HeatHack Test Book!!!!

Contents

This is a test of Github Pages rendering, before we commit to Jupyter Book. It's mostly the default Jupyter Book with a few simple format tests added to the beginning.

This is public, but of no use to anyone but the developers yet (sorry).

See the Jupyter Book documentation for documentation.

Admonitions formatting

Note

Notes have a nice format with a relevant icon and a specific colour.

Warning

See, this one is a bit different because it's a warning. We want a bunch of possibilities like this that aren't types they have natively: Key Concept (which is a some science), Fun Fact!, and Further Readings.

Admonitions are the general case where you can say gets in the "header", but how do you set the icon and colour - where does the "class" go and what are the ones that are already defined?

Key Concepts

Here's some text about some science.

Further Readings

How do we make this one different?

Fun Fact!

And this one - can it be fun?

Test of panels

We want to know what panels look like on GitHub Pages. Here's one.

Radiation in the sun	What usually happens in churches
:TODO: Put some simple graphic in here, like a PNG. Eventually it will show the sun with some waves with arrows on pointing to a wall. Do we have to be careful about the original file size - does it scale it to fit nicely? What does it do on a mobile?	:TODO: Put some simple graphic in here, like a PNG. Eventuall it will show a person in a box shape with some stained glass window shapes shown on it, with waves pointing from the person to all of the box.
The sun is very hot, and heat transfers from it to the surfaces around it, no matter how far away they are.	The person is warmer than the surrounding surfaces, so heat transfers from the person to the building.

At some point we want to know, how hard is it to put a javascript simulation in (for now, any simple one will do)?

Test of sidebars

This is a place to look at the side bar rendering. Maybe it can have classes like admonitions do. We might want to have some of our admonition types be side bars instead.

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Here's a sidebar!
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Markdown Files

Whether you write your book's content in Jupyter Notebooks (`.ipynb`) or in regular markdown files (`.md`), you'll write in the same flavor of markdown called **MyST Markdown**. This is a simple file to help you get started and show off some syntax.

What is MyST?

MyST stands for "Markedly Structured Text". It is a slight variation on a flavor of markdown called "CommonMark" markdown, with small syntax extensions to allow you to write **roles** and **directives** in the Sphinx ecosystem.

For more about MyST, see the MyST Markdown Overview.

Sample Roles and Directivs

Roles and directives are two of the most powerful tools in Jupyter Book. They are kind of like functions, but written in a markup language. They both serve a similar purpose, but **roles are written in one line**, whereas **directives span many lines**. They both accept different kinds of inputs, and what they do with those inputs depends on the specific role or directive that is being called.

Here is a “note” directive:

> **Note**
>
> Here is a note

It will be rendered in a special box when you build your book.

Here is an inline directive to refer to a document: Notebooks with MyST Markdown.

Citations

You can also cite references that are stored in a `bibtex` file. For example, the following syntax: `{cite}`holdgraf_evidence_2014`` will render like this: [HdHPK14].

Moreover, you can insert a bibliography into your page with this syntax: The `{bibliography}` directive must be used for all the `{cite}` roles to render properly. For example, if the references for your book are stored in `references.bib`, then the bibliography is inserted with:

[HdHPK14] Christopher Ramsay Holdgraf, Wendy de Heer, Brian N. Pasley, and Robert T. Knight. Evidence for Predictive Coding in Human Auditory Cortex. In *International Conference on Cognitive Neuroscience*. Brisbane, Australia, Australia, 2014. Frontiers in Neuroscience.

Learn more

This is just a simple starter to get you started. You can learn a lot more at jupyterbook.org.

Notebooks with MyST Markdown

Jupyter Book also lets you write text-based notebooks using MyST Markdown. See the Notebooks with MyST Markdown documentation for more detailed instructions. This page shows off a notebook written in MyST Markdown.

An example cell

With MyST Markdown, you can define code cells with a directive like so:

```
print(2 + 2)
```

```
4
```

When your book is built, the contents of any `{code-cell}` blocks will be executed with your default Jupyter kernel, and their outputs will be displayed in-line with the rest of your content.

> **See also**
>
> Jupyter Book uses Jupytext to convert text-based files to notebooks, and can support many other text-based notebook files.

Create a notebook with MyST Markdown

MyST Markdown notebooks are defined by two things:

1. YAML metadata that is needed to understand if / how it should convert text files to notebooks (including information about the kernel needed). See the YAML at the top of this page for example.
2. The presence of `{code-cell}` directives, which will be executed with your book.

That's all that is needed to get started!

Quickly add YAML metadata for MyST Notebooks

If you have a markdown file and you'd like to quickly add YAML metadata to it, so that Jupyter Book will treat it as a MyST Markdown Notebook, run the following command:

```
jupyter-book myst init path/to/markdownfile.md
```

Demonstration that we can produce the graphs we want easily in the Jupyter Book

This is a test file for some of the kinds of plots we will want in HeatHack-Sessions, so we can see what builds look like and how much we can automate. Although this uses csv files uploaded to Github manually, it may be possible to automate temp/RH feed download and the production of books specific to the venues we serve.

Basic plot showing a thingspeak temperature feed marked up for 16C, the child care commission minimum (not relevant for this particular data, just a test). This plot is also useful for assessing temperature control, especially on a short test for overshoot that tries holding a building at a temperature - cheapest in autumn. We'll want similar plots showing suggested RH bounds for the comfort of people and for organs/oil paintings and so on.

Note pan, zoom, etc - not beautiful, but even this basic level of plot would work. I wonder whether they'll be worried by the rogue readings. We could probably remove based on improbably fast temperature changes.

On our current thingspeak feeds, temperature is field1 and RH is field2 - we may be able to assign better names in future. I think I had to change the time format so that's either some scripting or a configuration change on the platform.

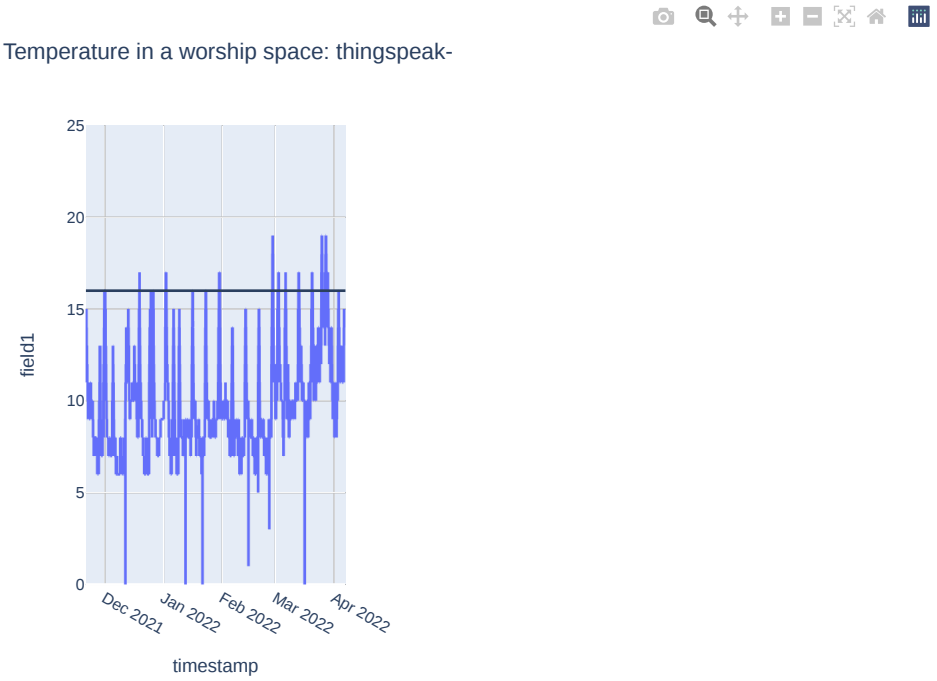
Plotly express is syntactic sugar over graph_objects; drop down into the graph_objects themselves allows more possibilities.

Information about non-plotly approaches: https://jupyterbook.org/interactive/interactive.html One consideration is whether they're going to need internet access to look at graphs - they might not have that when they're together if they meet on the premises. Altair sounded like it might be useful in that situation.

:TODO: find out if we can hide the code.

The graphs look terrible in pdf as generated via html.

```
import plotly.express as px
import plotly.graph_objects as go

import pandas as pd

filename = "thingspeak-feed"
dfthingspeak = pd.read_csv(filename + ".csv")
dfthingspeak["timestamp"] = pd.to_datetime(dfthingspeak['created_at'])

fig = px.line(dfthingspeak, x='timestamp', y='field1', range_x=['2021-11-
21','2022-04-07'],range_y=[0,25], title="Temperature in a worship space: " +
filename)

fig.add_hline(y=16)

fig.show()
```



Simple demonstration of data from two data frames on the same plot - with the wrinkle that one frame is from a lascar logger. We will be roughly exploring the calibration of the RH sensors by running batches of 10 DHT22s alongside a few Lascars over an RH range and showing groups the results, so they can judge how much to trust the data.

Lascars aren't configurable for what they export. I've removed a Unicode character this couldn't deal with (degree symbol) and used Excel to change the data format. These things should be fixable in code, but we won't use Lascars enough for that to be a priority task. Any processing we need to do on Thingspeak feeds is a priority, though.

We need every line labelled. Doing that requires us to pull out each line into a separate command to add it, I think - this might be an odd way of combining express and graph_object?

```
# Using plotly.express
import plotly.express as px
import plotly.graph_objects as go

import pandas as pd
dfthingspeak = pd.read_csv("thingspeak-feed.csv")
dfthingspeak["timestamp"] = pd.to_datetime(dfthingspeak['created_at'])

dflascar = pd.read_csv("lascar-data.csv")
dflascar['timestamp'] = pd.to_datetime(dflascar['Time'])

# fig = px.line(dfthingspeak, x='timestamp', y='field2', range_x=['2021-11-
21','2022-04-07'],range_y=[35,85], title="Comparing RH as measured by different
devices")
fig = px.line(dfthingspeak, x='timestamp', range_x=['2021-11-21','2022-04-
07'],range_y=[35,85], title="Comparing RH in a worship space as measured by
different devices side by side")
fig.add_scatter(x = dfthingspeak['timestamp'], y = dfthingspeak['field2'], name =
'thingspeak')
fig.add_scatter(x = dflascar['timestamp'], y = dflascar['RH'], name = 'lascar')


fig.show()
```

Vertical lines are useful for the start and end time of events. It would be better rendered as a separate background shading when the space is occupied.

Perhaps we can set up a worksheet where they put in their usual weekly schedule with a descriptive short string to render these. We could use diary export, but if their diary doesn't have a busy/free option, there's too much risk of personal data being in there, and there could be too many diary systems to deal with.

:TODO: It would be helpful if there were a dropdown control for choosing to view a day or a week, and then which specific day or week. That sort of control could be used to choose the group and venue, as well, so we're only producing one master book for everyone.

```
# Using plotly.express
import plotly.express as px

import pandas as pd
df = pd.read_csv("thingspeak-feed.csv")
df["timestamp"] = pd.to_datetime(df['created_at'])


#animation_frame and animation_group should make it possible to add a range
slider??

fig = px.line(df, x='timestamp', y='field1',  range_x=['2021-12-24','2021-12-
26'],range_y=[0,20], title="Midnight mass and Christmas morning services in a
worship space.")
fig.add_vline(x='2021-12-24 23:00')
fig.add_vline(x='2021-12-25 00:00')
fig.add_vline(x='2021-12-25 10:00')
fig.add_vline(x='2021-12-25 11:30')

fig.show()
```