

PACE-ML CASE STUDIES

PACE-ML for Data Science Team of a Global freight service provider



Business Challenge

- One of the worlds largest courier and freight service companies has its data science team migrating to Azure Cloud and wants to implement MLOps for their development and deployment cycles.
- Data Scientist working on personal systems and multiple cloud environments making experiment tracking difficult
- Minimal Governance and Compliance of Model Development pipelines
- Multiple models with different training methodologies and data preparation
- No current system in place for model / data drift monitoring



Solution

- AI/ML Pipelines that accelerates model development, testing, deployment, and monitoring
- State of the art open source tools to set-up versioning, tracking and monitoring of models through Mphasis PACE-ML framework
- Customizable modular cloud agnostic framework
- Easy to plug-in components



Benefits

- Allows Data Scientists to create and develop Models and collaborate
- Accelerate deployment through automated pipelines for new model developments
- Performs drift check and monitoring of models to initiate model retraining
- Version controlled code for better auditability and reproducibility of models



INTELLIGENT TIME SERIES FORECAST FOR PHARMA CLIENT



Business Challenge

- A large US based pharma company would like to forecast 3 years demand for their world-wide products
- Demand forecasting required for 27 thousand SKUs for a forward outlook of 36 months
- Generate a forecast using time series and machine learning based models which outperforms the existing benchmark of the SAP based forecasting system
- Forecasting to be carried out every month with the last month data added to the univariate time series
- Limited features and data descriptions available
- Accuracy of forecast critical from the planning point of view.



Solution

- SKU Categorization
 - Categorize SKU data into 16 distinct categories based on statistical time series parameters
 - A set of models were identified and ensembled using Automatic model selection based on previous 3 test runs.
- Time series and Machine learning models
 - 40 distinct models were developed
 - Model-driven ensembling based forecast is provided as final output
- Causal forecasting methods used to leverage the available features to improve the forecasting accuracy.
- A system of model win to identify the best performing models for each of the SKU groups
- Identification of seasonality using an unsupervised learning approach
- SKU groups identified using statistical parameters



Benefits

- The forecast accuracy improved from 30% to 70% . This helped client,
 - Improved production planning
 - Reduced inventory management costs
- Significantly improved forecast accuracy over the previously employed methodology
- Seamless integration with the planning workflow
- Continuous monitoring of system performance with automated alert mails to the stakeholders
- Forecasting system robustness with input and output quality checks.



Cross-sell / Up-sell Recommender System For eCommerce Platform



Business Challenge

- One of the worlds largest courier companies has an ecommerce platform enabled printing business which is trying to increase value by providing relevant recommendations to its users.
- **Increase in revenue & cost reduction through targeted customer reach using AI/ML based recommendation engine**
 - Identify Cross-sell opportunities
 - Identify Up-sell opportunities
 - Targeted reach over digital channels improving campaign response rate
- **Improve customer experience**
 - Recommendation of right products at the right time for the right customer
 - Faster checkout process for repeat/new customers



Solution

- Use multiple data facets for generating recommendations
 - User
 - User Profiling
 - User Purchase Pattern Identification
 - User Context Analysis
 - Transactions
 - Patterns Clustering
 - Exploration of New Patterns
 - Seasonality Analysis
 - Product/Business Context Analysis
- Use of graph based optimizers and market basket analysis models to generate up-sell and cross-sell opportunities with the objective of providing relevant results and improving the per user value.



Benefits

- The system can provide recommendations at various stages of customer journey on e-comm channels
- Improvement in average revenue per user
- Improvement in customer experience
- Robust solution pipeline with
 - Multi-level recommendations (SKU, Product, Product Features)
 - Data validation
 - Error controls
 - Performance monitoring
 - Version controls
 - Model Governance
 - Automated retraining pipeline

