ADS 506 — Week 5 Shiny Wine Varietals

Katie Kimberling

2025-11-22

Tab 1 - Visualize Data

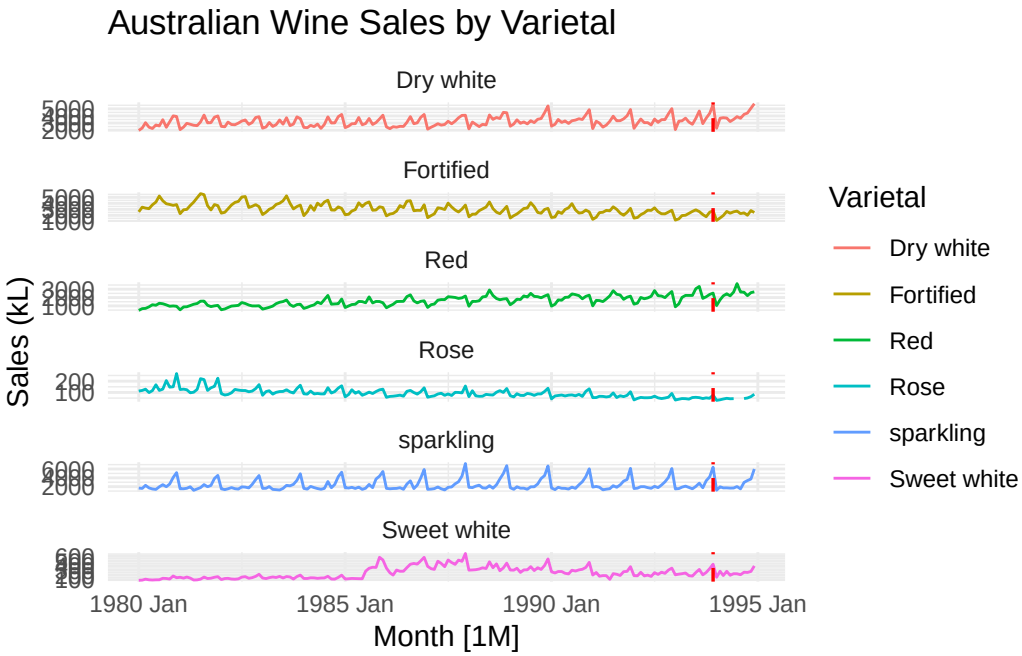
Data imort / preparation

Inputs

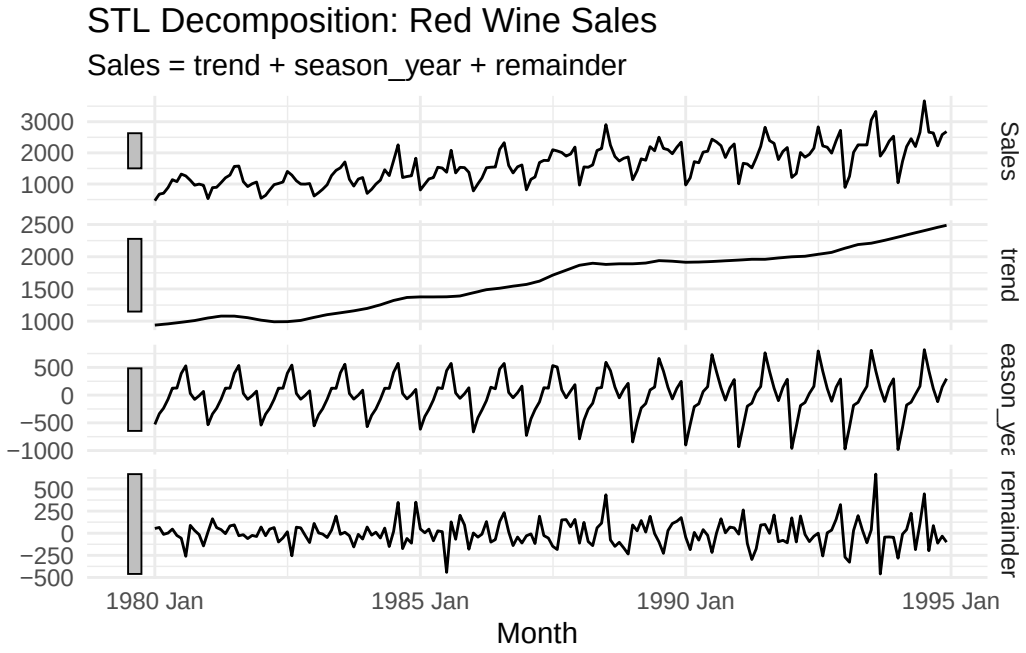
- Multiselect for Wine Varietal
- Date range
- First date is train date cutoff - default to 1 year prio to the max date
- Second date is the end of the forecast horizon – default ot last date

Data visualization

Give the user the ability to select one or more purposes to visualize in our app



Optional: Seasonality / Decomposition view



Tab 2 - Model Building

Inputs: * Toggle for model specification (default off) * Toggle the training accuracy (default off) * Forecast horizon input (default 12 months)

Model fitting

Build multiple models for each Varietal using TSLM, ETS and ARIMA. This is a second area or tab for our app

```
# A mable: 6 x 4
# Key:     Varietal [6]
  Varietal       tslm          ets                                arima
  <chr>       <model>      <model>                              <model>
1 Dry white    <TSLM> <ETS(M,N,M)> <ARIMA(0,0,0)(0,1,1)[12] w/ drift>
2 Fortified    <TSLM> <ETS(M,A,M)> <ARIMA(0,0,0)(2,1,1)[12] w/ drift>
3 Red          <TSLM> <ETS(M,A,M)> <ARIMA(1,0,1)(0,1,1)[12] w/ drift>
4 Rose         <TSLM> <ETS(M,A,M)> <ARIMA(3,0,0)(2,1,0)[12] w/ drift>
5 Sweet white  <TSLM> <ETS(M,A,M)>          <ARIMA(2,0,0)(0,1,1)[12]>
6 sparkling    <TSLM> <ETS(M,N,M)> <ARIMA(0,0,1)(0,1,2)[12] w/ drift>
```

Training Accuracy by Model and Varietal

Varietal	.model	RMSE	MAE	MAPE
Fortified	arima	283.03	209.55	6.84
Dry white	arima	326.12	230.17	7.33
Red	arima	194.55	139.48	8.95
sparkling	arima	355.07	247.00	11.06
Sweet white	arima	50.59	35.58	13.85
Rose	arima	19.39	13.07	13.98
Fortified	ets	285.23	222.32	7.10
Dry white	ets	318.36	243.41	7.64
Red	ets	177.65	132.50	8.33
sparkling	ets	349.91	254.85	11.01
Rose	ets	17.13	12.04	12.25
Sweet white	ets	44.57	31.26	12.97
Fortified	tslm	286.21	222.37	7.21
Dry white	tslm	315.52	243.12	7.74
Red	tslm	197.68	152.57	10.94
sparkling	tslm	367.66	267.89	11.38
Rose	tslm	18.46	13.11	13.95
Sweet white	tslm	100.88	81.03	35.50

Training accuracy

Forcast accuracy

Tab 3

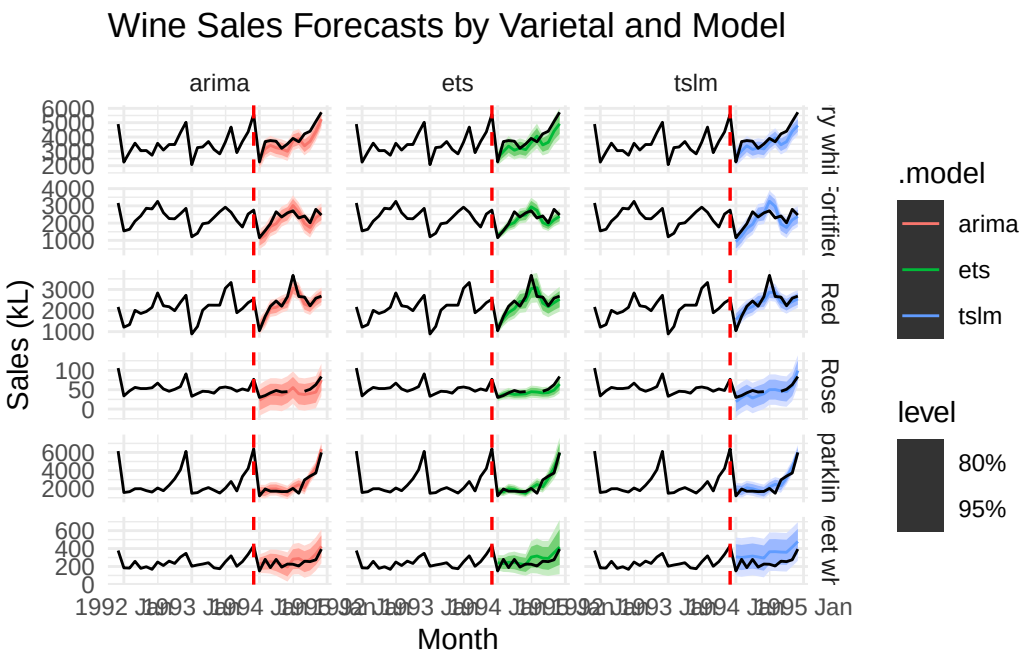
Iputs: * User can select model for forecast visualization * User can select which varietals to display

Forecasts visualization

The third tab in my Shiny app - outputting visualizations of the forecasts

Validation Accuracy by Model and Varietal

Varietal	.model	RMSE	MAE	MAPE
Red	arima	257.86	202.54	8.63
Dry white	arima	484.39	420.06	10.26
Fortified	arima	328.50	266.46	11.65
Rose	arima	9.36	8.14	16.59
sparkling	arima	461.46	363.62	18.19
Sweet white	arima	51.27	45.49	21.12
Fortified	ets	318.90	242.65	10.24
Red	ets	297.16	255.37	10.43
Dry white	ets	562.69	510.79	12.71
Rose	ets	9.17	7.20	13.01
sparkling	ets	444.48	338.62	17.58
Sweet white	ets	61.11	53.32	24.69
Red	tslm	319.28	249.00	11.79
Dry white	tslm	556.28	497.74	12.37
Fortified	tslm	426.53	362.69	16.25
Rose	tslm	9.80	8.06	17.37
sparkling	tslm	459.05	353.39	19.10
Sweet white	tslm	112.76	104.20	47.74



Model Specifications Summary

- Exract and display model specification in a readable format # Extract ETS component forms ets_specs <- fit |> filter(.model == “ets”) |> mutate(ets_spec = format(ets)) |> select(Varietal, ets_spec)

Extract ARIMA orders

arima_specs <- fit |> filter(.model == “arima”) |> mutate(arima_spec = format(arima)) |> select(Varietal, arima_spec)

Display as tables

ets_specs |> gt() |> tab_header(title = “ETS Model Specifications”)

arima_specs |> gt() |> tab_header(title = “ARIMA Model Specifications”)