Interactive GTS Map

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Contents

1   Overview

This *Interactive GTS Application* is the result of a 10 week Research Experience Undergraduate internship. The internship focused on time ontology, RDF databases, and designing applications in R. This application provides demonstrations for the functions in the DeepTimeKB R Package.

2 GTS Knowledge Page

The GTS Knowledge page provides demonstrations and documentation for several functions in the DeepTimeKB R package. The demonstration pages include parameters that the user can adjust.

2.1 User Interface & Workflow

In the GTS Knowledge Page there is a sub-menu with each function. For each function there is another sub-menu to navigate between the demonstration and documentation pages.
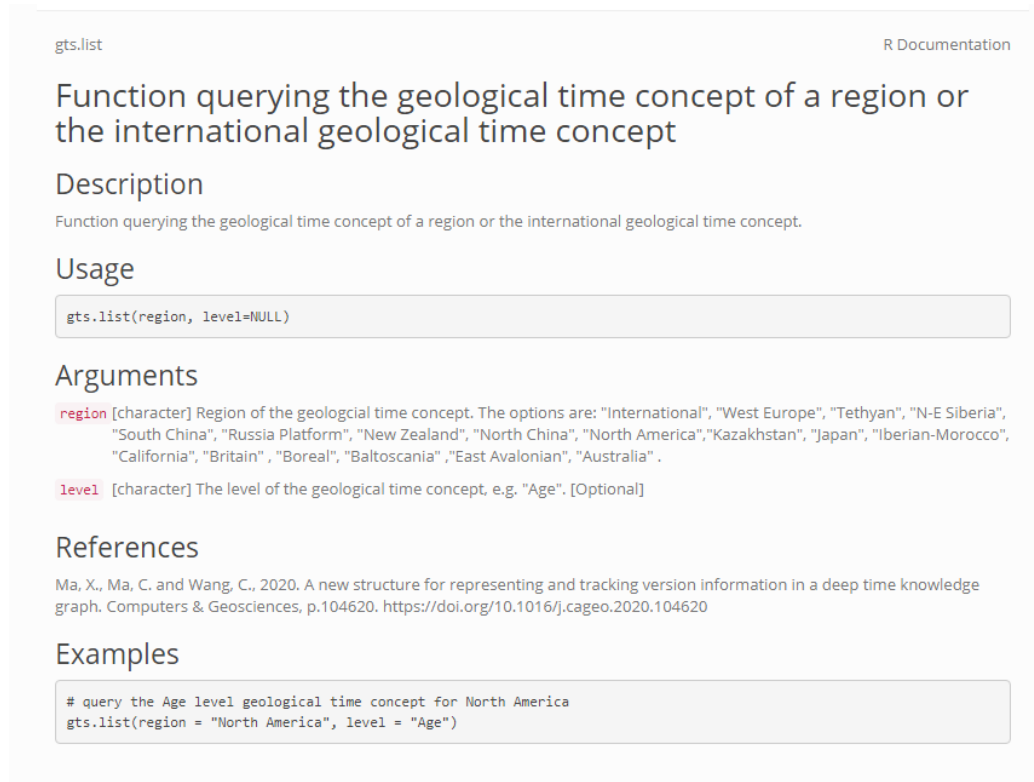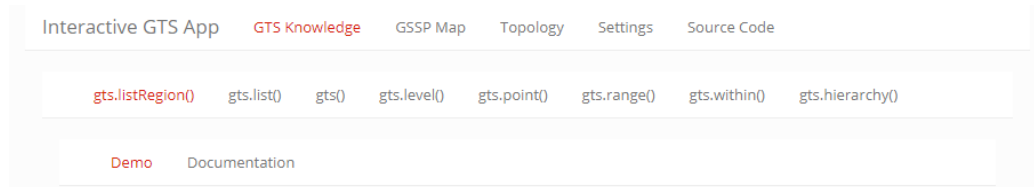
(a) The navigation menu

Each demo page has input fields that the user can fill or modify. These input fields are used as arguments when calling the function. If the demo page has a "Run" button then the output is shown after pressing the button. Otherwise, the output from that function call is automatically shown on the page after making changes to the input.
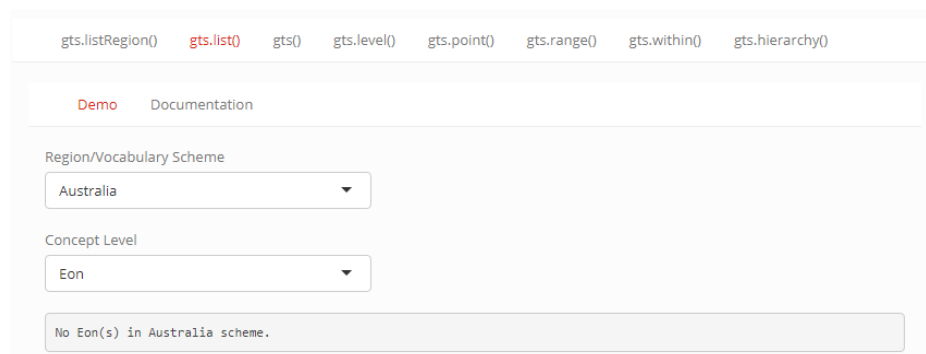
(b) An example demo page

The documentation page is the R help page. This can be shown outside of the app by typing '?' followed by the function name in the R console

(?gts.list() or ?gts.list, for example).

(c) An example documentation page

2.2 Server

After being triggered, either by the user pressing the "Run" button or modifying the input, the page will refresh. The function is called with the provided arguments from the user. Several functions have optional arguments. These are only provided if the user provided the arguments. The function output is captured. Typically this output is a dataframe. If it is a dataframe it is padded and formatted so that it is easier to read and then displayed on the page.

The help pages are read as HTML using built-in R functions. This HTML is rendered onto the documentation page. This HTML includes formatting such as highlighting, bolding, italicizing, lists, and more.

3   GSSP Map Page

Users can plot maps with markers for each GSSP in a selected international scheme.

3.1   User Interface & Workflow

There is a single input field: a drop-down menu where the user selects an international scheme. It defaults to the most recent scheme. When the user makes a different selection the scheme is passed as an argument to gssp.map() and the output of the function is plotted below.
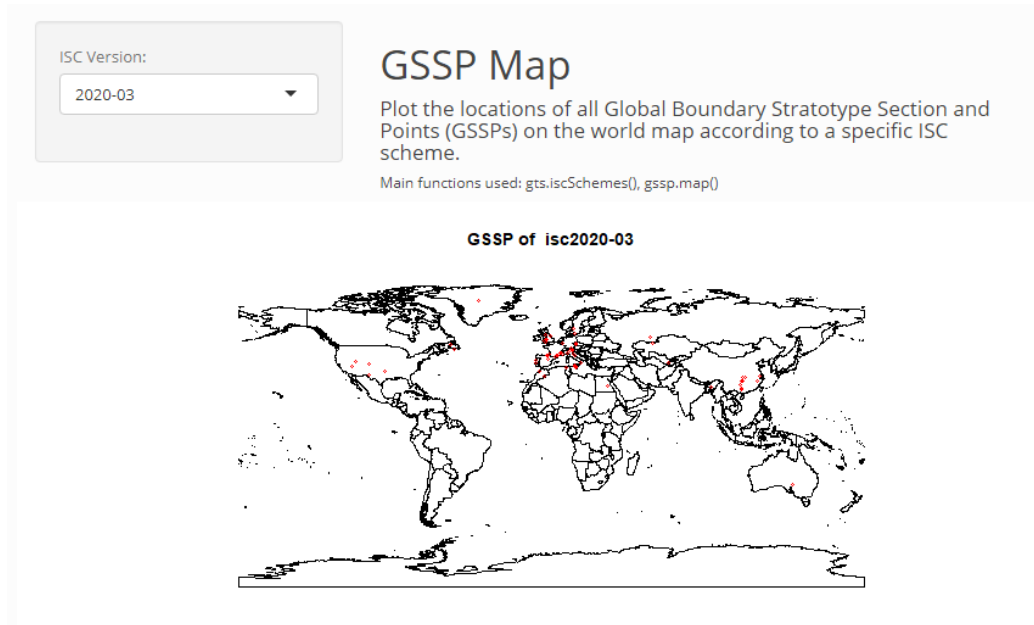
(d) UI for the gssp.map() page

3.2   Server

First, a list of international schemes is gathered from the gts.iscSchemes() function. This list is used as the choices for the drop-down menu. Once the user makes a selection, their selection is passed as an argument into gssp.map() and the output is plotted onto the page.

4   Topology Page

Users select two geological time concepts and compare them topologically in this page of the application.

4.1   User Interface & Workflow

There are two geological time concepts that the user selects. Each of these concepts is selected from a scheme.

When the user selects a scheme the options for the geological concepts are refreshed to only show concepts in the selected scheme. If the scheme selected is "International" another dropdown menu appears with the ISC versions as the choices. Then the user selects a geological concept. This must be done for both entries.

After the user has selected both geological time concepts they press the "Run" button to run the function and display the output. The output shows the concepts topological relationship, as well as their lower and upper bounds.

(e) UI for the gts.topo() page

4.2   Server

A list of all regions is used to make the dropdown menus to select the region. This list can be made with the output from gts.listRegion().

If the region is "International" then an additional dropdown menu appears and the user can select ISC versions with it. These dropdown menus are made with the output from gts.iscVersions().

User then selects a geological time concept from the corresponding region. This list is made with using the region as an argument for gts.list().

Once the user presses the "Run" button then gts.topo() is run with the regions/schemes, ISC versions if applicable, and geological time concepts as arguments. Another function, gts.range(), is used to provide the lower and

upper bounds of the concepts to provide more information to the user.

5 Tools Used

5.1 Databases & Web Services

- [Deep Time Knowledge Base](#)

5.2 R Packages

- [Shiny](#)

6 Source Code & Contact

The source code is available [here](#). If you have any questions you can reach me at christophermcv@outlook.com.