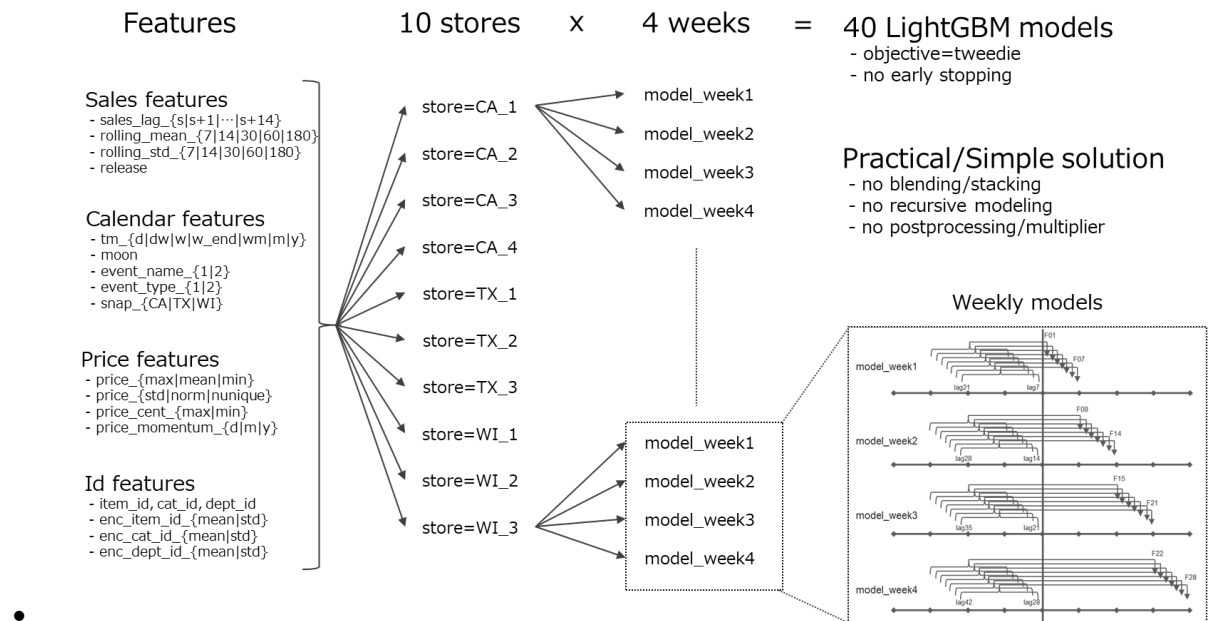# A. MODEL SUMMARY

A1. Background on you/your team

- Competition Name: M5 Forecasting - Accuracy
- Team Name: monsaraida
- Private Leaderboard Score: 0.53583
- Private Leaderboard Place: 4th

- Name: Masanori Miyahara (Kaggle name: monsaraida)
- Location: Japan
- Email: monsaraida@gmail.com

A2. Background on you/your team

- What is your academic/professional background?
    - I got my master's degree in computer science
- Did you have any prior experience that helped you succeed in this competition?
    - After completing graduate school, I have worked as a software engineer in a Japanese company.
- What made you decide to enter this competition?
    - Kaggle is one of my hobbies. I like table competitions, so I decided to participate in this competition.
- How much time did you spend on the competition?
    - About 100 hours.
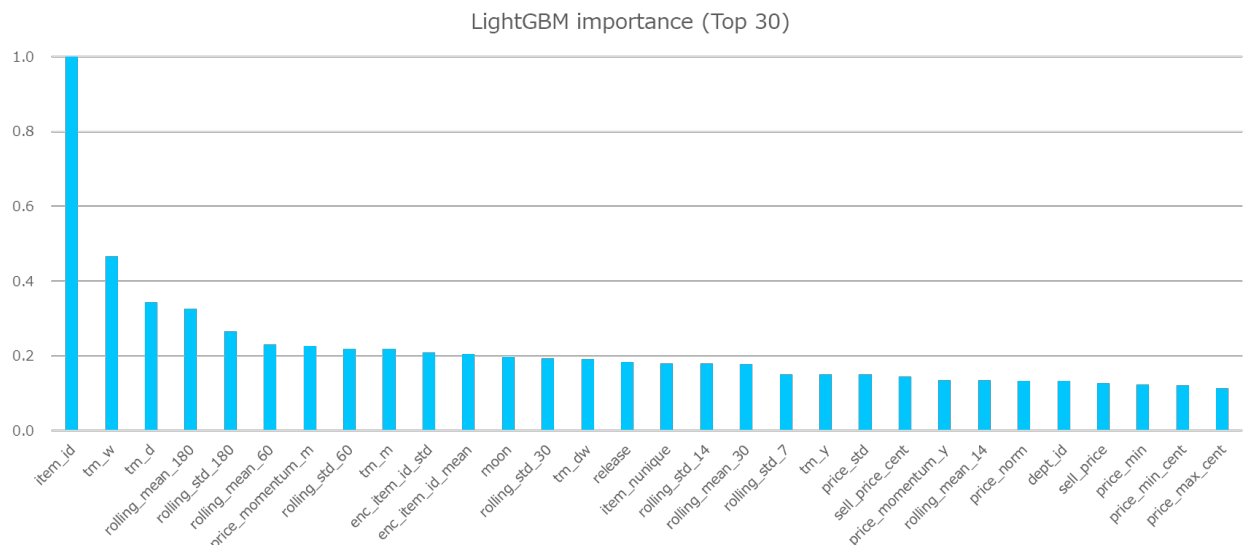
A3. Summary

- General features (sales, calendar, price, id), nothing special
- 10 stores x 4 weeks = 40 LightGBM models
- Practical solution (no blending/recursive modeling/multiplier)
- Used Python
- 16.5 hours to train and predict

Features   10 stores x 4 weeks = 40 LightGBM models
- objective=tweedie
- no early stopping

Sales features
- sales_lag_{s|s+1|···|s+14}
- rolling_mean_{7|14|30|60|180}
- rolling_std_{7|14|30|60|180}
- release

Calendar features
- tm_{d|dw|w|w_end|wm|m|y}
- moon
- event_name_{1|2}
- event_type_{1|2}
- snap_{CA|TX|WI}

Price features
- price_{max|mean|min}
- price_{std|norm|nunique}
- price_cent_{max|min}
- price_momentum_{d|m|y}

Id features
- item_id, cat_id, dept_id
- enc_item_id_{mean|std}
- enc_cat_id_{mean|std}
- enc_dept_id_{mean|std}

store=CA_1, store=CA_2, store=CA_3, store=CA_4, store=TX_1, store=TX_2, store=TX_3, store=WI_1, store=WI_2, store=WI_3

model_week1, model_week2, model_week3, model_week4

Practical/Simple solution
- no blending/stacking
- no recursive modeling
- no postprocessing/multiplier

Weekly models

A4. Features Selection / Engineering

- What were the most important features?

LightGBM importance (Top 30)

- How did you select features?
  - No feature selection
- Did you make any important feature transformations?
  - No
- Did you find any interesting interactions between features?
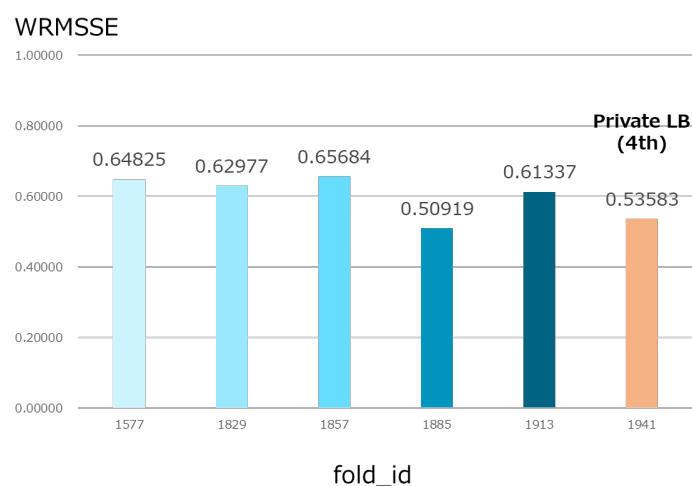 - No
- Did you use external data? (if permitted)
  - No

A5. Training Method(s)

- What training methods did you use?
  - LightGBM
  - No parameter tuning, just use the following parameters which is used in a public notebook
    - 'boosting_type': 'gbdt'
    - 'objective': 'tweedie'
    - 'tweedie_variance_power': 1.1
    - 'metric': 'rmse'
    - 'subsample': 0.5
    - 'subsample_freq': 1
    - 'learning_rate': 0.03
    - 'num_leaves': 2 ** 11 – 1
    - 'min_data_in_leaf': 2 ** 12 – 1
    - 'feature_fraction': 0.5
    - 'max_bin': 100
    - 'n_estimators': 1400
    - 'boost_from_average': False
- Did you ensemble the models?
  - No

A6. Interesting findings

- What was the most important trick you used?
  - I kept my solution simply and practically
- What do you think set you apart from others in the competition?
  - I correctly recognized the difficulty of the problem (=validation scores varied significantly over the period, see below chart)

fold_id	d	date	dow	data
	1	2011-01-29	Sat	Train
	...	...	...	Train
	...	...	...	Train
1577	1578	2015-05-25	Mon	Train
1577	...	...	...	Train
1577	1605	2015-06-21	Sun	Train
	...	...	...	Train
	...	...	...	Train
1829	1830	2016-02-01	Mon	Train
1829	...	...	...	Train
1829	1857	2016-02-28	Sun	Train
1857	1858	2016-02-29	Mon	Train
1857	...	...	...	Train
1857	1885	2016-03-27	Sun	Train
1885	1886	2016-03-28	Mon	Train
1885	...	...	...	Train
1885	1913	2016-04-24	Sun	Train
1913	1914	2016-04-25	Mon	Public LB
1913	...	...	...	Public LB
1913	1941	2016-05-22	Sun	Public LB
1941	1942	2016-05-23	Mon	Private LB
1941	...	...	...	Private LB
1941	1969	2016-06-19	Sun	Private LB

WRMSSE

fold_id	WRMSSE
1577	0.64825
1829	0.62977
1857	0.65684
1885	0.50919
1913	0.61337
1941	0.53583 (Private LB (4th))

A7. Simple Features and Methods

- My solution is simple enough
- If customers would like to reduce computational time, they can use 10 stores models instead of 10 stores x 4 weeks models

A8. Model Execution Time

- How long does it take to train your model?
    - 16 hours
- How long does it take to generate predictions using your model?
    - 10 minutes

A9. References

[Notebooks]

https://www.kaggle.com/kyakovlev/m5-simple-fe

https://www.kaggle.com/kyakovlev/m5-lags-features

https://www.kaggle.com/kyakovlev/m5-custom-features

https://www.kaggle.com/kyakovlev/m5-three-shades-of-dark-darker-magic

https://www.kaggle.com/dhananjay3/wrmsse-evaluator-with-extra-features

[Discussions]

Few thoughts about M5 competition

https://www.kaggle.com/c/m5-forecasting-accuracy/discussion/138881

Evaluation metric

https://www.kaggle.com/c/m5-forecasting-accuracy/discussion/133834

Three shades of Dark

https://www.kaggle.com/c/m5-forecasting-accuracy/discussion/144067

Moon Phase. Odd, yet helpful feature.

https://www.kaggle.com/c/m5-forecasting-accuracy/discussion/154776