epiworld-forecasts

Automatic Disease Forecasting with epiworldR

Andrew Pulsipher | 10.02.2025 | https://github.com/EpiForeSITE/epiworld-forecasts

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Forecast Steps

Automate!

1. Gather data
2. Calibrate a model
3. Make a forecast
4. Create a report
5. Publish the report

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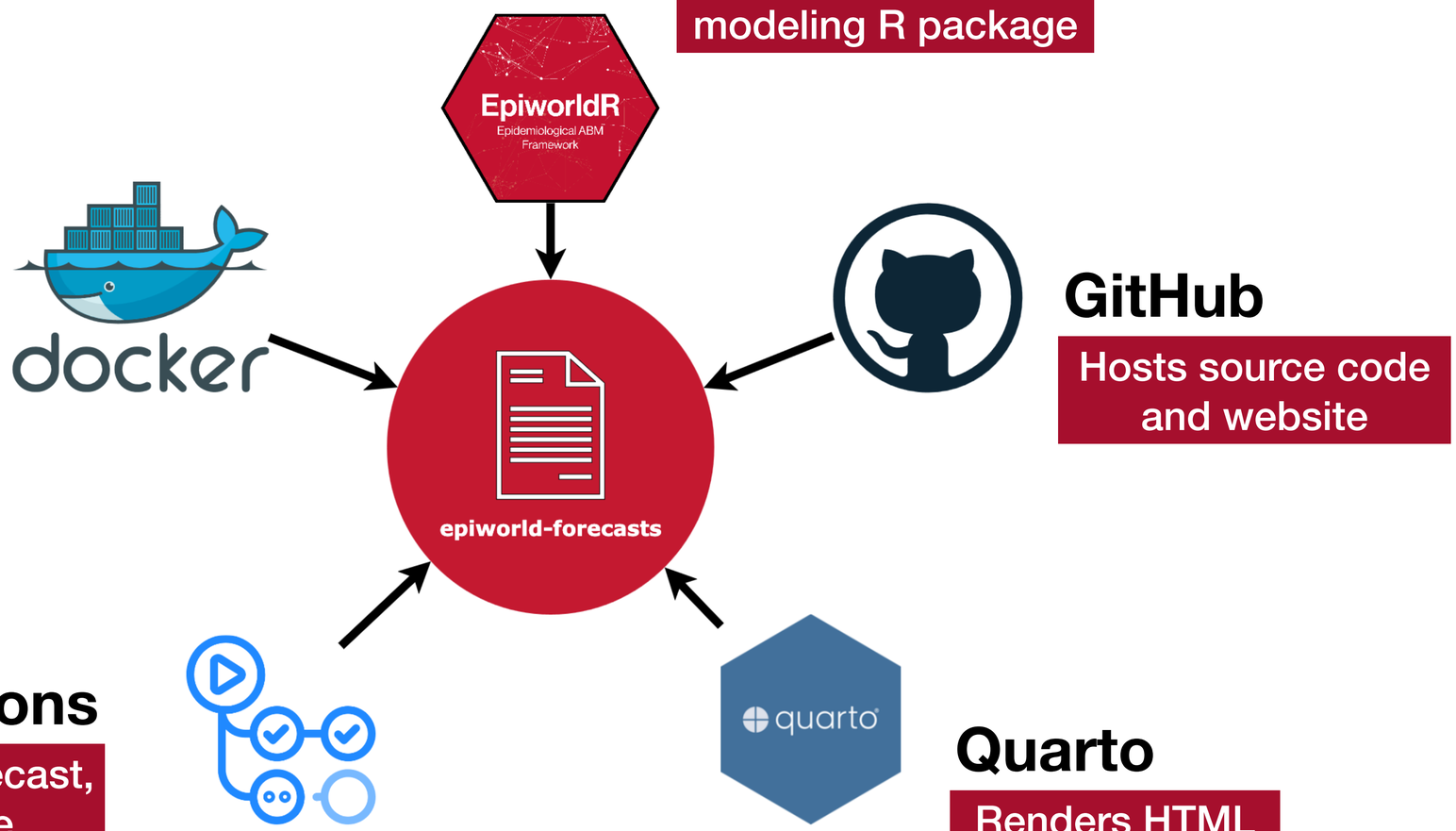
Technologies

epiworldR

Agent-based modeling R package

Docker

Contains all the packages needed to run the forecast



GitHub

Hosts source code and website

GitHub Actions

Schedules and runs forecast, builds Docker image

Quarto

Renders HTML website

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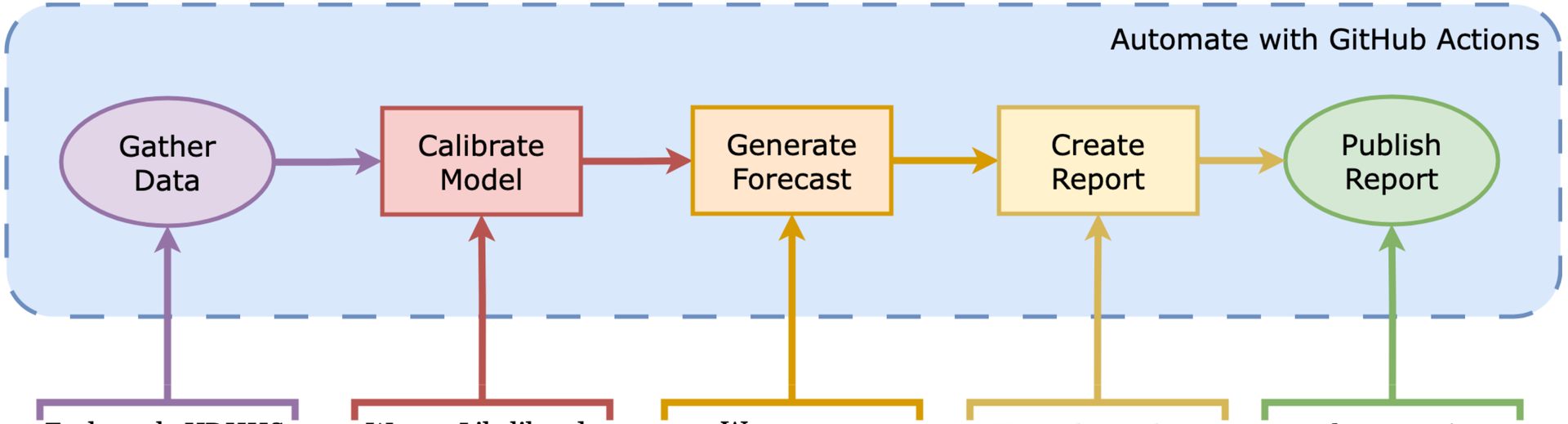
Example Forecast

COVID-19 Cases in Utah for the Next 14-Days



Each week, UDHHS publishes the latest COVID-19 cases counts for Utah. We grab this data from the URL and process it.

We use Likelihood-Free Markov chain Monte Carlo (LFMCMC) to calibrate an SIR Connected model. Both LFMCMC and the SIR Connected model are features of the epiworldR package.

We run our calibrated model for 14-days and n = 200 iterations. The 200 model runs comprise a forecast distribution, which gives us a mean forecast and confidence intervals for our forecast.

Using the ggplot2 package and Quarto, we create figures and generate an HTML report which gives the forecast and describes our methodology.

The report is published to a public website hosted on GitHub Pages (scan QR code below to go to site).

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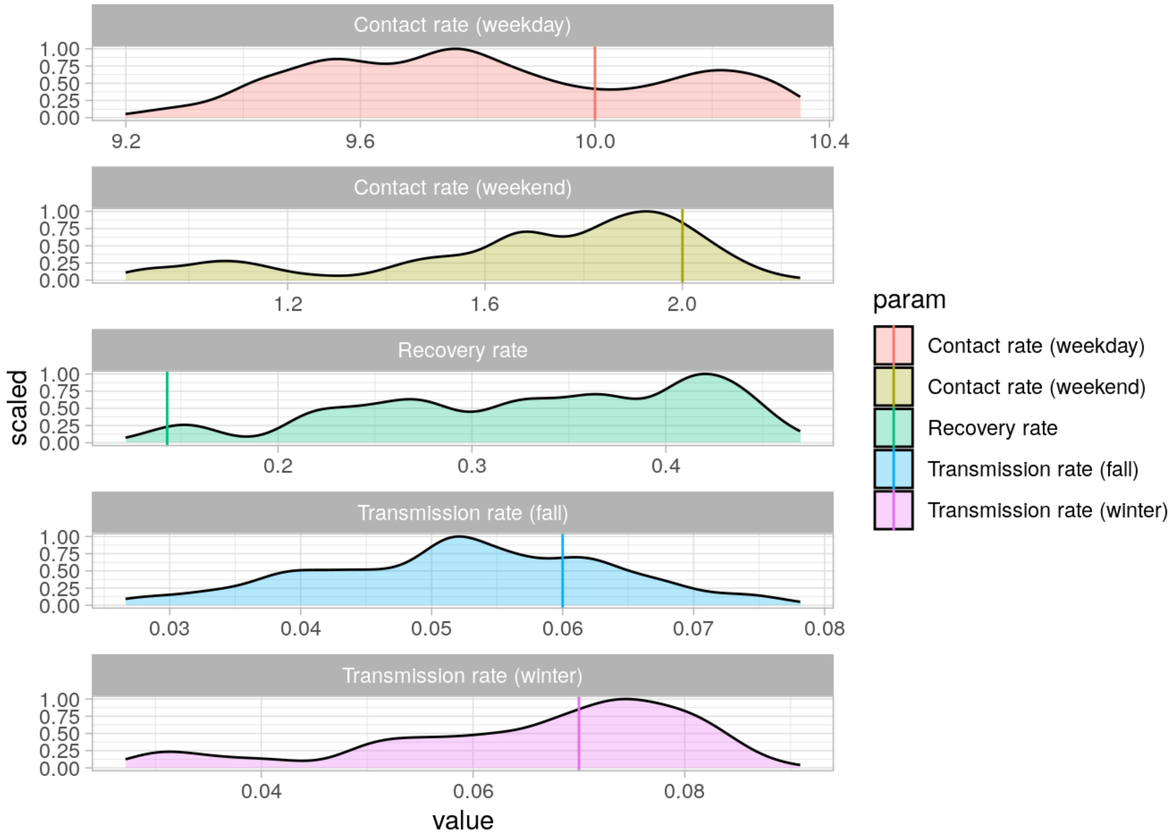
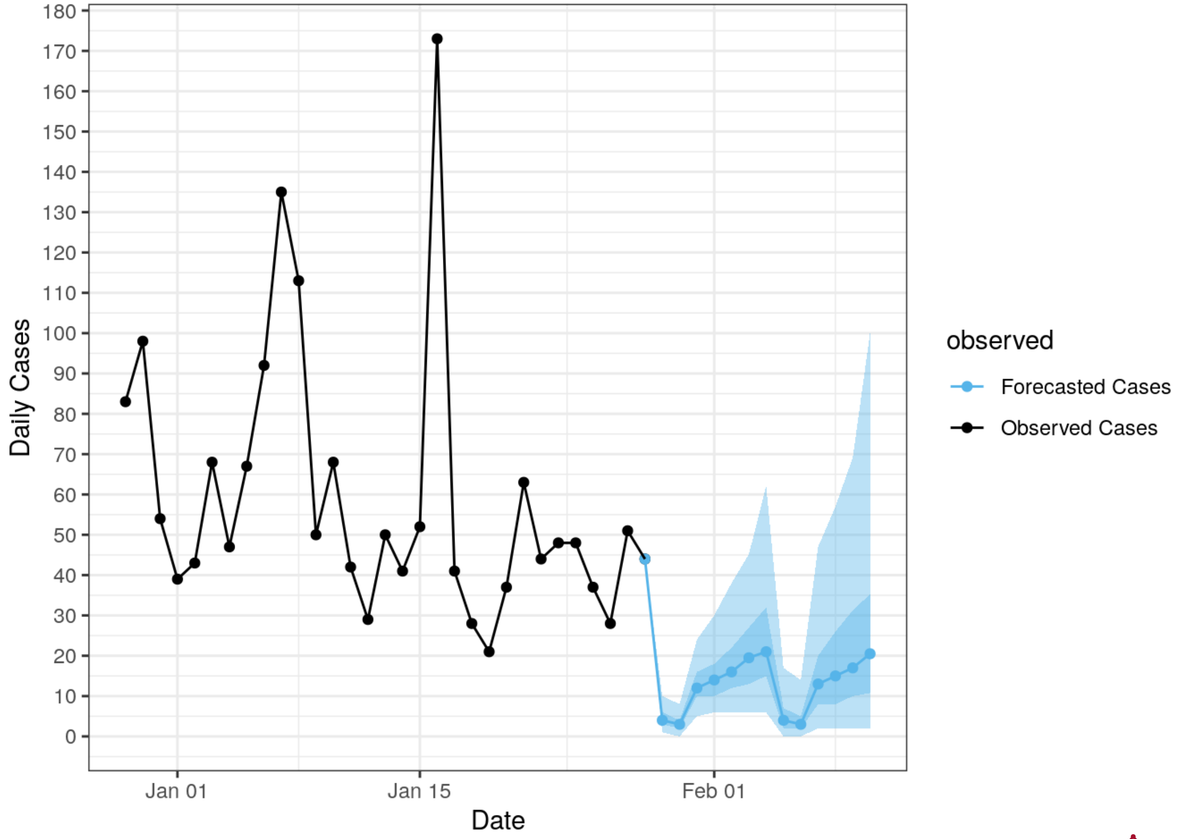
Example Figures

Model Params Post. Distribution



Final Forecast



Adapting `epiworld-forecasts` to Your Needs

A Story in Four Files

Forecast

`forecast.R`

- Libraries
- Gather Data
- Process Data
- Model Definition
- Model Calibration
- Run Model Calibration
- Run Forecast
- Forecast Visualizations

`index.qmd`

- Report text
- Calls code from “forecast.R”
- Renders as HTML webpage

Automation

`run-forecast.yml`

- Defines GitHub Action workflow (schedule, publishing destination, etc.)

`Dockerfile`

- Defines Docker image for running the forecast

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Get In Touch

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- GitHub Repo: https://github.com/EpiForeSITE/epiworld-forecasts

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