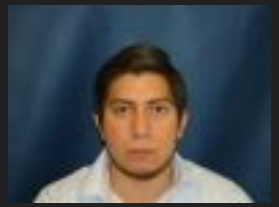
# NEORIS
# Demand Sensing

October, 2021

# Agenda

1. About NEORIS
2. Forecasting methods
3. The data and business opportunity
4. Development Lifecycle
5. Deliverables

# People



Roberto

Jose
Mauricio

Adam

NEORIS

# About **NEORIS**

**+20 years** Consulting Experience

**+600** Active clients

**+7000** Consultants

We were born to service an unmet need to accelerate and speed up digital transformation.

We're not a systems integrator, we're not a strategy shop.

NEORIS is a Digital Accelerator. We help companies become Intelligent Enterprises, faster.

Our clients are companies with purpose (ESG values) who want to create a better future.

We are agile and results-driven because we were born digital and inside a company (CEMEX).

**5** Global Regions

**12** Countries

**27** Locations

**50** **International** Awards and recognitions

**TOP 30** Among Forrester's **top 30 Digital Accelerators**

**+200** Local prices

Microsoft **Microsoft Partner of the year** for SAP on Azure projects

First Latin-American company to become **SAP Global Services Partner**

**No. 1 IT Consulting and Systems Integration** company for Mexico for IDC ranking

Gartner **Gartner SAP Magic** Quadrant for LATAM

**"Best Nearshore Outsourcing company in Latin America"** – Brown-Wilson Black Book

**#31** **Forrest's Most significant SAP service provider** for mid-size enterprises

## Global **Footprint**

- UNITED STATES
- MEXICO
- COLOMBIA
- PERU
- BRAZIL
- CHILE
- ARGENTINA
- CZECH REPUBLIC
- SPAIN
- UK
- INDIA

**PRIVATELY HELD, MAIN OWNERSHIP:**
**U$ 21 BILLION CEMEX, NYSE: CX**

# Examples of Data Science Projects

**Decision Support**

Prioritizing safety reports for review

Staffing optimization algorithms

Smart search for legal documents

Post-hoc decision analysis

**Marketing/Sales**

Customer retention prediction

Identifying ideal customer profile

Customer 360

Recommender systems

**Common use cases**

Chatbots, customer journey mapping

Supply chain optimization, demand prediction

# Forecasting methods

# There are many methods to choose from

Time-series - data points mapped at a certain successive time duration

Prophet - https://facebook.github.io/prophet

statsmodels - https://www.statsmodels.org/dev/tsa.html

Tensorflow - https://www.tensorflow.org/tutorials/structured_data/time_series

In our data the days with missing values are days where no products were sold

# Supervised-learning approaches

Represent the data as a matrix with engineered features

Time-series cross-validation

Time-series supervised learning example with XGBoost

Time-series as a supervised learning problem

NOTE: this is a more challenging approach than classical methods

# If you have time:


Check out the model diagnostics for prophet

Try to build some interactive plots with plotly

See if you can use mlflow to keep track of experiments

Use the python holidays package as an additional covariate

# The data and business opportunity

# The data

| | BILL_DATE | MATERIAL | PIEZAS |
|---|---|---|---|
| **17613** | 2019-03-03 | 9184 | 1 |
| **17614** | 2019-03-03 | 495 | 1 |
| **17615** | 2019-03-03 | 552 | 1 |
| **18706** | 2019-03-03 | 2130 | 1 |
| **41200** | 2019-03-03 | 12064 | 1 |

```
original data size: (4376, 3)
```

MATERIAL = SKU

NOTE: these data are from a client and so it is important that you do not share them as part of a public repository or in anyway.

# Business Opportunity

## Demand Sensing

Forecasting is the process of making predictions based on past and present data.

## Opportunity 1

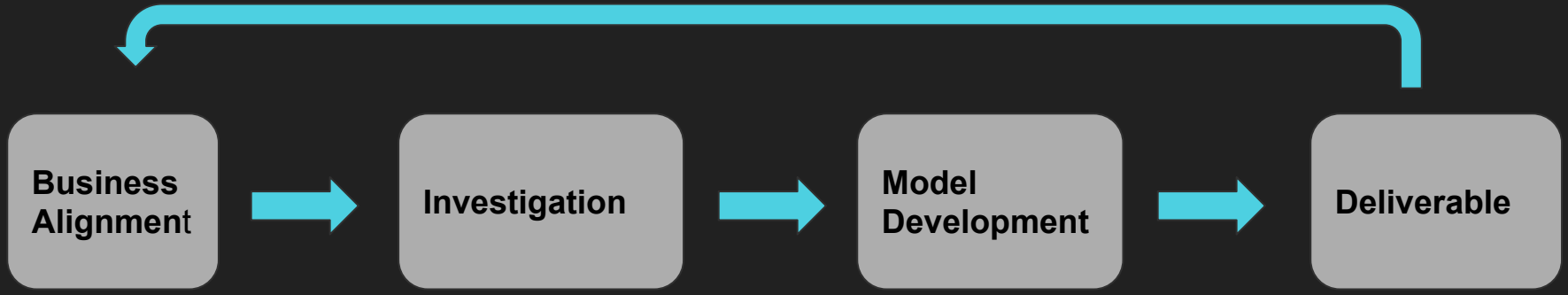
For a given time window say 7 days be able to predict the ‘composite demand’ or total number of ‘piezas’.

## Opportunity 2

For a given time window say 7 days be able to predict the demand for the top 10 SKUs.

# Development Lifecycle

# Development Lifecycle

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ITERATIONS:

1. **Discovery** - Create a Minimum Viable Product
2. **Experimentation** - Experiment with approaches and ideas
3. **Deliverable** - Focus only on the most relevant tasks and add polish

plotly | Dash

# Tools of the trade

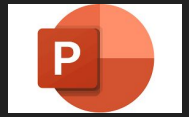
## Investigative Tools



## Model Development Tools



## Deliverable Tools



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RISE

# Deliverable

# About the Deliverable

- Start with the business opportunity and background on the problem
- Use visualizations to tell your story
- Be prepared to talk about how your model works
- Be prepared to talk about how your model is evaluated
- Make sure your methods are carefully explained
- Talk about the experiments you ran
- Talk about next steps if you had more time
- Talk about how you might scale your solution to thousands of POS
- Use plots, tabular summaries and other visuals to tell the story

# Ask Questions!

- For discovery projects like this one simple is better than complex
- If you are using Jupyter please do not show all of your code
- Organize your team before getting started
- The documentation is generally better than a blog
- And most importantly have fun and learn something new

- https://app.sli.do/event/1dgqrwwh
- https://github.com/neoris-ai/semana-i-project