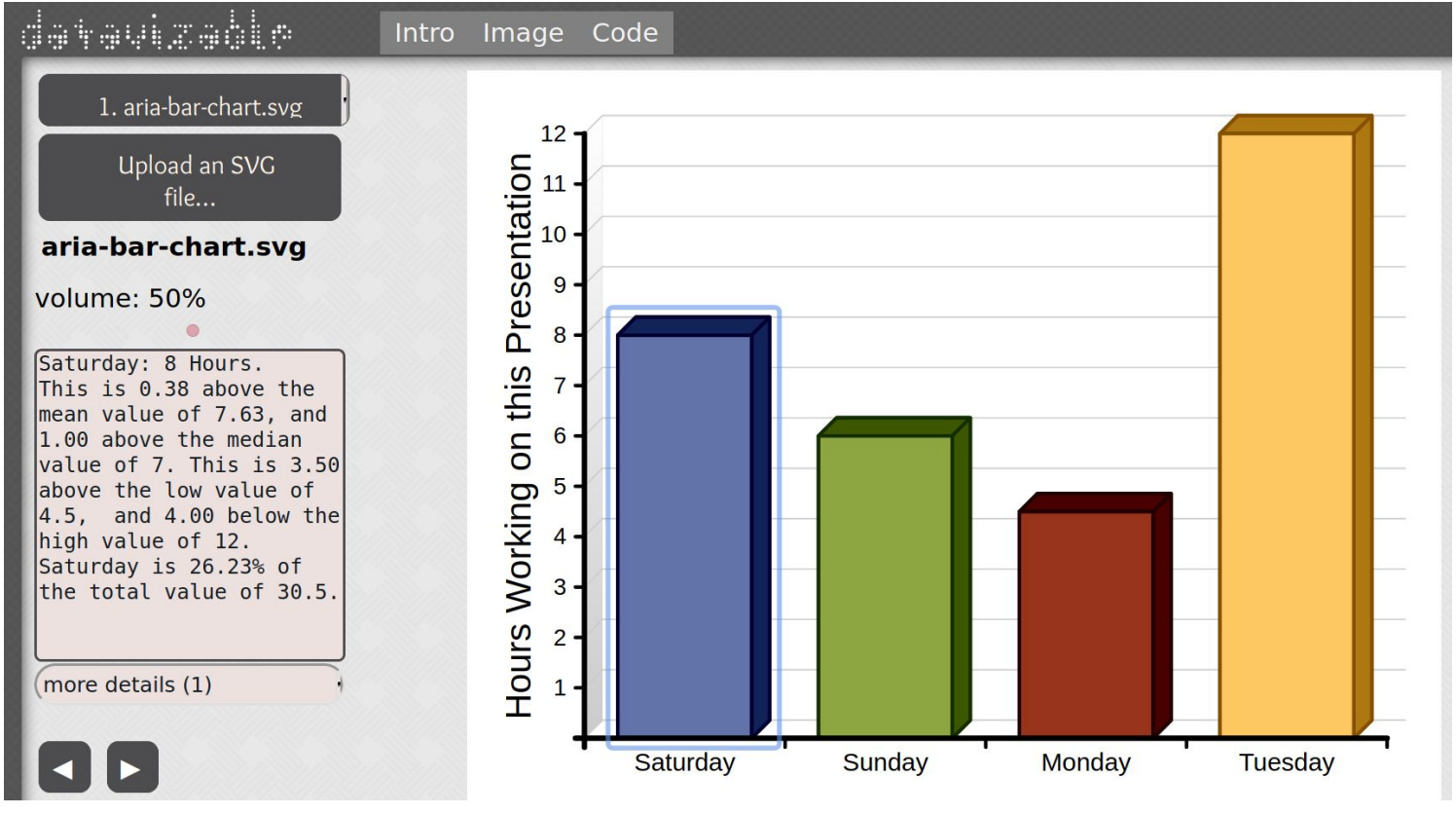


Accessible Charts - Example Chart Markup Snippet

```
<g id="ChartRoot" font-family="Arial" role="chart" aria-charttype="bar"
tabindex="0">
  <title role="heading">Finished tasks per day</title>
  <g>
    <rect role="chartarea" x="65" y="35" width="445" height="335"></rect>
  </g>
  <g id="xScale" role="xaxis" aria-axistype="category" tabindex="0">
  <title role="heading">Days</title>
  <text role="axislabel" id="x-Friday" x="121" y="388">Friday</text>

...

  <g id="dataarea" role="dataset">
  <g id="datapoint_0" role="datapoint" tabindex="0" fill="rgb(97, 115, 169)">
  <title role="datavalue" aria-labelledby="x-Friday">8 Tasks</title>
  <path d="M83,147 H158 V370 H83 V147"></path>

...
```

Inspiration: Describler

Inspiration for AChart Reader: Describler (describler.com)



AChart Reader

"Accessible Chart Reader"

AChart Reader Functionality

Original Version

AChart Reader

- AChart Reader takes SVG charts with correct ARIA markup.
- Creates a textual summary of the chart.
- Audibly reads out the summary of the chart. (Acts as screen reader.)
- Enables navigation through the chart and text elements via key presses.
- Also generates additional statistics and information about the chart.
- Text data points can be sorted et cetera.

AChart Reader

- Some of this may be obvious when looking at the chart.
- Visually impaired users can explore the chart using the screen reader and additional information.
- Only possible with properly marked-up charts.
  (Helper tool: AChart Creator)
- People marking up their SVGs can test if the markup is correct with AChart Reader.
  (Minimal tool: AChart Summariser)

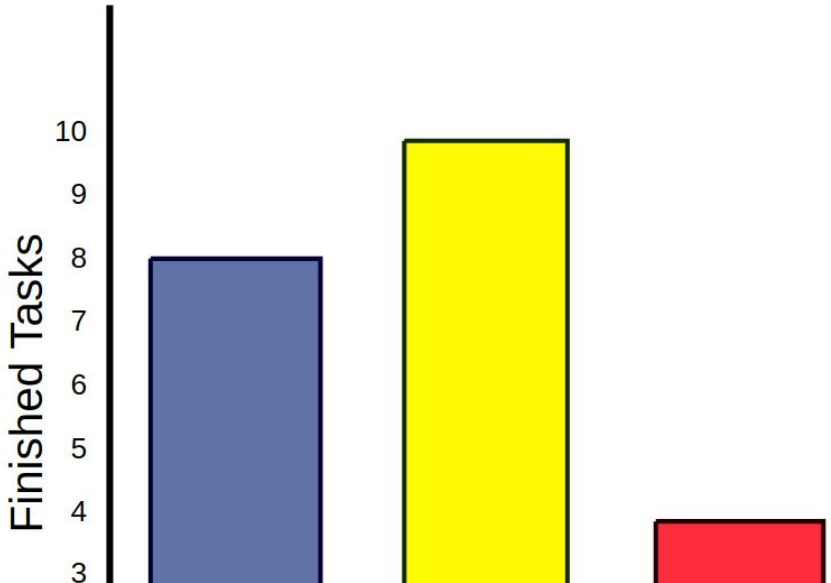
AChart Reader - Original

AChart Reader Demo

This page is intended to test AChart Reader, the screen reader for charts in SVG format. Choose an SVG chart to explore, then click on the graphic to start the application!

Choose a sample SVG chart: manual-bar-chart-tasks.svg or upload an SVG file from your computer: Choose File No file chosen

Graphic: manual-bar-chart-tasks.svg



AChart Reader - Original

AChart Reader

Disable builtin speech (Alt+S) | Switch to Application Mode (Alt+A) | Help (F1)

▼ Graphic: "Accessible SVG Bar Chart", contains 1 chart

▼ Chart: "Finished tasks per day", contains 1 data series

Bar chart showing "Finished Tasks" in relation to "Days" from Friday to Sunday

x-axis: "Days", contains 3 labels ranging from Friday to Sunday

y-axis: "Finished Tasks", ranging from 1 to 10

▼ Data Series: contains 3 items

Sort items: in original order

- Friday: 8 Tasks
- Saturday: 10 Tasks
- Sunday: 4 Tasks

Show statistics for this data series

Close (ESC)

Changes

To the Original AChart Reader

Changes

Improvements

Fixes

Changes

- Synchronization of graphic and reader panel.
  - Clicking on a data point focuses text element in reader.
  - Clicking on a text element focuses SVG element.
- Improved highlighting of current selection.
  - Instead of large pink filling.
  - Either outline or mask/filter for SVG elements.
- Internal synthesizer voice selection.
  - Need to have built-in synthesizer voice in browser (Chrome).
  - Or installed on system (Chromium/Firefox).
  - AChart Reader selects proper English Voice.

Changes

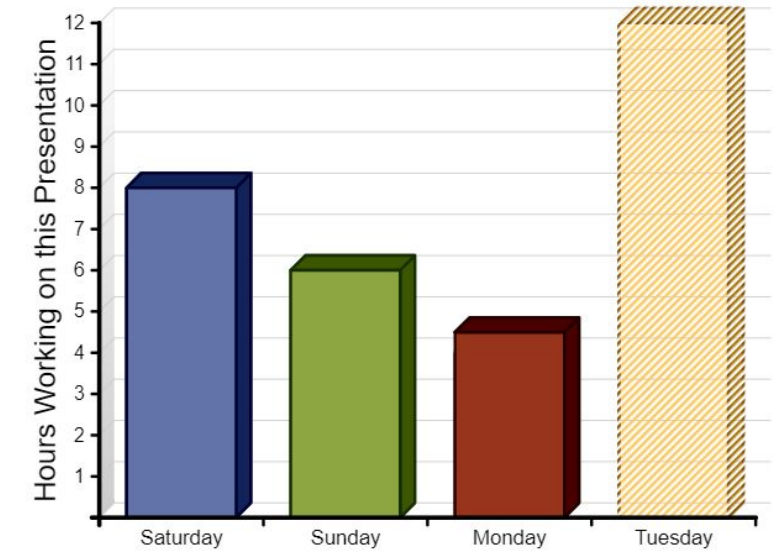
- Standalone version using electron + distributable installers.
  - Binaries with `electron-packager`.
  - Installers with `electron-installer-*`.
  - Scripts for automatic creation of these for future versions of AChart Reader.
- User interface overhaul:
  - Look and feel more like an application rather than a website.
    (Header menu, font improvements).
  - Responsiveness (CSS grid(s) / Hamburger menu).
- Many smaller improvements and fixes:
  - Automatic sample files.
  - Generalized sample files and file upload.

Changes - New UI

ACR | About | aria-bar-chart.svg | File upload | Disable builtin speech (Alt+S) | Switch to Application Mode (Alt+A) | Help (F1)

Graphic: aria-bar-chart.svg

Remove SVG



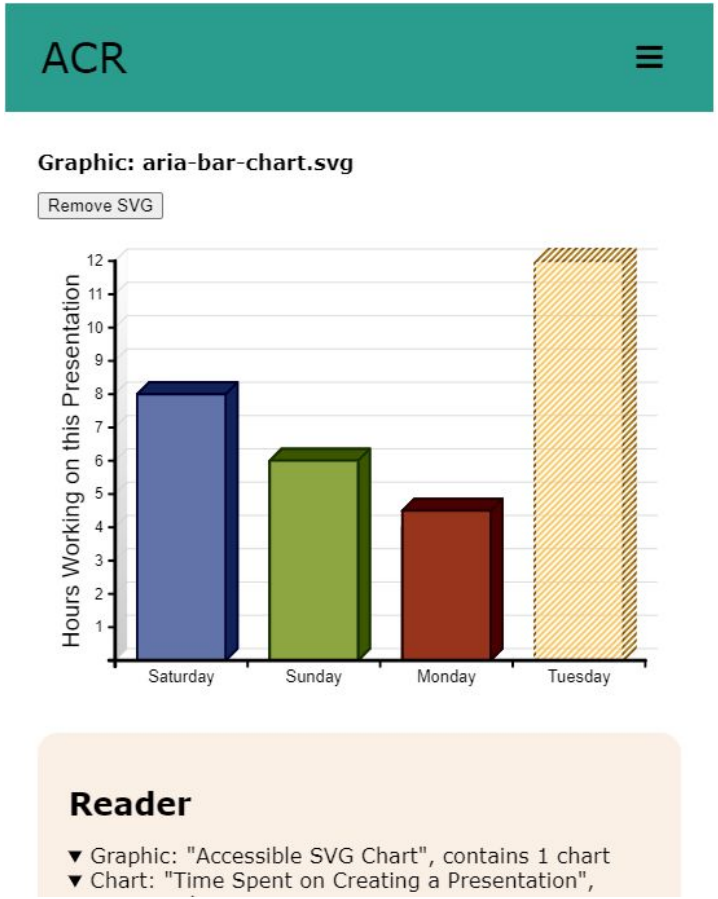
Reader

▼ Graphic: "Accessible SVG Chart", contains 1 chart
▼ Chart: "Time Spent on Creating a Presentation", contains 1 data series
Bar chart showing "Hours Working on this Presentation" in relation to "Weekdays" from Saturday to Tuesday
x-axis: "Weekdays", contains 4 labels ranging from Saturday to Tuesday
y-axis: "Hours Working on this Presentation", ranging from 0 to 12
▼ Data Series: contains 4 items
Sort items: in original order

1. Saturday: 8 Hours
2. Sunday: 6 Hours
3. Monday: 4.5 Hours
4. Tuesday: 12 Hours

Show statistics for this data series
Close (ESC)

Changes - New UI (Narrow Width)



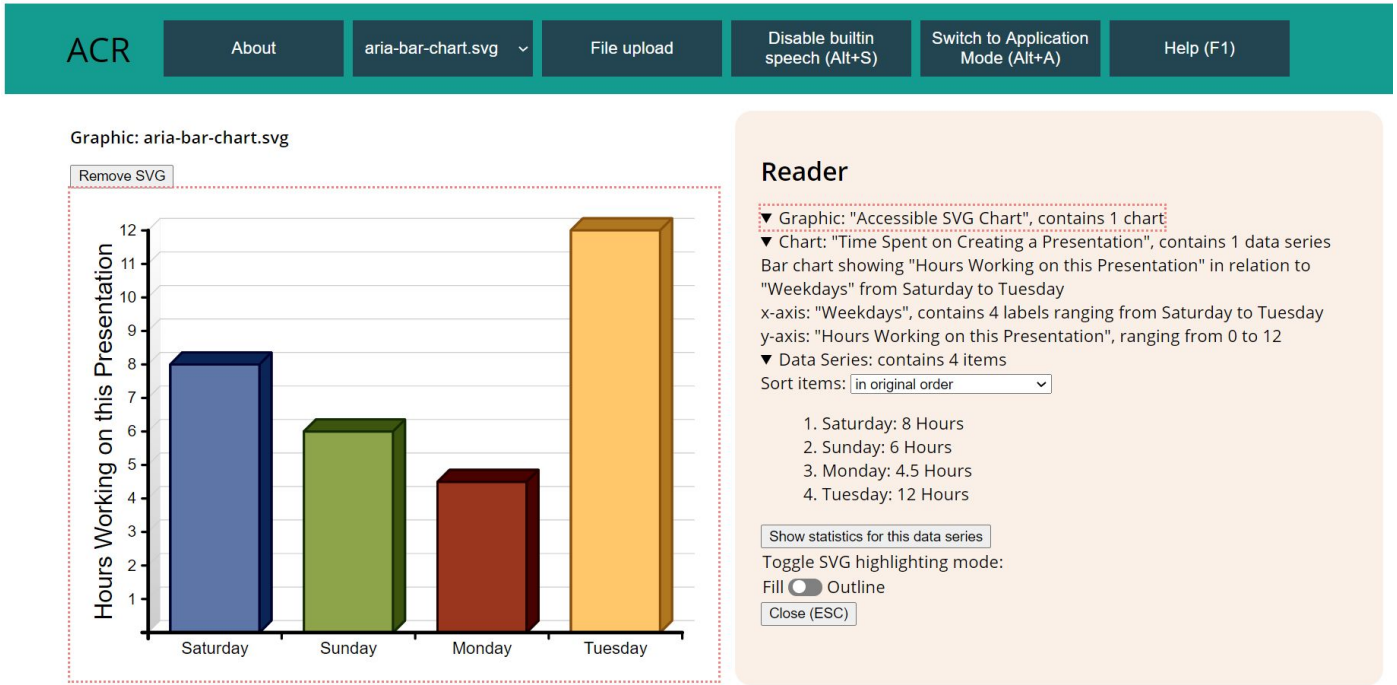
Demo

Live Demo

Showcase Video Link

Demo

- Live demo now.
- Showcase video: https://youtu.be/7unJ2aU9ghc



Thank you for your attention.