



SIX Payment Transaction Volumes Forecasting

DISCLAIMER_FROM_SIX

**Data has been
anonymised**

**No conclusion needs
to be derived out of it**

SIX_PACK_TEAM



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BUSINESS_UNITS

Stock Exchanges

Switzerland & Spain

Securities services

Financial instruments

Banking services

Payment processing

Financial information

Data provider



```
SIX_Banking_Services = ['ATM transactions',  
                        'Debit card transactions',  
                        'Point-of-sale transactions',  
                        'Interbank payments']
```

Why is forecasting transaction volumes important?

TRANSACTION FEE REVENUE MODEL

Fee earned for each payment transaction processed



DIRECT TRANSACTIONS FEE

i.e. contactless card payment in a shop



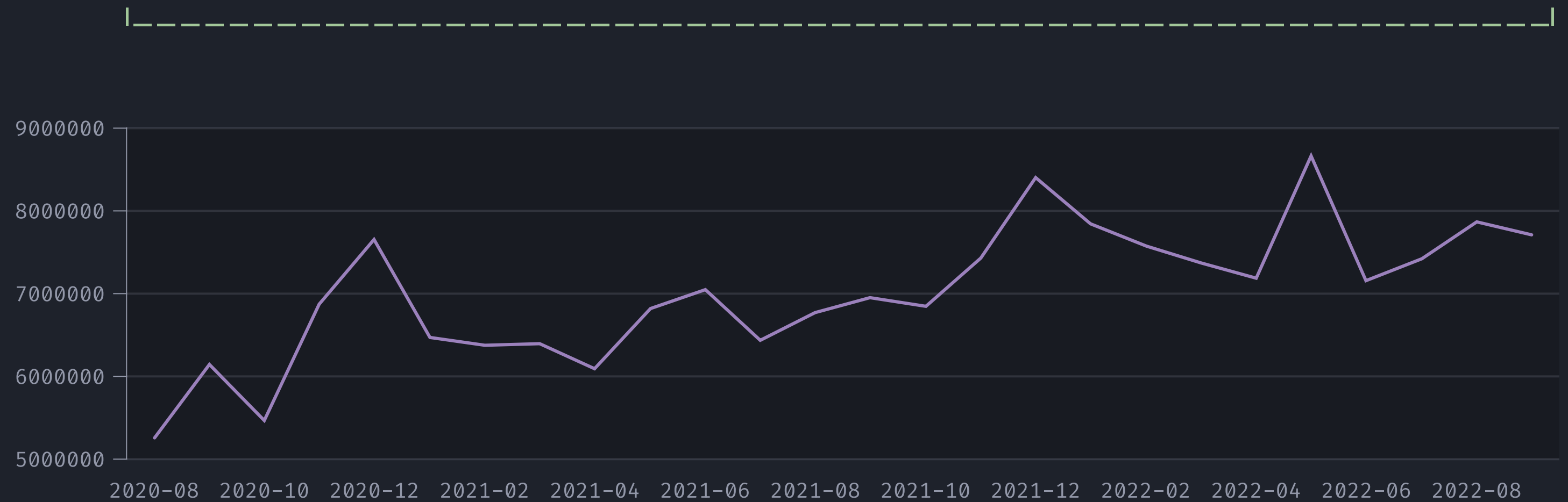
ADDITIONAL SERVICES (ADD-ONS)

i.e. 3-D secure and fraud check

What is time series data?

MEASUREMENTS OVER TIME

Month	08-2020	09-2020	10-2020	11-2020	12-2020	...	09-2022
Number of transactions	5'256'987	6'143'986	5'467'321	6'872'328	7'654'293	...	7'784'154



Time series decomposition

BREAKDOWN INTO SIMPLE SIGNALS

TREND



+

SEASONALITY



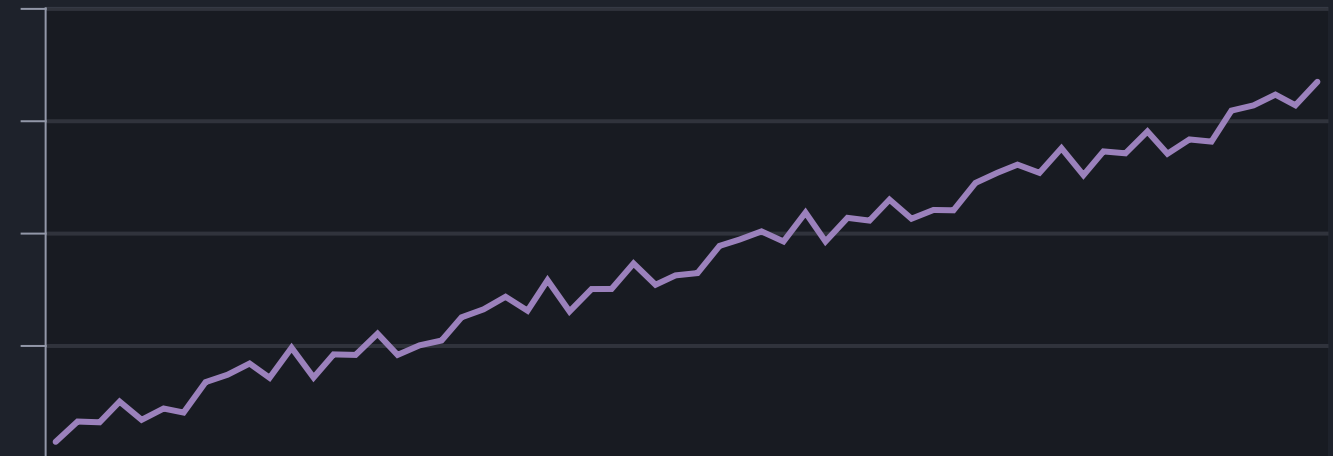
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RANDOM EFFECT



=

ACTUAL DATA (SUM OF SIGNALS)



Time series decomposition

BREAKDOWN INTO SIMPLE SIGNALS

TREND



+

SEASONALITY



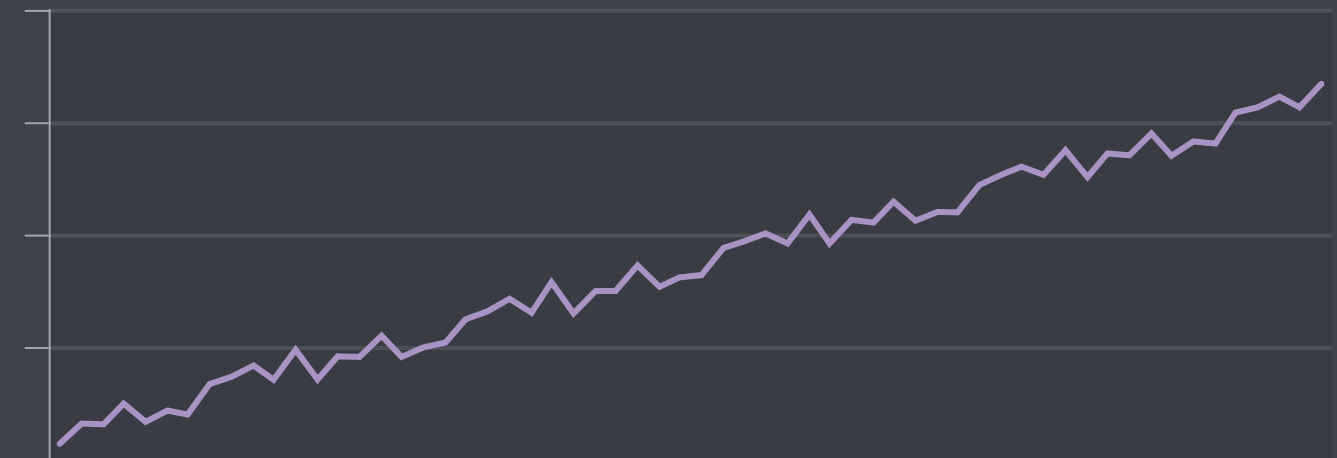
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RANDOM EFFECT



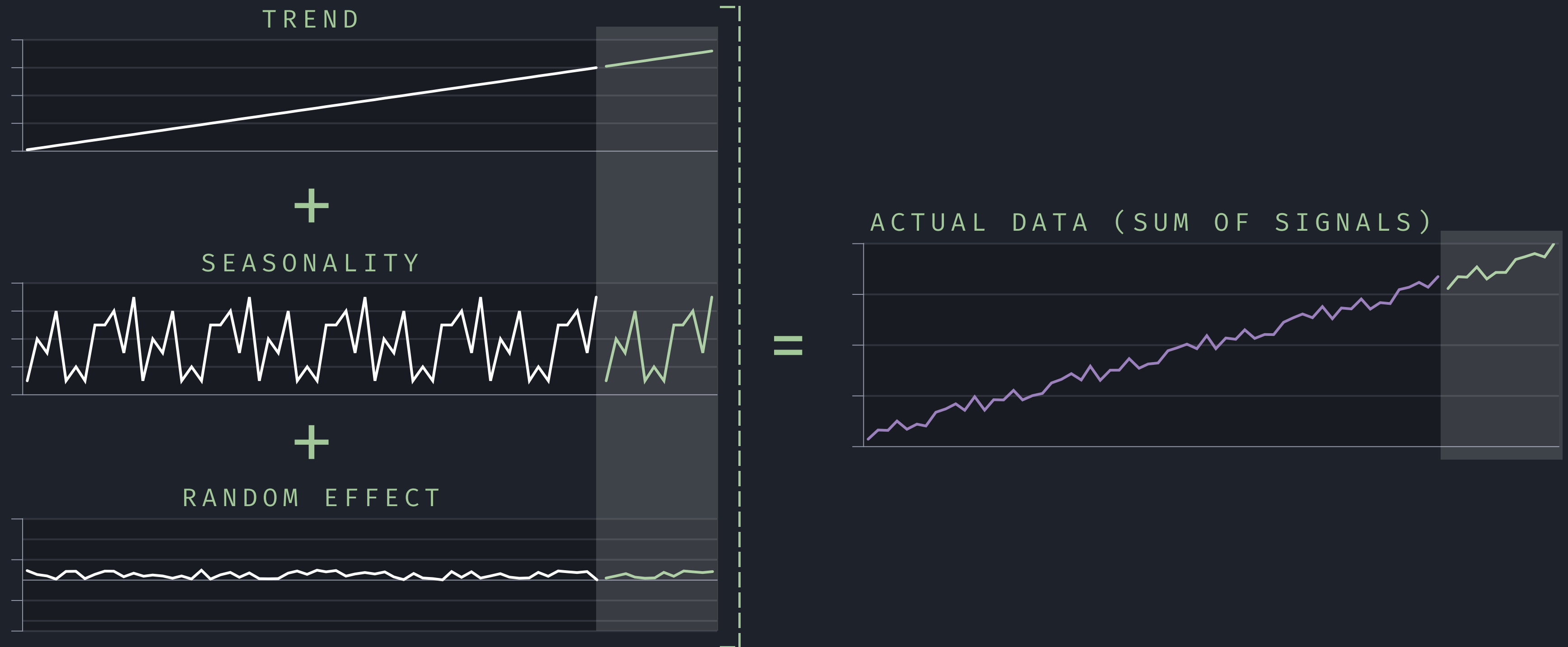
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ACTUAL DATA (SUM OF SIGNALS)



How does understanding simple signals help us?

FORECAST EACH SIGNAL INDIVIDUALLY AND SUM THEM TO PREDICT DATA



Time series models to estimate weights

- Special type of regression models
- For each "simple" signal, weights ("importance") are assigned to past values to predict the future
- Each model assigns weights in its own way

S(ARIMA): SEASONAL AUTOREGRESSIVE INTEGRATED MOVING AVERAGE

- Uses linear weights

ETS: EXPONENTIAL TRIPLE SMOOTHING

- Uses exponential weights

PROPHET

- Uses machine learning techniques to determine weights

What makes a good model?

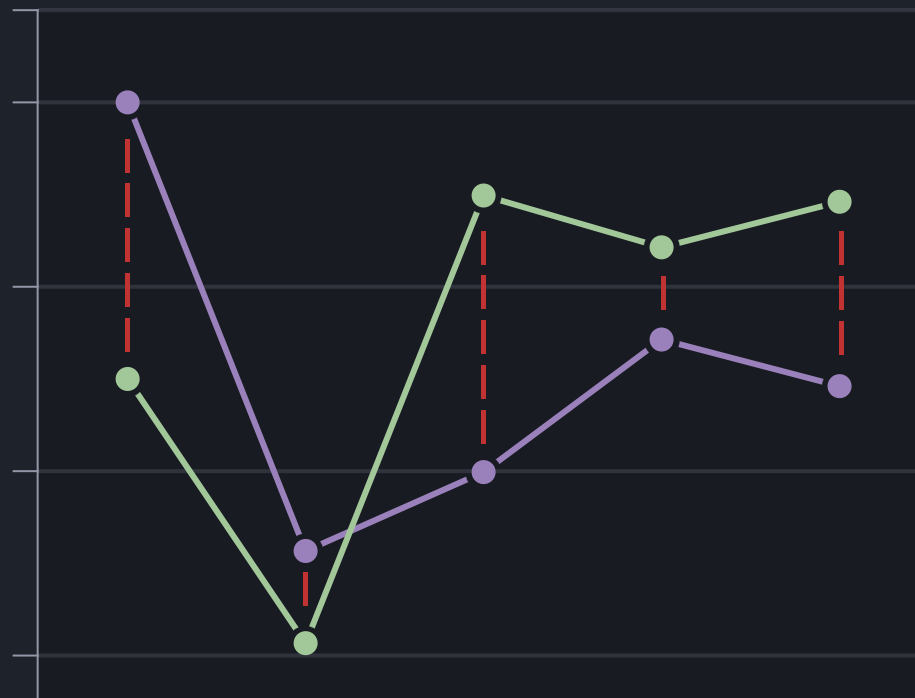
- Predicted data should try to predict actual data as close as possible

● Actual
● Predicted
| Difference

The **Error** calculates average % difference of the predictions from the real data

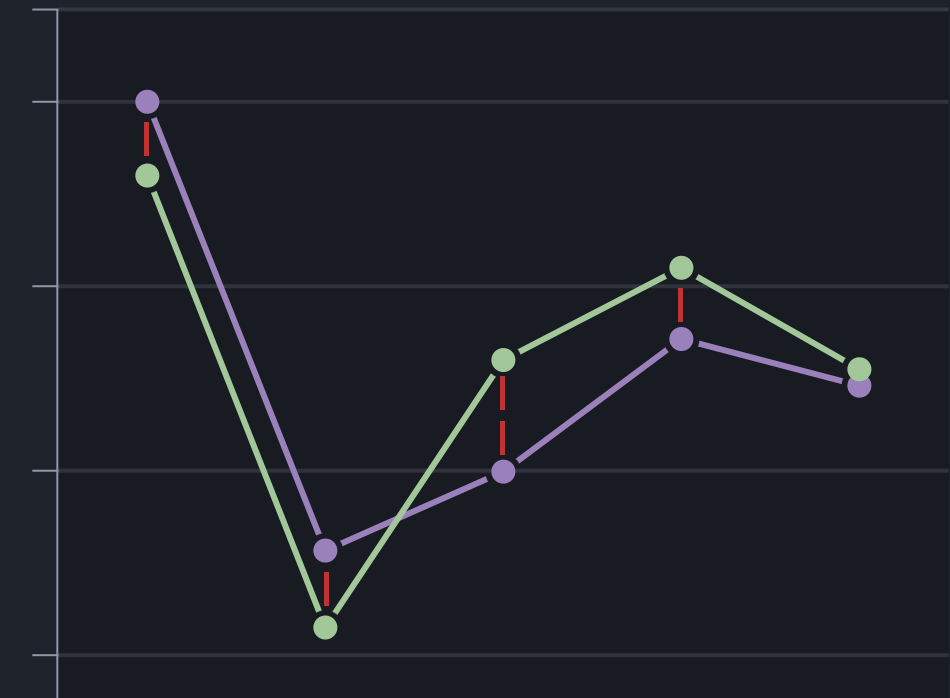
Example 1

5%



Example 2

1%



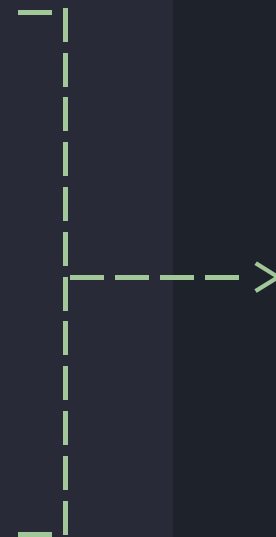
Better = lower error

PIPELINE_APPROACH

STEP_1

Transactions for
1913 merchants (26 months)

Merchant name	08-2020	09-2020	...	09-2022
Merchant 1	0	11	...	12
Merchant 2	915'976	1'002'153	...	978'198
...
Merchant 1913	57'282	70'174	...	62'109



STEP_2

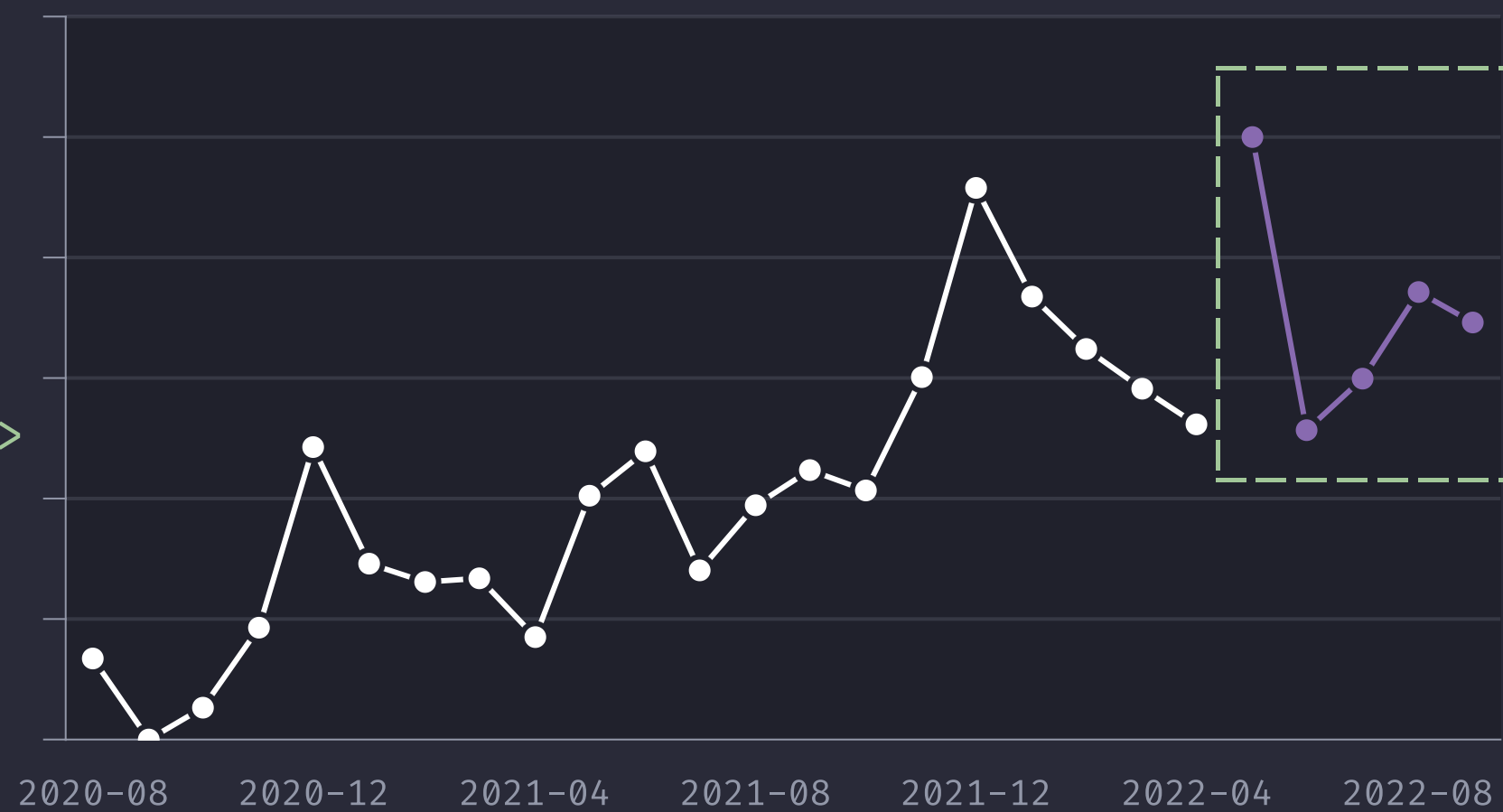
Sum of all transactions
per month (26 months)

Merchant name	08-2020	09-2020	...	09-2022
SUM	5'256'987	6'143'986	...	7'784'154

PIPELINE_APPROACH_NEXT

STEP_3

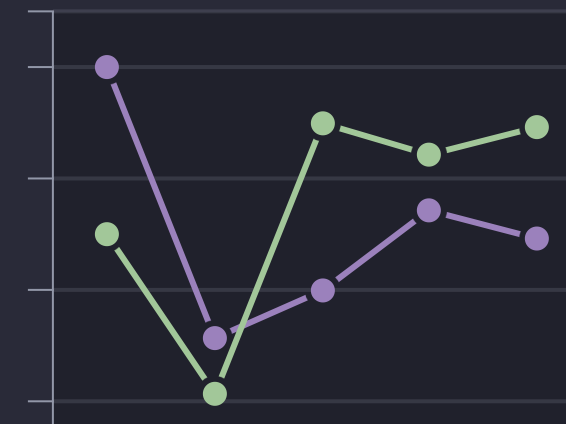
Model selection based on 21 months ●
Evaluation based on last 5 months ●



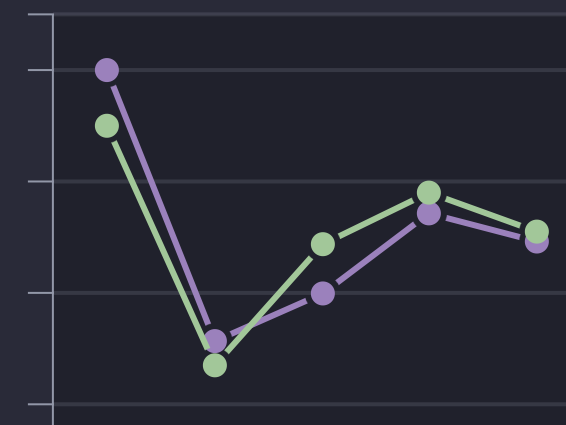
Which model would
you choose?

● Actual
● Predicted

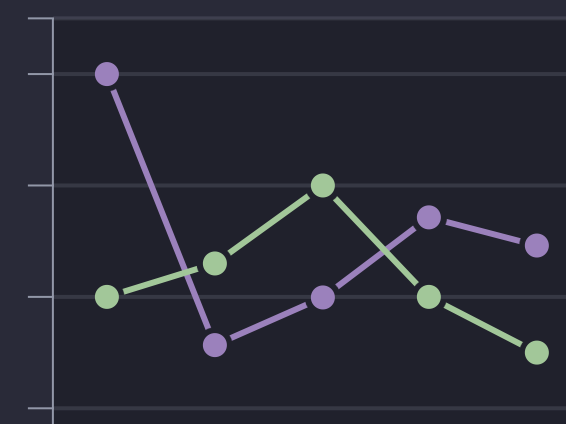
ARIMA



ETS



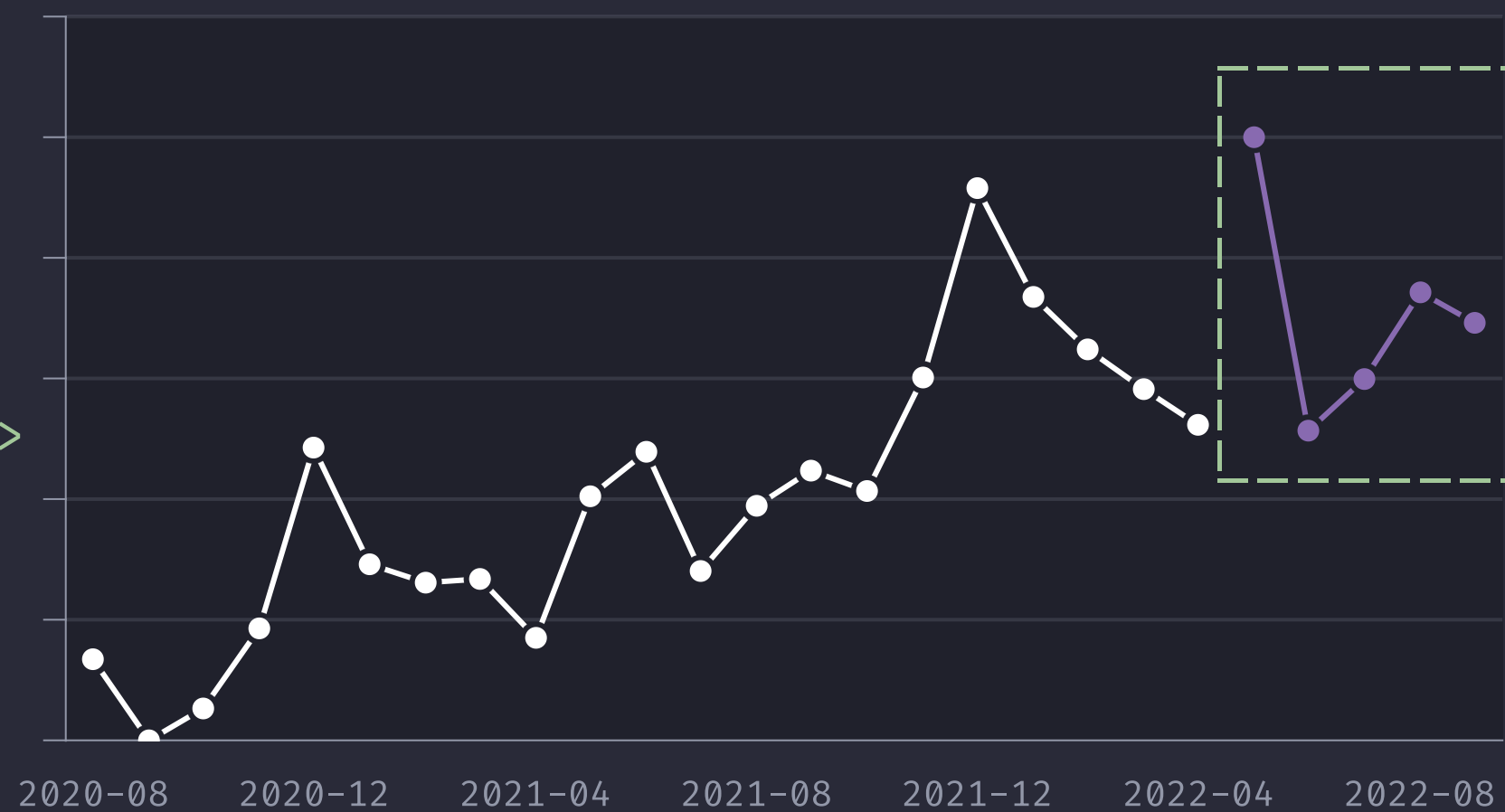
PROPHET



PIPELINE_APPROACH_NEXT

STEP_3

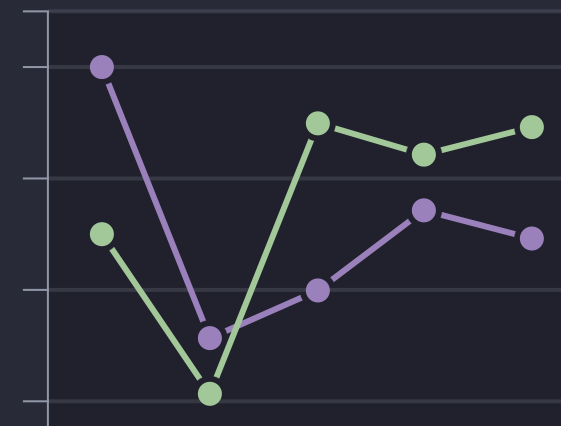
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Evaluation based on last 5 months ●



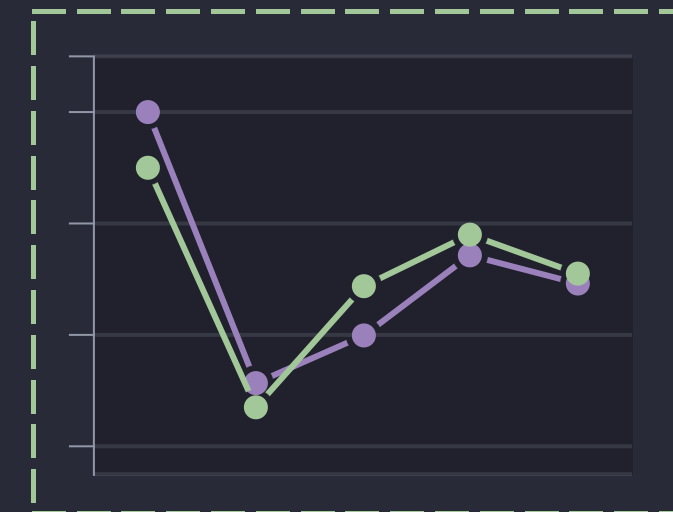
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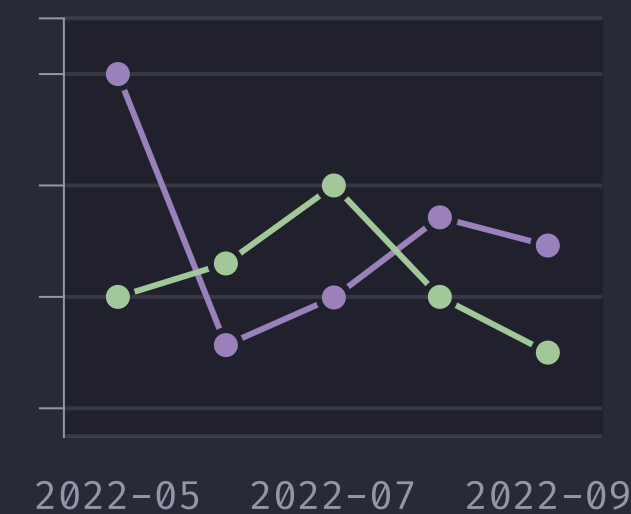
ARIMA



ETS



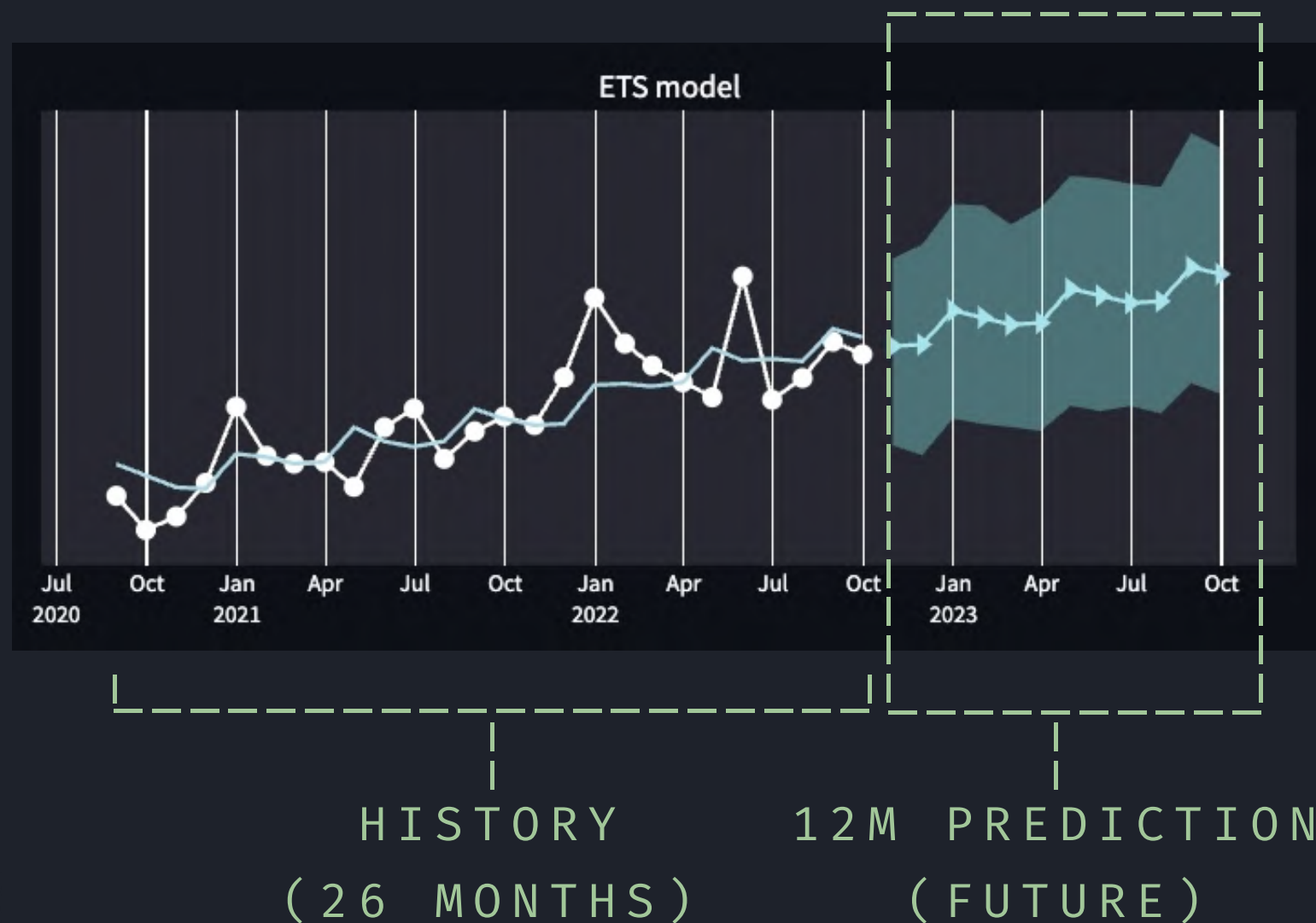
PROPHET



PIPELINE_APPROACH_END

STEP_4

Using the best model selected in step 3
we predict the next 12 months



STEP_5

Automatic monitoring of model
errors given new data

Model	10-2022	11-2022	12-2022	...
2022_09_best	0.75%	1.2%	2.4%	...
2022_10_best		1%	3.5%	...
2022_11_best			2.7%	...
...				...

ERROR = % DIFFERENCE
(PREDICTED VS ACTUAL FOR NEW MONTHS)

<TITLE> PIPELINE IN ACTION </TITLE>

^ (^ 0 ^) / \ (^ _ ^)

Let's see our work in action

{ \ _ _ / }

(• _ •)

(> 🎮)

[HTTPS://TRANSACTION-VOLUMES-FORECASTING-APP-PY.STREAMLIT.APP/](https://transaction-volumes-forecasting-app-py.streamlit.app/)

Project conclusions

FORECASTING TRANSACTION VOLUMES => FORECASTING REVENUE

- Thanks to our pipeline SIX will be able to forecast transaction volumes more precisely

IDENTIFY MERCHANTS WITH HIGH VOLUME OF TRANSACTIONS

- SIX will be able to plan tailored solutions

<TITLE> ALMOST_THE_END </TITLE>

^ (^ 0 ^) / \ (^ _ ^)

**Thank you very much
for your time and consideration**

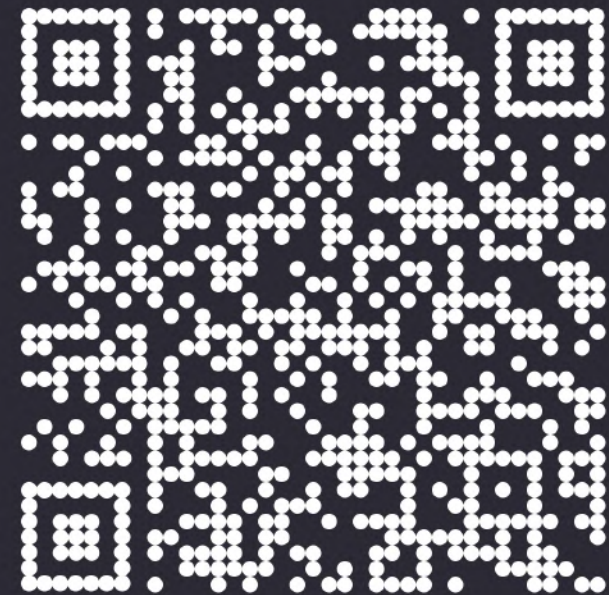
SIX_PACK TEAM



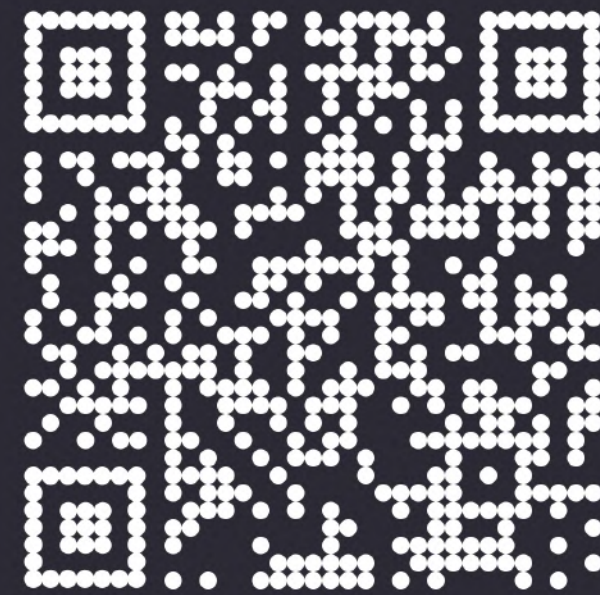
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Michael Flury

