



FreshForecast

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25.05.2021 – REACH tech presentation

How to reduce food waste?

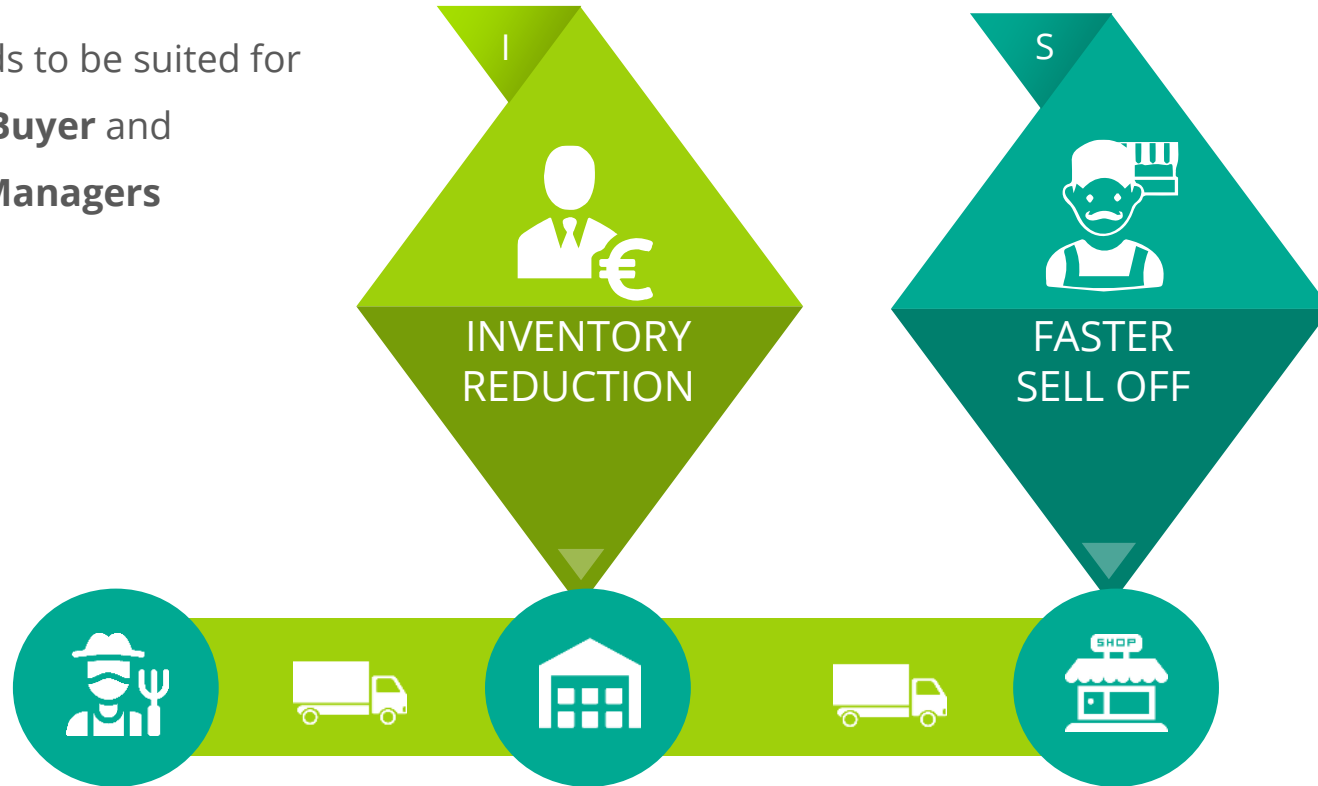


Where to act?

The solution needs to be suited for

I – Centralized Buyer and

S – Local Store Managers



- Proven, scalable, flexible and robust Big Data Solution that
 - Provides detailed Sales Forecast
 - for each fresh produce, store, day
 - by modeling sales behavior
 - taking external data into account
 - Recommends food waste counter measures at the level of store managers and central warehouse.

Data Scenario

INTERNAL

- **Incoming,**
per day, store and product
 - Ordered volume ?
 - Delivered volume ✓
 - Current inventory ✓
 - Annual inventory checks ?
- **Outgoing,**
per day, store and product
 - Products sold ✓
 - Revenue generated ✓
 - Shrinkage & waste ✓
- **Product details**
 - production details ✓
- **Stores**
 - Rough location ✓
 - MIGROS Promotion ✓

EXTERNAL

- **Meteorological**
 - Weather @ Sales (today) ✓
 - Weather during logistics ✓
 - Weather during production ✓
- **Seasonality**
 - national, cultural ✓
- **POI**
 - Competitor proximity ✓
 - Competitor promotions ✓

Modeling approach



Waste

There is a model *Waste(sales,salesForecasted,inventory,meteorological)*



SalesForecast

Therefore, there is *SalesForecast(sales,inventory,meteorological,waste)*
where waste (≥ 0) want to be minimized and it is prone to represent
the error of the SalesForecast model



SalesForecast with Waste Error

Therefore, we look for a model *SalesForecast(sales,inventory,meteorological)*
where waste is the leading error during the learning process

Deep Learning Architecture

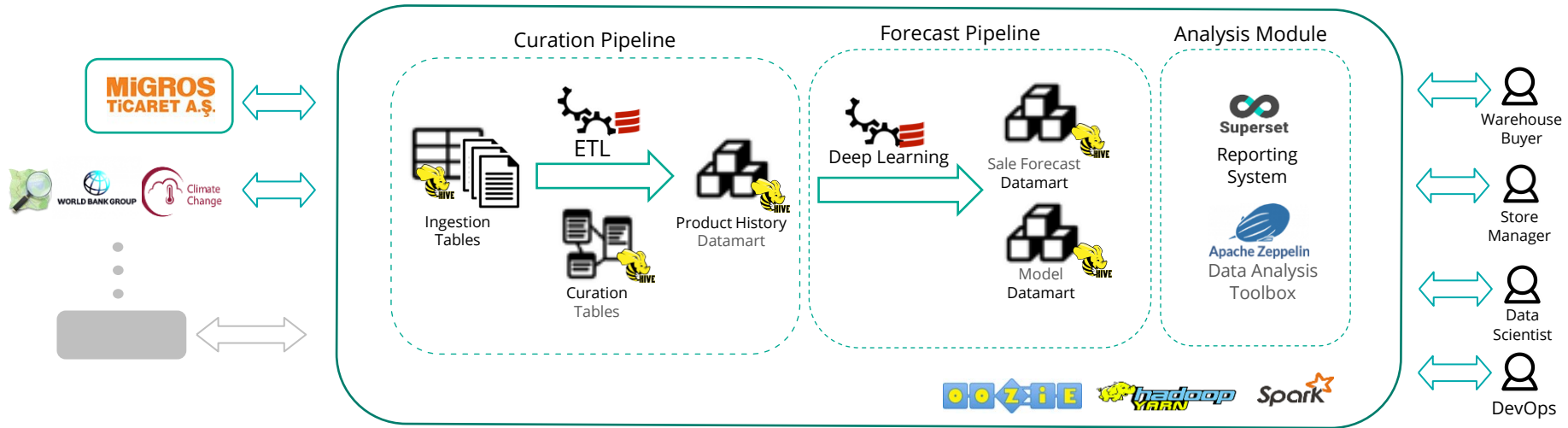
RNN, Recurrent Neural Networks

- Suitable to relate time series
- Weighted and delayed feedbacks

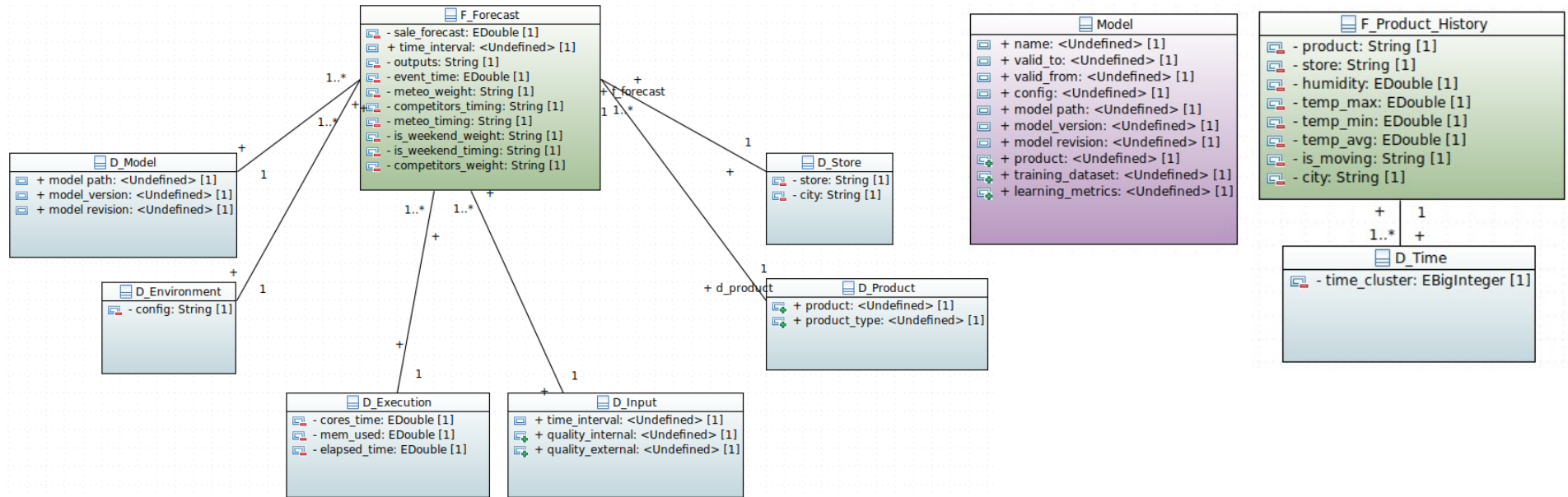
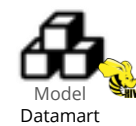
XNN, Explainable Neural Networks

- Join prediction and explanation
- Feature weight and timing

Solution Architecture



Provisioning Layer



Mock-up scenario

DATA

INTERNAL

- Sample Sales/Inventory/Waste

EXTERNAL

- Meteorological
 - Climate Data Store

MODELS

- Basic NN

ANALYSIS

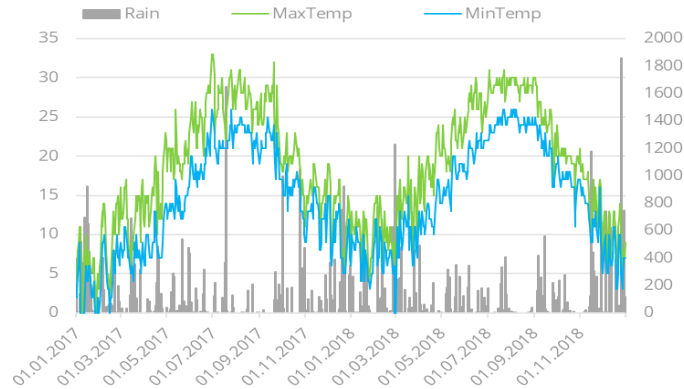
- Data profiling
- Reports
 - Store Manager
 - Warehouse Buyer
 - Data Scientist

PLATFORM

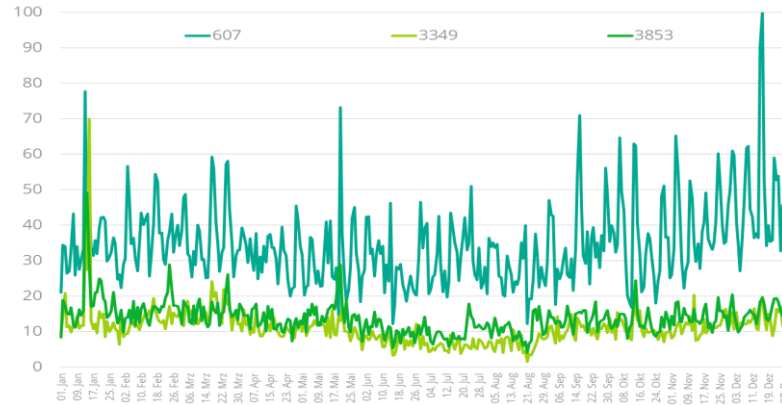
- 5 nodes
 - 80 vCPU
 - 320 GB RAM
 - 10 TB SSD
- Spark/Yarn cluster
 - Hive
 - Zeppelin
 - Oozie

Data Profiling

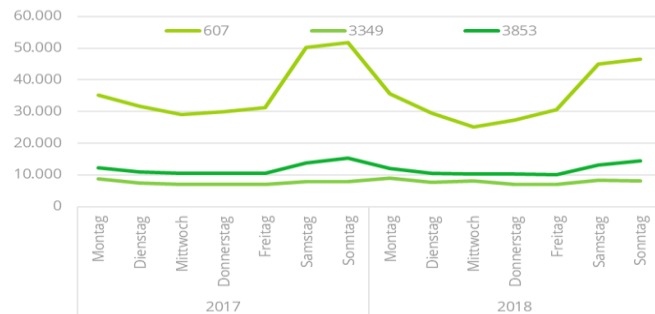
Weather data



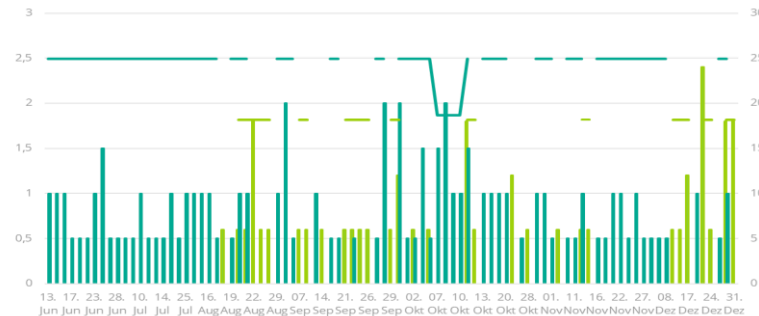
Sales data by store



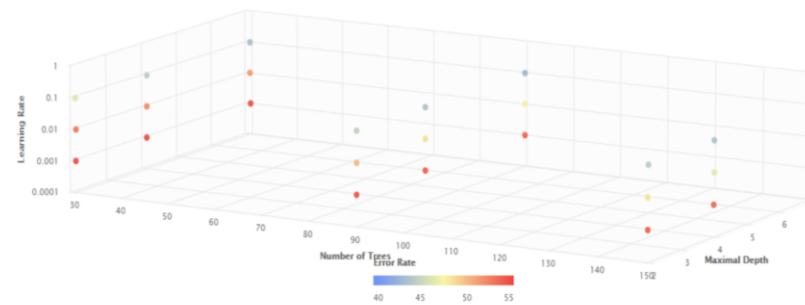
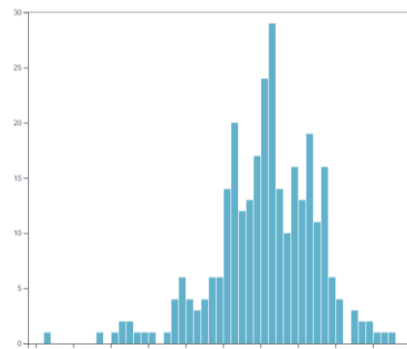
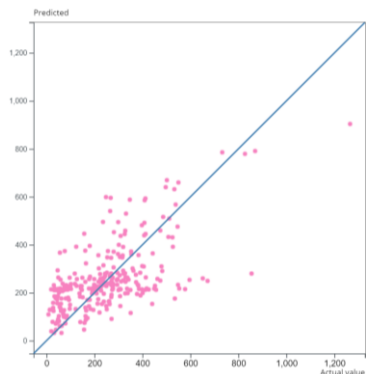
Food waste by weekday



Price elasticity of sales volumes



Gradient Boosted Trees Model – cheap, medium, premium apples



Apples - cheap	0.774
Apples - medium	0.385
Summe von Total promotion based date,store and items [TRY	0.162
Apples - expensive	0.155
Summe von Promotionflag	0.003

Solution Mock-up - Buyer



Solution Mock-up – Store Manager

FreshForecast Store

SEARCH

FILTER

TOTAL CASES: 100

TOTAL COSTS: 1.103,00€

SUBMIT DEMAND

Update/accept Order no.

CATEGORIES F&E	ITEM	INVENTORY	Fresh Forecast	ORDER	ACTIONS
POME FRUITS	Mango Adet	- 20 +	12	- 12 +	⚙️ ⬇️ ⬆️
BANANAS	ID: 270358 - Origin: Istanbul- Price: 6,90 € / Unit GTIN:8430631000308			12	
STONE FRUITS				13	
EXOTIC FRUITS	Excelent Yemeye Hazir Mango Adet	- 20 +	12	- 14 +	⚙️ ⬇️ ⬆️
▶ Mango	ID: 270440 - Origin: Antalya - Price: 10,9 € / Unit GTIN: 4008638172010			15	
Mango A.D				16	
Excelent Yemeye Hazir					
Excelent Mango 150g	Excelent Mango 150g	- 12 +	08	- 08 +	⚙️ ⬇️ ⬆️
Verita Yemeye Hazir A.D.	ID: 50272258 - Origin: Istanbul - Price: 8,5€ GTIN 5411361011478				
Pineapple					
Avocado					
TOMATOES	Verita Yemeye Hazir Adet	- 15 +	10	- 10 +	⚙️ ⬇️ ⬆️
POTATOES	ID: 50271858- Origin: Istanbul - Price: 12,45€ /Unit GTIN: 8722800905638				
LETTUCE					

Submit quality check for risk products

Solution Mock-up – Store Manager

FreshForecast Store

SEARCH

FILTER

TOTAL CASES: 100

TOTAL COSTS: 1.103,00€

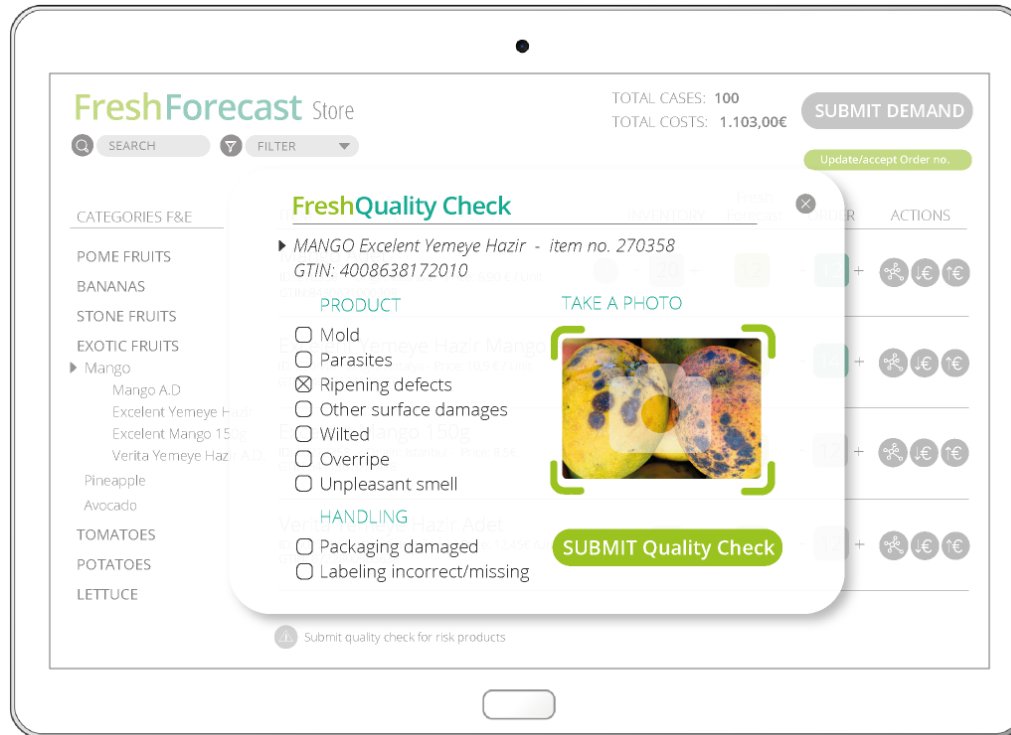
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LETTUCE					

⚠️ Submit quality check for risk products

Solution Mock-up – Store Manager



Solution Mock-up – Buyer & Store Manager



We are deep-tech based on an interdisciplinary team

Dr. Matthias Brunner

Founder, CEO & Sales

10 J. Sensor-Sales @



Prof. Dr. Christian Fleck

Founder, Head of R&D

Prof. for Systems Biology Head of
Research Group since 2006



Dishi Lui

Machine Learning Expert

15 years ML/AI and
Uncertainty Quantification



Dr. Octavio Glorio

Solution Architect

10 J. Big Data &
Data Analytics @



Dr. Matthias Heiden

Food Scanners

Founder CTO at



Julia Seemüller

Business Development

8 J. Experience in
Consumer Industry





Thank you

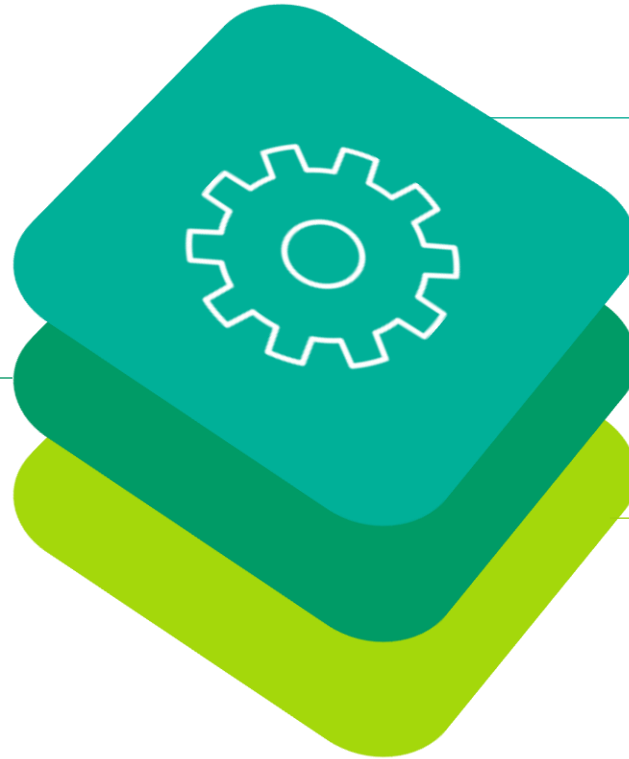
FreshForecast

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Some information requirements

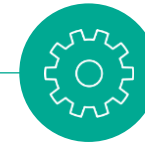
SALES

- Sales forecast
- Explainability
 - Feature weights
 - Feature timing
- ...



OPERATIONS

- Product/sales ingestion
- External data ingestion
- Pipeline statistics
- ...



MODELING

- Forecast error stats
- Model explore
- ...

