



escaping batpigday

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batpigday

batpigday *noun* The coding equivalent of groundhogday.

the problem

Simulating data is a bitch.

Debugging frequently dominates the time of students in mathematical science. These students know how to solve equations, and next to nothing about code.

New tools are emerging daily to enable researchers to avoid these timesink pitfalls. These tools have lowered the programmatic barrier for researchers, but it still a learning curve.

We consider a case study in meta-analysis.

meta-analysis Statistical methodology for combining the results of several studies.

meta-analysis of medians

Conventional meta-analytic tools, such as `metafor::rma`, require an **effect** and a **variance** of that effect.

But what if the reported statistics are **median** and **interquartile** range?

To test our proposed estimator for the variance of the sample median, I found myself repeating tasks and checks in the algorithms.

I tried to find a better way of debugging and writing simulations. This lead to:

- a packaged analysis, `varameta::*`, which is built on
- the simulation package for meta-analysis data, `metasim::*`.

(*in development)

escaping batpigday

`\begin{center} \textbf{\textit{coding}} is the easiest part of coding \end{center}`

- Modular code, break the code into chunks.
- Reproducibility is more than `set.seed()`: accessibility, refactoring, integratability, versioning,

```
library(tidyverse)
library(metasim)
```

Generate sample sizes for k studies.

```
# simulate 2 studies where most have at most 25
sim_n(k = 2, min_n = 10, max_n = 25) %>% output_table()
```

Table 1:		
study	group	n
study_1	control	13
study_2	control	18
study_1	intervention	12
study_2	intervention	18

```
# generate simulation dataframe
sim_df() %>% head(2) %>% select(-n) %>% output_table()
```

Table 2:							
k	tau2_true	median_ratio	prop	rdist	parameters	id	true_effect
3	0	1	0.3	norm	list(mean = 67, sd = 0.3)	sim_1	67.0000000
3	0	1	0.3	exp	list(rate = 2)	sim_2	0.3465736

Each **row** of this dataframe represents a set of **simulation** parameters.

Each simulation runs a **trial** function.

```
metatrial() %>% output_table()
```

Table 3:											
conf_low	conf_high	estimate	std_err	tau2	tau2_low	tau2_high	tau2_sd	tau2_sq	tau2_sq_low	tau2_sq_high	tau2_sq_sd
58.2788	108.6071	0.0637745	0.0121893	REML	4.27991	194.878	29220.665	962.381	10610875	50.0000000	0.0000000
-	-	0.0637745	0.0121893	REML	0.12928	9992.225	89.118	43.4290	222601	0.182721	0.0000000
0.694678	58791	0.4202788									0.6026004

the maths

references

Introduction

Welcome to posterdown ! This is my attempt to provide a semi-smooth workflow for those who wish to take their RMarkdown skills to the conference world. Many creature comforts from RMarkdown are available in this package such as Markdown section notation, figure captioning, and even citations like this one [1] The rest of this example poster will show how you can insert typical conference poster features into your own document.

Study Site

Here is a map made to show the study site using ggplot2, ggspatial, and sf and you can even reference this with a hyperlink, this will take you to **Figure ??**. Lorem ipsum dolor sit amet, [2] consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua.

```
library(ggplot2)
library(ggspatial)
library(tidyverse)
library(ggthemes)
library(sf)
```

```
canada <- read_sf("data/Canada.geojson")
```

```
yukon <- canada %>%
  filter(PROV == "YT")
```

```
ggplot() +
  ggspatial::layer_spatial(canada, fill = "grey80", colour = "black") +
  ggspatial::layer_spatial(yukon, fill = "yellow", colour = "black") +
  ggspatial::annotation_north_arrow(location = "br", pad_y = 10,
  ggspatial::annotation_scale(location = "br", style = "ticks") +
  coord_sf() +
  theme_pander() +
  theme(legend.position = "none") +
  NULL
```

Objectives

1. Easy to use reproducible poster design.
2. Integration with RMarkdown.
3. Easy transition from posterdown to thesisdown or rticles

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Methods

This package uses the same workflow approach as the RMarkdown you know and love. Basically it goes from RMarkdown > Knitr > Markdown > Pandoc > Latex > PDF.

Results

Usually you want to have a nice table displaying some important results that

you have calculated. In posterdown this is as easy as using the kable table formatting you are probably use to as per typical RMarkdown formatting. I suggesting checking out the kableExtra package and its in depth documentation on customizing these tables found [here](#).

```
library(kableExtra)
library(ggplot2)
```

```
data("iris")
```

```
kable(iris[1:4,], align = "c", caption = "Tables are a breeze with Kable and Kable extra package!", booktabs = TRUE) %>%
  kable_styling(latex_options = c("striped", "HOLD_position"), full_width = TRUE, font_size = 25)
```

```
library(tidyverse)
library(patchwork)
library(ggthemes)
```

```
theme_set(theme_gray() + theme_tufte() + theme(legend.position = "none"))
```

```
base <- ggplot(iris, aes(x = Sepal.Length, y = Sepal.Width,
```

```
p_point <- base + geom_point()
p_line <- base + geom_line()
p_area <- base + geom_area()
p_box1 <- ggplot(iris) + geom_boxplot(aes(x = Species, y = Sepal.Length, fill = Species))
p_box2 <- ggplot(iris) + geom_boxplot(aes(x = Species, y = Sepal.Width, fill = Species))
```

```
{p_point + p_box1} +
  plot_layout(ncol = 1) + plot_annotation(tag_levels = "a", tag_line_north_arrow orienting(")) +
  NULL
```

```
library(ggplot2)
library(ggthemes)
```

```
ggplot(data = iris, aes(x = Sepal.Length, y = Sepal.Width, colour = Species)) +
  geom_point() +
  theme_tufte() +
  labs(x = "Sepal Length", y = "Sepeal Width") +
  NULL
```

```
# Here is some code for people
# to look at and be in awe of!!!!
```

```
library(ggplot2)
library(ggthemes)
```

```
ggplot(data=iris,
  aes(x = Sepal.Width,
    y = Sepal.Length,
    colour = Species)) +
  geom_point() +
  theme_tufte() +
  NULL
```

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Next Steps

There is still A LOT of work to do on this package which include (but are note limited to):

- Better softcoding for front end user options in YAML
- Images in the title section for logo placement which is a common attribute to posters as far as I have come to know.
- Figure out compatiability with natbib which wasn’t working during the initial set up.
- MUCH BETTER PACKAGE DOCUMENTATION. For example, there is nothing in the README...
- Include References section only if initiated by the user like in RMarkdown.

References

[1] Eun-Jung Holden et al. “Identifying structural complexity in aeromagnetic data: An image analysis approach to greenfields gold exploration”. In: *Ore Geology Reviews* 46 (Aug. 2012), pp. 47–59. ISSN: 01691368. DOI: 10.1016/j.oregeorev.2011.11.002. URL: <http://linkinghub.elsevier.com/retrieve/pii/S0169136811001454> (visited on 10/03/2018).

[2] Maarit Middleton, Tilo Schnur, and Peter Sorjonen-Ward. “GEOLOGICAL LINEAMENT INTERPRETATION USING THE OBJECT-BASED IMAGE ANALYSIS APPROACH: RESULTS OF SEMI-AUTOMATED ANALYSES VERSUS VISUAL INTERPRETATION”. In: (), p. 20.

```
colour = Species)) +
```