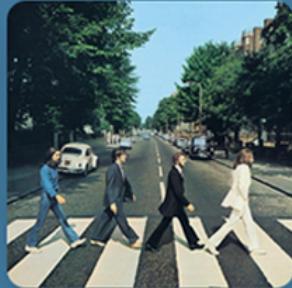




Weather Conditions and Music Preferences

Advanced Methods of Software Engineering

Kilian Wenker · 2023-06-28



Here Comes The Sun

The Beatles

PREVIEW



...



Singin' In The Rain

Gene Kelly

PREVIEW



...



Let It Snow!

Frank Sinatra, B. Swanson Quartet

PREVIEW



...



Thunder

Imagine Dragons

PREVIEW



...



Sweater Weather

The Neighbourhood

PREVIEW



...



Mr. Blue Sky

Electric Light Orchestra

PREVIEW



...



Data Sources

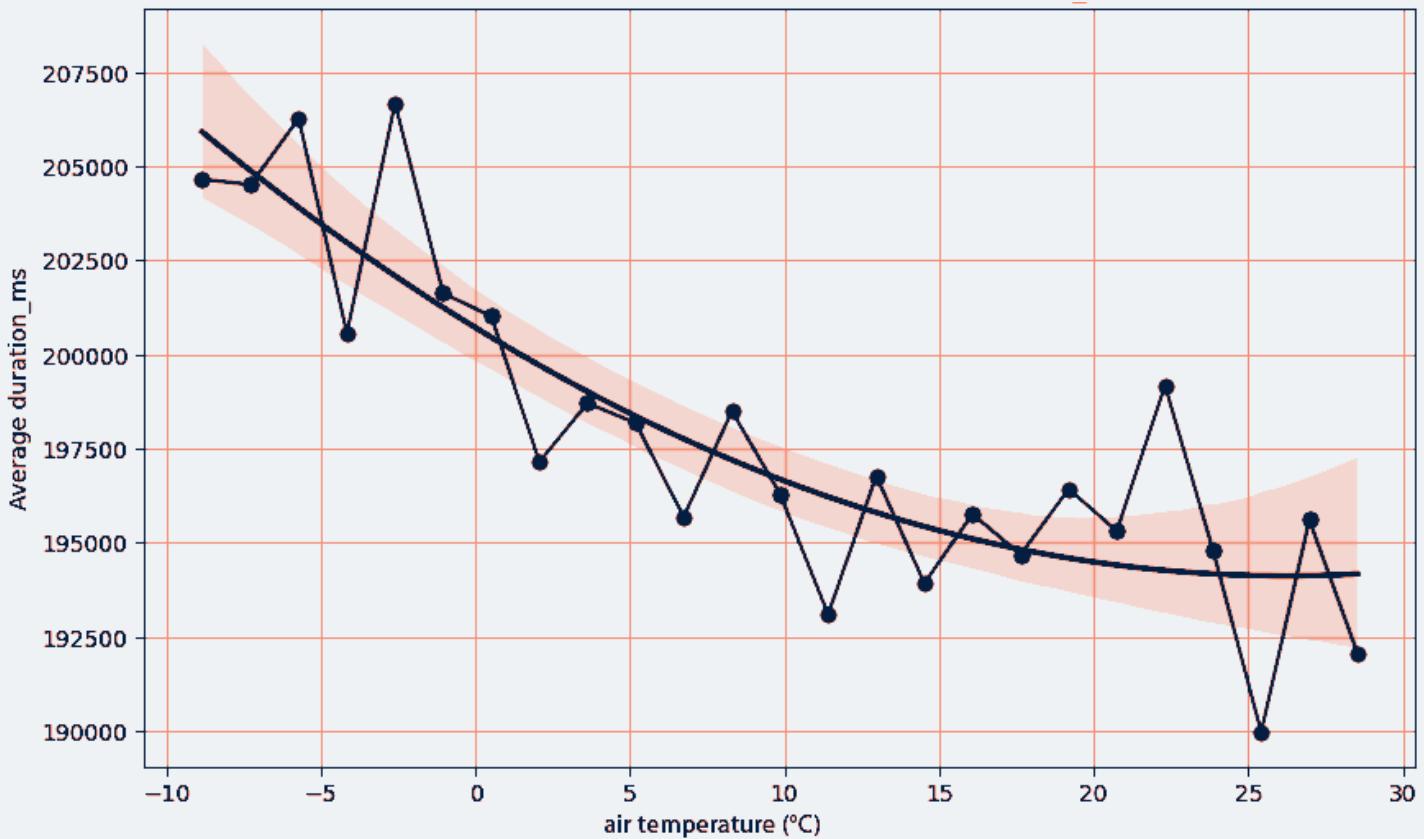
1. **Weather data**
Daily Weather Data for Germany
 - Source: Deutscher Wetterdienst (DWD)
 - Format: *CSV / KL2000*

1. **Music data**
Daily Spotify Charts for Germany
 - Source: *Kaggle*
 - Format: *CSV*

- Song's Audio Features
 - Source: *Spotify*
 - Format: *JSON*

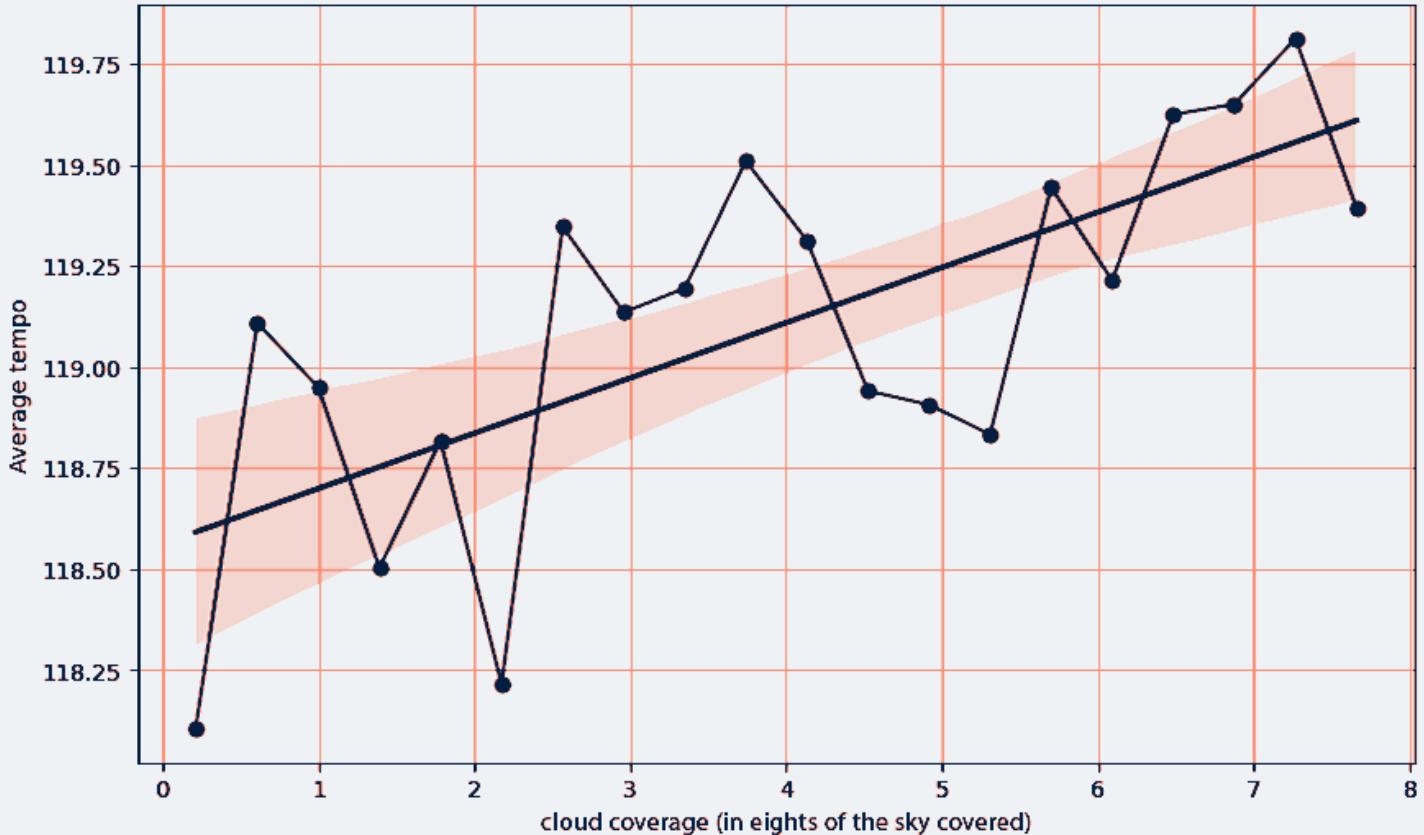
Correlations

Negative correlation between air temperature and song duration.



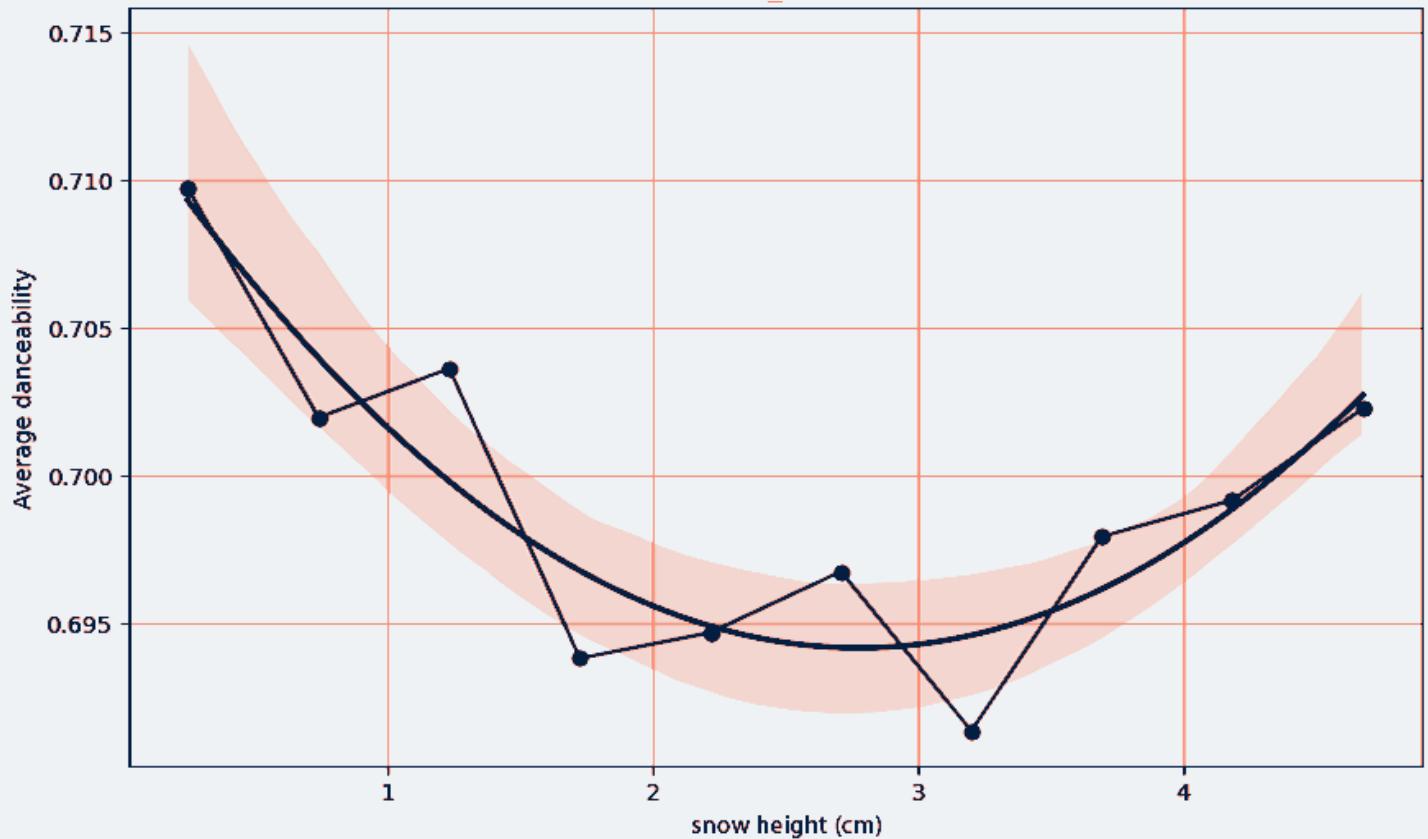
Correlations

Positive correlation between cloud coverage and the beats per minute of songs.



Correlations

Complex relationship between snow height and song's suitability for dancing.



Random Forest Regressor

The Random Forest Regressor combines predictions from multiple decision trees. This leverages the diversity of the trees to offset their individual errors.

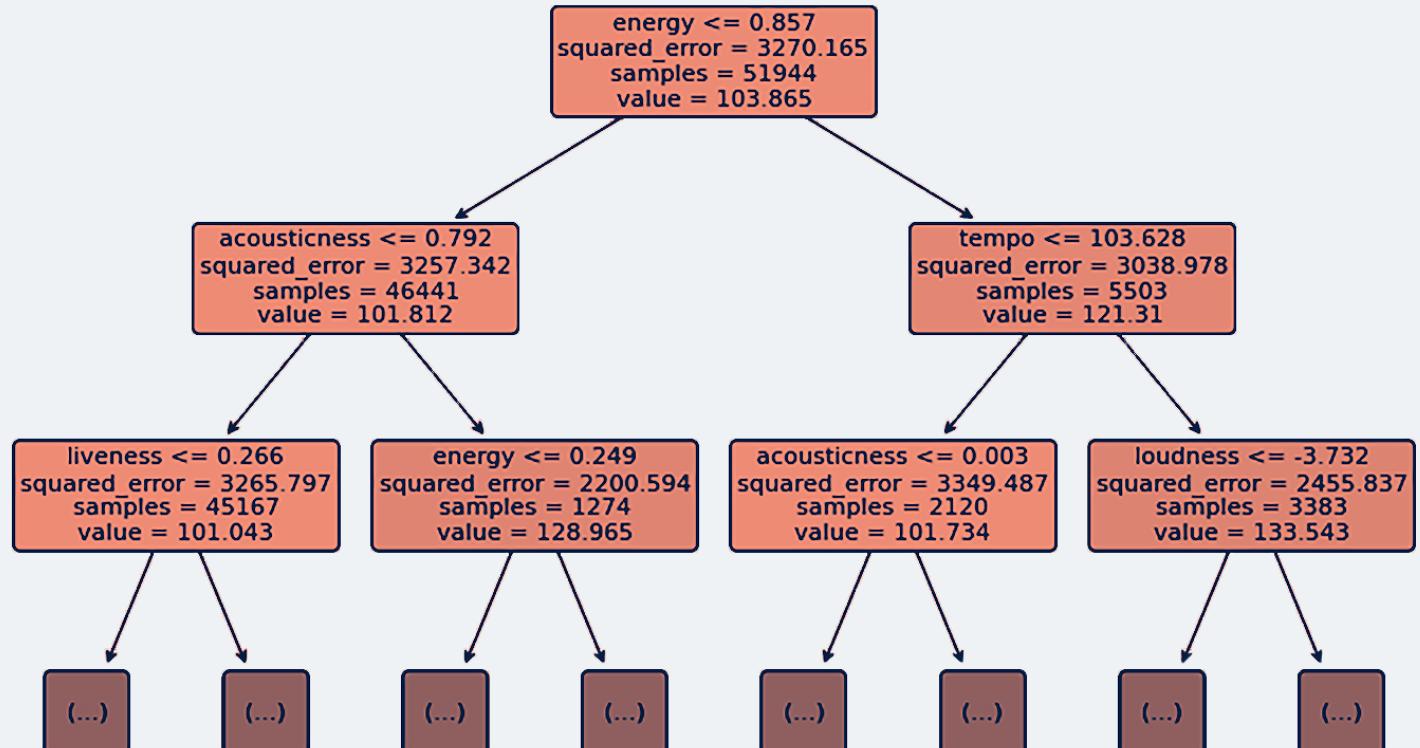
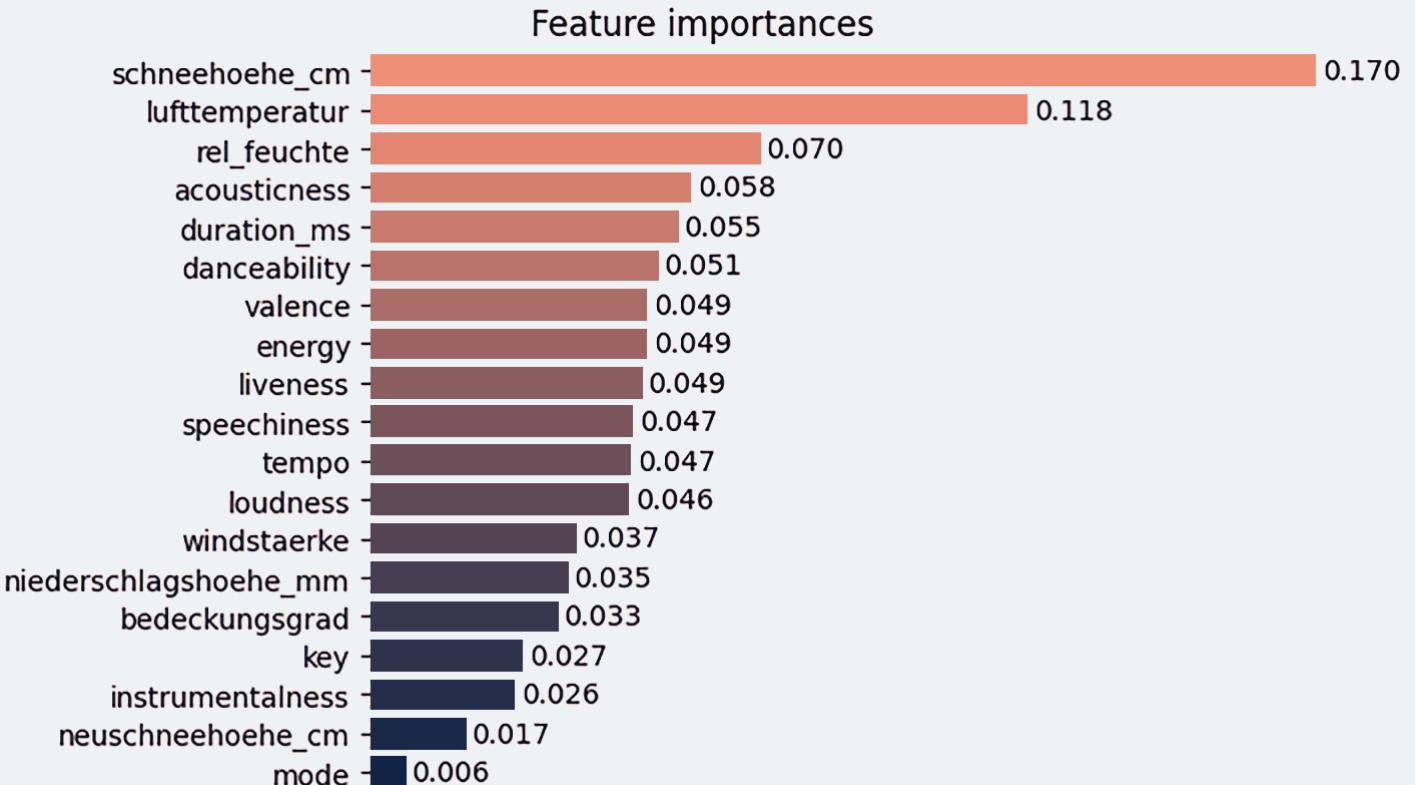


Figure: excerpt of one of the trees in the RFR

Random Forest Regressor

Ranking the features by importance reveals which ones are most informative to the model.



RFR usage Example

```
1 # generate a prediction for the top songs for today
2 today_pred = rfr.predict(today_df)
3
4 # get the highest predicted song ranking
5 best_pred_position = today_pred.argmax()
6
7 print(f"latest weather data is from {most_recent_date}")
8 print(f"The model recommends \"{playlist['items'][best_pred_position]['track']['name']}\" "
9      "by {playlist['items'][best_pred_position]['track']['artists'][0]['name']} "
10     "(predicted position {today_pred[best_pred_position]}).")
11
12 # show embed
13 track_id = playlist["items"][best_pred_position]["track"]["id"]
14 spotify_embed_url = f"https://open.spotify.com/embed/track/{track_id}"
15 display.display(display.IFrame(spotify_embed_url, width=700, height=200))
```

[latest weather data is from 2023-06-24]
The model recommends "Roller" by Apache 207 (predicted position 43.13).



Q&A

