

# Zwei-Stufen-XGBoost - Experiment-Report

Experiment-ID: v3\_h4\_thr0p3pct\_relaxed

Dieses Dokument fasst die wichtigsten Parameter, Datenquellen und Metriken eines Zwei-Stufen-XGBoost-Experiments zusammen.

Stufe 1 (Signal): neutral vs. Bewegung ('move'). Stufe 2 (Richtung): down vs. up – nur an Bewegungstagen.

## Label-Parameter:

- horizon\_days: 4
- up\_threshold: 0.003
- down\_threshold: -0.003
- strict\_monotonic: False

## Datensatz & Splits:

- dataset\_path: /Users/jeremynathan/Documents/GitHub/hs2025\_ml\_project/hs2025\_ml\_project/data/processed/datasets/eurusd\_news\_training.csv
- test\_start: 2025-01-01
- train\_frac\_within\_pretest: 0.8

**Features (FEATURE\_COLS): vollständige Liste auf der Feature-Seite weiter unten.**

# Legende & Begriffe

## Zielvariablen:

- label: 3-Klassen-Ziel auf Basis des 4-Tage-Lookaheads (neutral / up / down).
- signal: 0 = neutral, 1 = Bewegung (up oder down).
- direction: 0 = down, 1 = up; nur definiert, wenn signal == 1.

## Wichtige Metriken:

- precision: Anteil der vorhergesagten positiven Fälle, die wirklich positiv sind.
- recall: Anteil der tatsächlichen positiven Fälle, die erkannt wurden.
- f1: harmonischer Mittelwert aus precision und recall (Balance beider Größen).
- support: Anzahl der Beobachtungen in der jeweiligen Klasse.

## Feature-Abkürzungen (Auswahl):

- article\_count: Anzahl News-Artikel pro Tag.
- avg\_polarity / avg\_neg / avg\_neu / avg\_pos: durchschnittliche Sentiment-Werte.
- pos\_share / neg\_share: Anteil positiver bzw. negativer Sentiment-Komponente.
- intraday\_range\_pct:  $(\text{High} - \text{Low}) / \text{Close}$  – relative Tages-Spanne (Volatilität).
- upper\_shadow / lower\_shadow: obere/untere Dochte der Kerzen (High/Low vs. Körper).
- month / quarter: Kalendermonat und Quartal.

# Modell-Parameter (XGBoost)

## Signal-Modell (Stufe 1):

- objective: binary:logistic
- max\_depth: 3
- learning\_rate: 0.05
- n\_estimators: None
- subsample: 0.9
- colsample\_bytree: 0.9
- scale\_pos\_weight: 0.37454545454545457

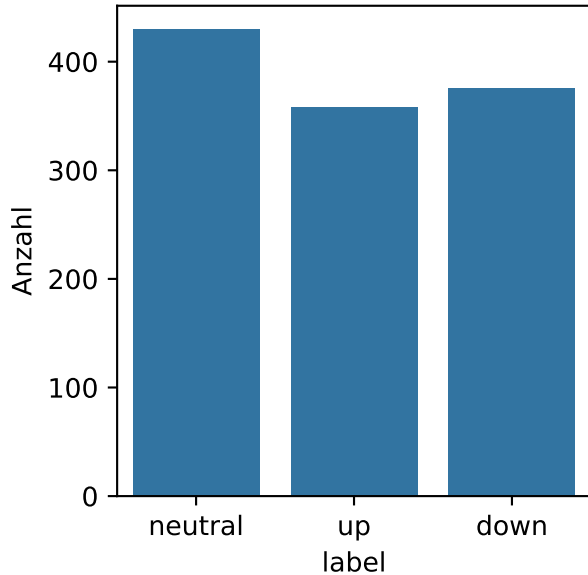
## Richtungs-Modell (Stufe 2):

- objective: binary:logistic
- max\_depth: 3
- learning\_rate: 0.05
- n\_estimators: None
- subsample: 0.9
- colsample\_bytree: 0.9
- scale\_pos\_weight: 1.0

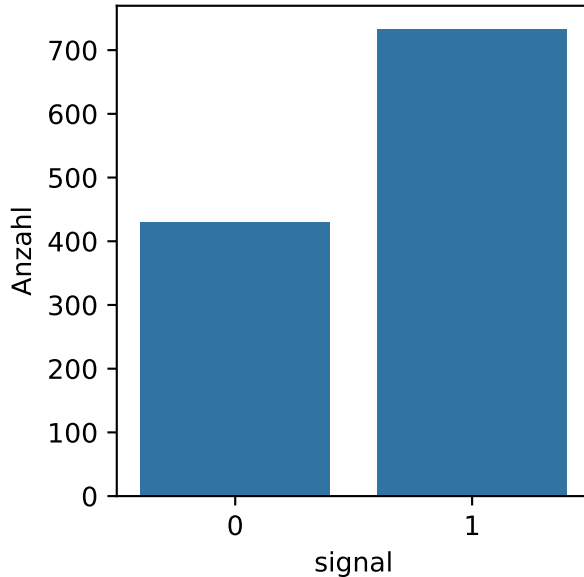
## Verwendete Features (FEATURE\_COLS)

#	feature_name
0	article_count
1	avg_polarity
2	avg_neg
3	avg_neu
4	avg_pos
5	pos_share
6	neg_share
7	intraday_range_pct
8	upper_shadow
9	lower_shadow
10	price_close_ret_1d
11	price_close_ret_5d
12	price_range_pct_5d_std
13	price_body_pct_5d_mean
14	news_article_count_3d_sum
15	news_article_count_7d_sum
16	news_pos_share_5d_mean
17	news_neg_share_5d_mean
18	news_article_count_lag1
19	news_pos_share_lag1
20	news_neg_share_lag1
21	month
22	quarter
23	cal_dow
24	cal_day_of_month
25	cal_is_monday
26	cal_is_friday
27	cal_is_month_start
28	cal_is_month_end
29	hol_is_us_federal_holiday
30	hol_is_day_before_us_federal_holiday
31	hol_is_day_after_us_federal_holiday

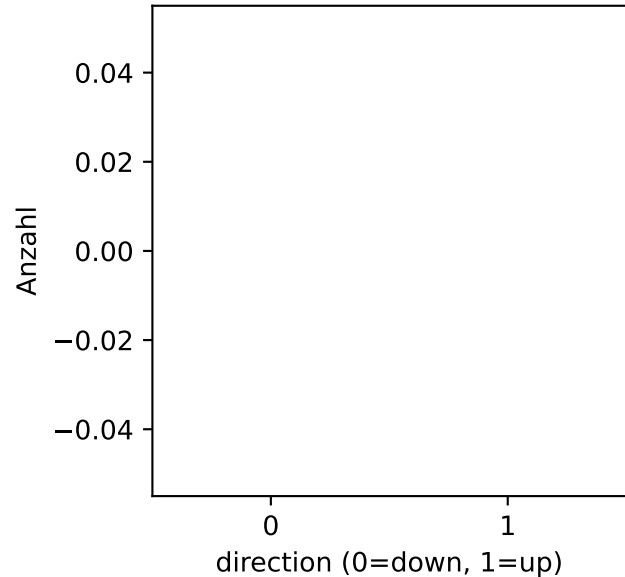
Label-Verteilung (neutral / up / down)



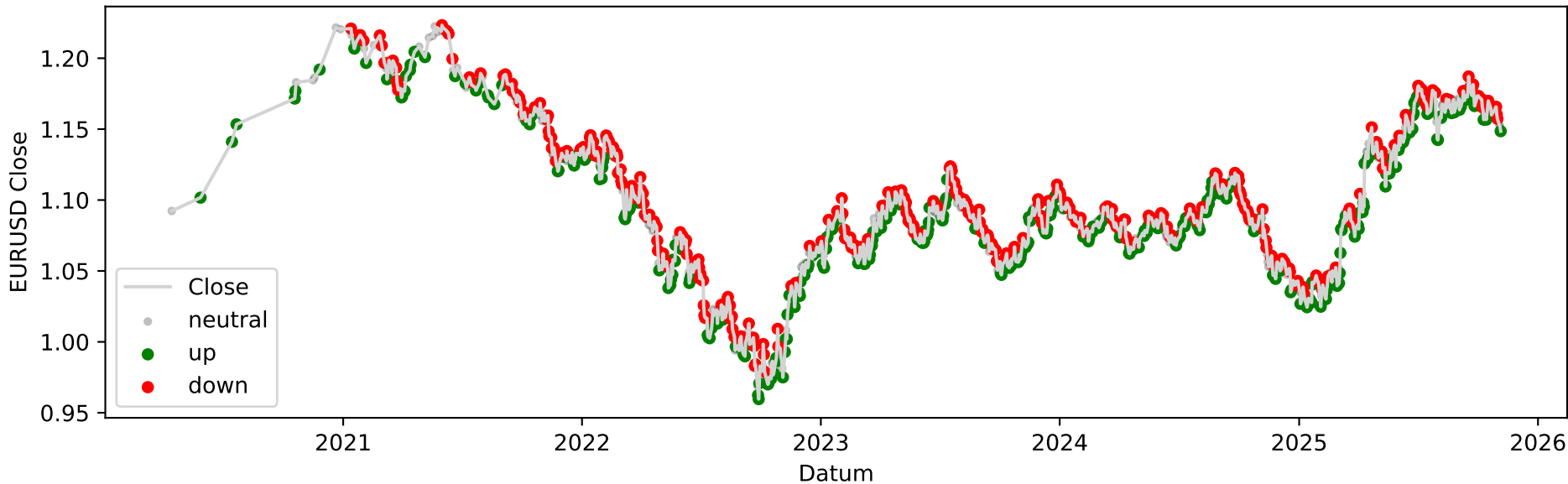
Signal-Verteilung (0=neutral, 1=move)



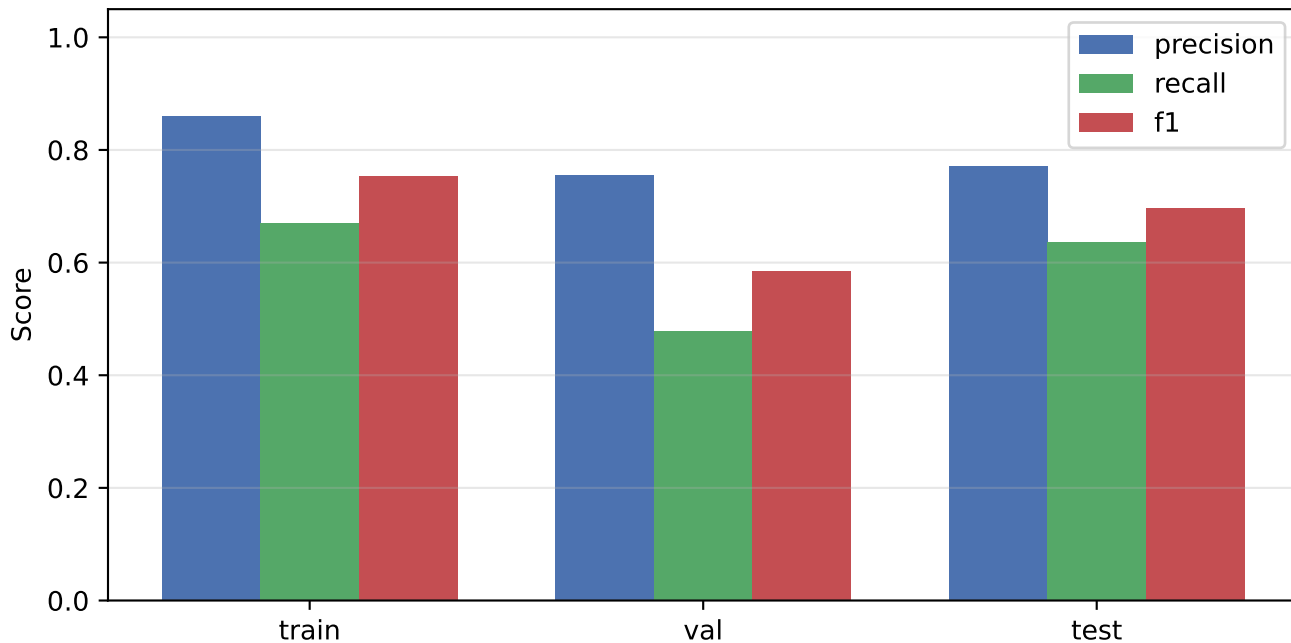
Richtung-Verteilung (nur signal==1)



EURUSD-Zeitreihe mit hervorgehobenen up/down-Tagen (ab 2020)



Signal-Modell - Kennzahlen für Klasse 'move' (train/val/test)

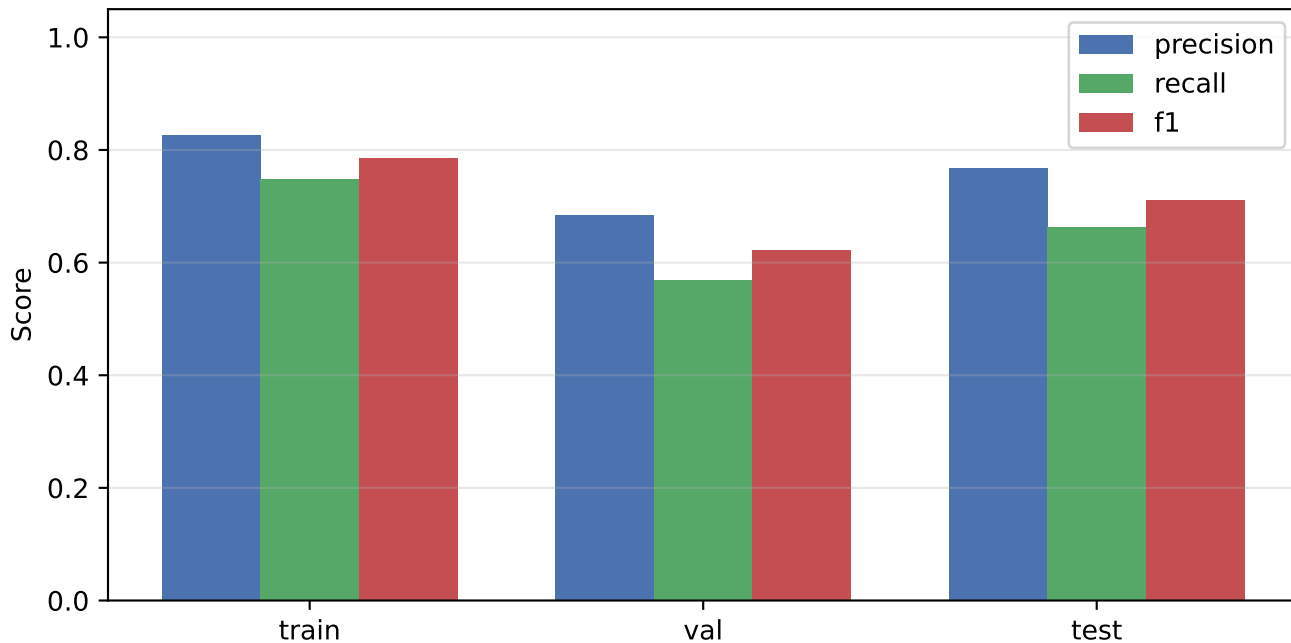


## Signal-Modell - Tabelle (Klasse 'move')

split	precision	recall	f1	support
train	0.860	0.671	0.754	550.000
val	0.756	0.478	0.586	136.000
test	0.772	0.636	0.698	165.000



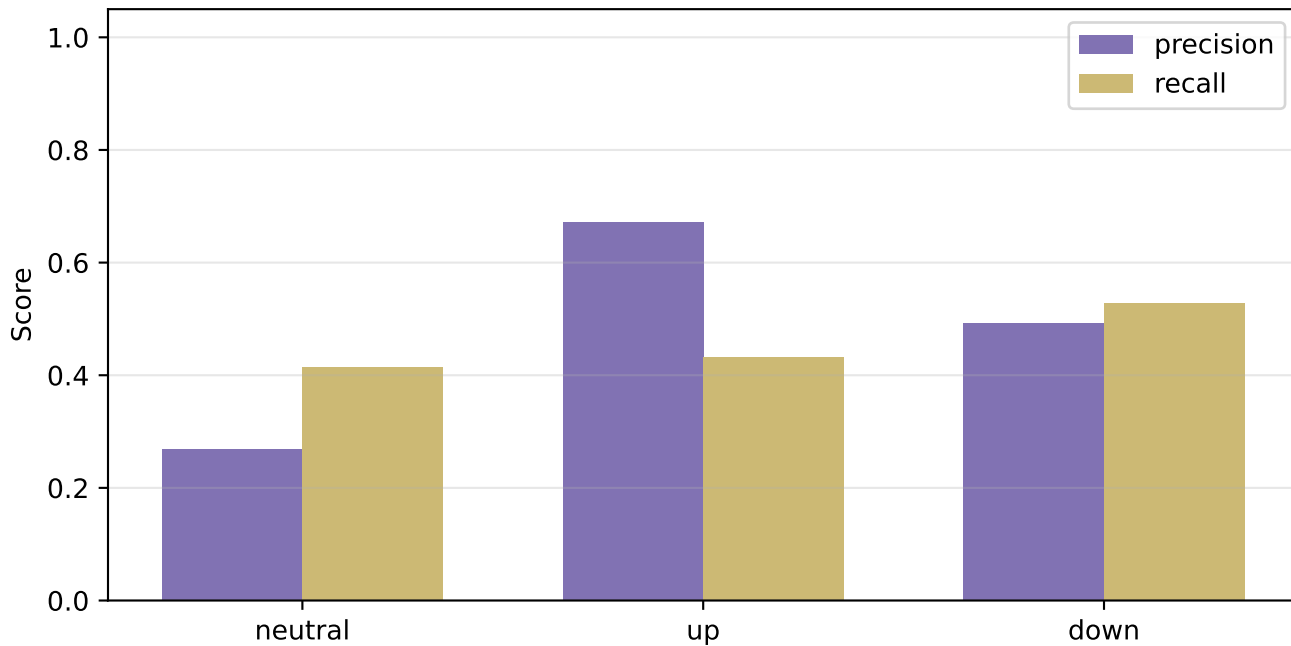
Richtungs-Modell - Kennzahlen für Klasse 'up' (train/val/test)



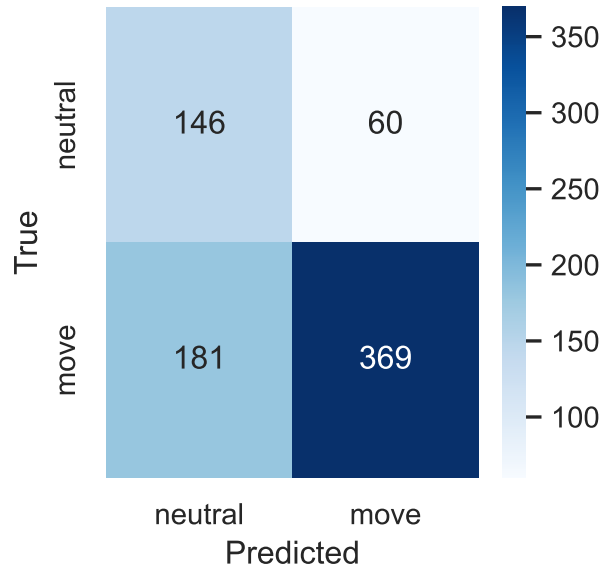
## Richtungs-Modell - Tabelle (Klasse 'up')

split	precision	recall	f1	support
train	0.826	0.748	0.785	254.000
val	0.685	0.569	0.622	65.000
test	0.768	0.663	0.712	95.000

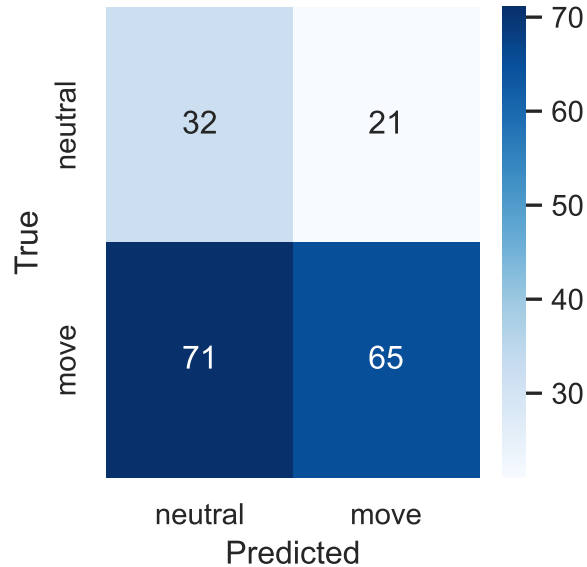
Kombinierte Test-Auswertung - neutral / up / down



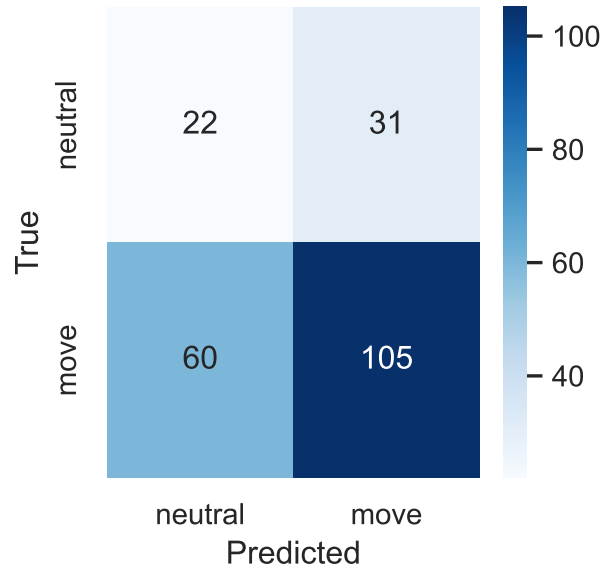
Signal – train



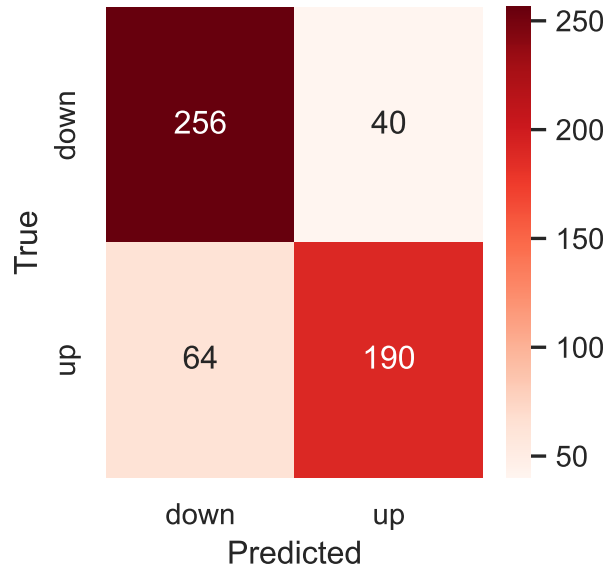
Signal – val



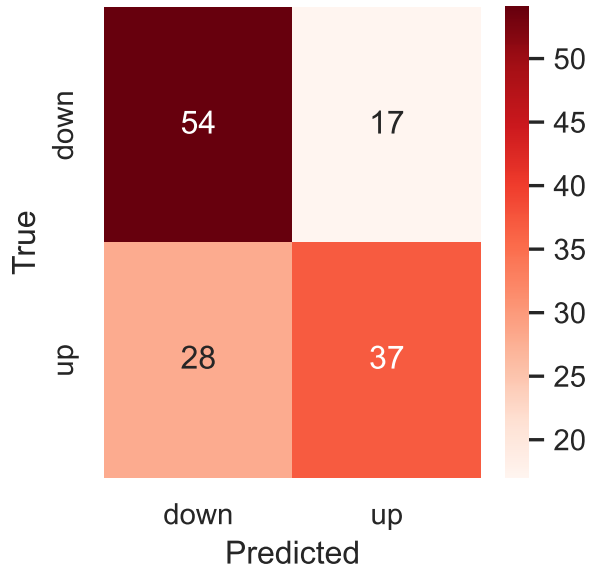
Signal – test



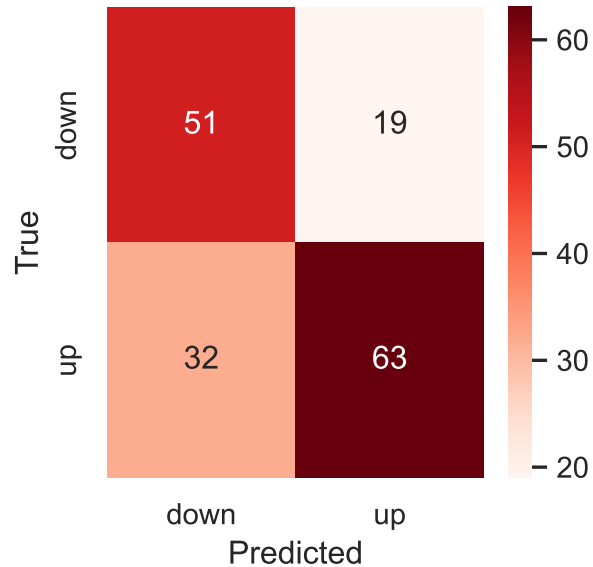
Richtung – train



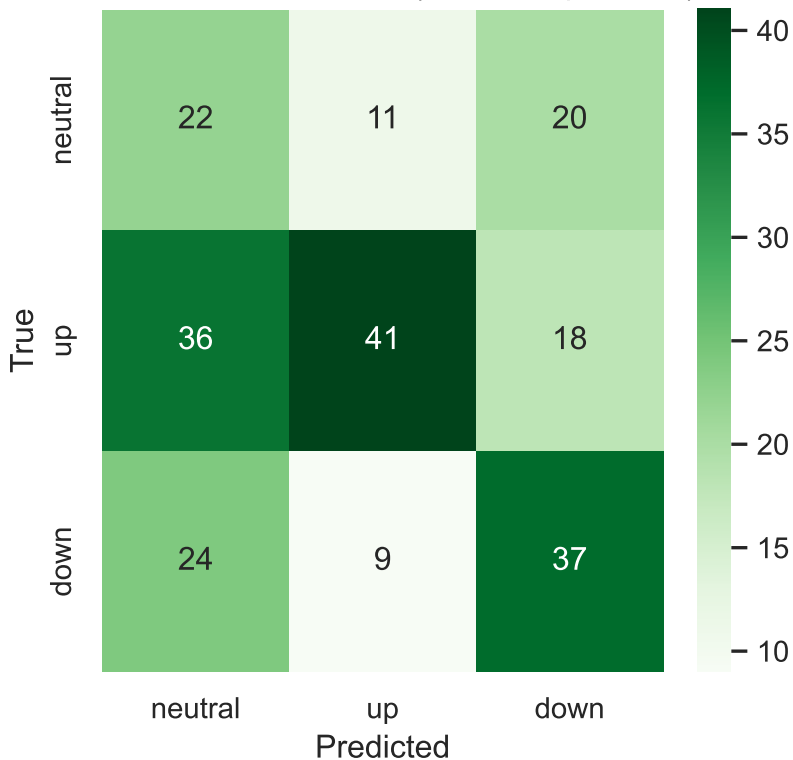
Richtung – val



Richtung – test



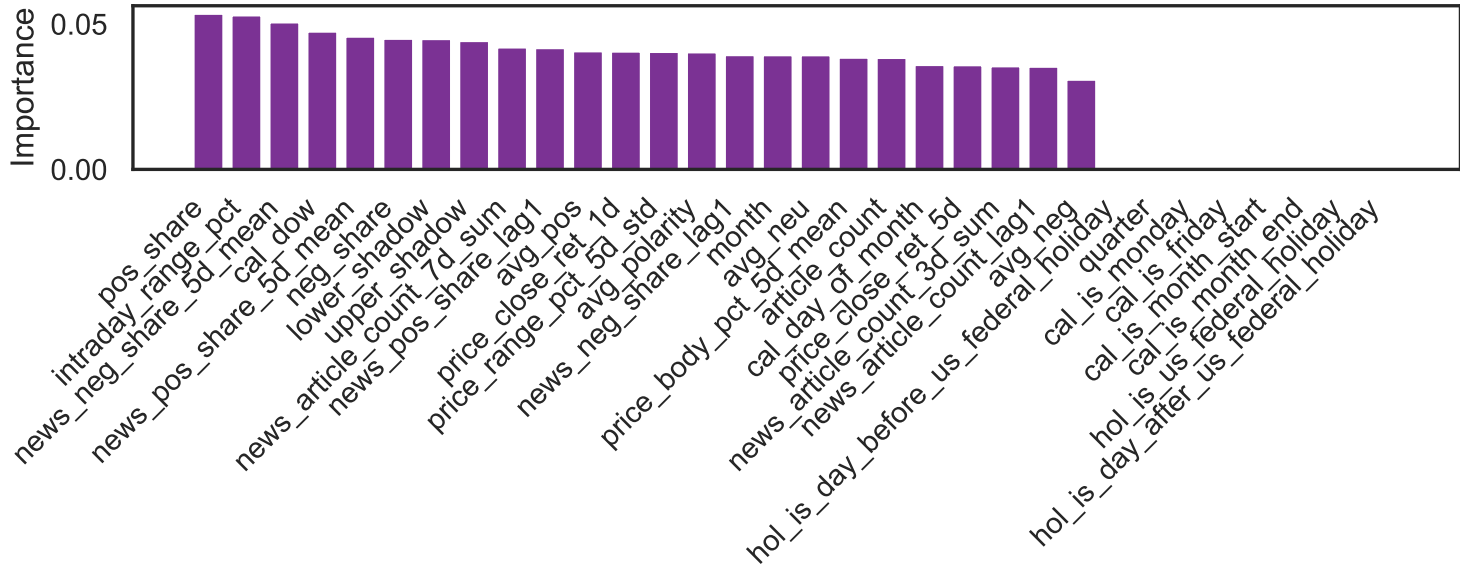
Confusion Matrix – Test (neutral / up / down)



## Konfusionsmatrizen – Zählwerte (TN/FP/FN/TP)

modell	split	TN	FP	FN	TP
signal (neutral vs. mov	train	146	60	181	369
signal (neutral vs. mov	val	32	21	71	65
signal (neutral vs. mov	test	22	31	60	105
direction (down vs. up	train	256	40	64	190
direction (down vs. up	val	54	17	28	37
direction (down vs. up	test	51	19	32	63

# Feature Importance – Signal-Modell







Confusion Matrix – Test (Richtung: down vs. up)

