IBM Watson OpenScale

Operating trusted AI

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IBM **Cloud**

Business stakeholders do not trust AI

60%

of companies see **regulatory constraints** as a barrier to implementing AI.

– *IBM IBV AI 2018*

63%

cite availability of **technical skills** as a challenge to implementation.

- IBM IBV AI 2018

Without expensive Data Science resources handholding multiple AI models in a production application:

1. No way to **validate** if AI models are **compliant with regulations** and will achieve expected business outcomes before deploying
2. Difficult to **track and measure** indicators of business success in production
3. Resource intensive and unreliable processes for **ongoing business monitoring and compliance**

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Watson OpenScale

Validate and monitor AI models, deployed anywhere, to help comply with regulations, address internal safeguards, and mitigate business risk

Production monitoring for compliance and safeguards

Mitigate biased model behavior

Explain model decisions

Validate and control risk

Ensure that models are resilient to changing situations

Detect drift during runtime

Generate specific model retraining inputs

Align model performance with business outcomes

Actionable metrics and alerts

Open: Monitor and optimize models deployed on any model serve engine, beyond WML

Description:

Use Watson OpenScale to monitor models developed in a 3rd party IDE, open source framework and hosted in a 3rd party or private model serve engine

Value:

- Automate and Operationalize AI wherever your AI and applications reside
- Leverage flexibility and innovation of open source model building and training frameworks
- Retain existing data and model pipelines deployed to support applications in production
- Extend investments in skills and tools deployed as part of current data science and AI stacks

Model build/train frameworks

Model serving environments

Multi-Cloud Deployment
Through IBM Cloud Pak for Data

- Watson OpenScale can be deployed wherever organizations need it
  - IBM Public Cloud
  - IBM Cloud Pak For Data
- Deployment through IBM Cloud Pak for Data provides a common installation and management experience wherever the offering is located

PUBLIC

Maximize on cloud agility and economics

PRIVATE

Cloud native, behind the firewall, client managed

Cloud Native Experience

Regardless of which cloud you choose, you get market leading Watson capabilities.

IBM SOFTLAYER

OPENSHIFT

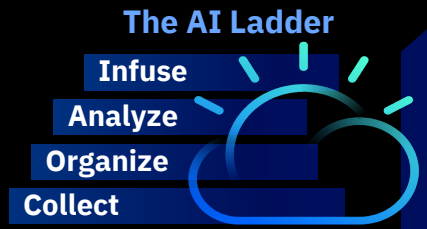
amazon web services

Microsoft Azure

openstack

The IBM Data and AI Portfolio

Everything you need for enterprise data and AI, on any cloud



A prescriptive approach to the journey to AI

Talent & Skills

Pre-built Use Cases
Watson Applications

Prepare	Build	Run	Manage
Watson Knowledge Catalog	**Watson Studio**	**Watson Machine Learning**	**Watson OpenScale**

Hybrid Data Management
Db2 Family

Data Ops & Governance
InfoSphere Family

Hybrid Data and AI Platform
Cloud Pak for Data

IBM Cloud · RED HAT OPENSHIFT · aws · Azure · openstack · Google Cloud · intel · IBM Z · IBM Power Systems · Hyperconverged System

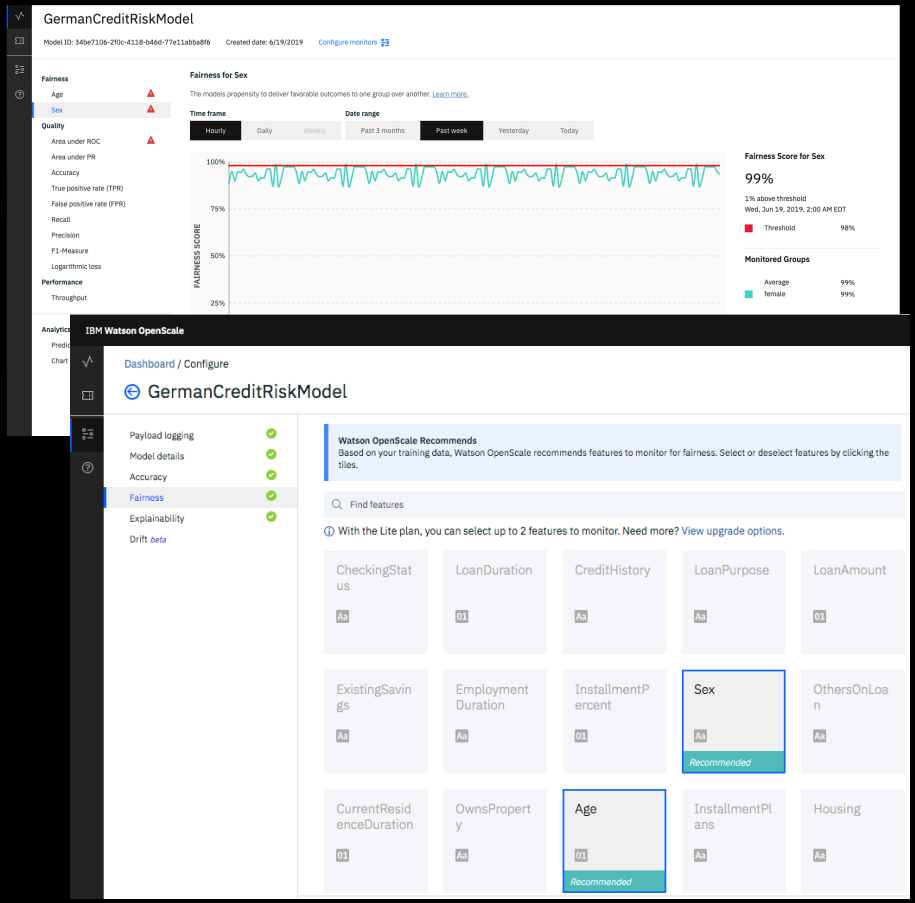
Bias Detection

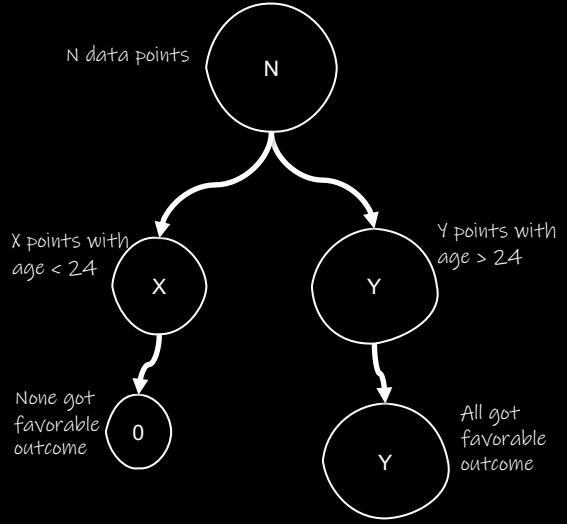
OpenScale enables enterprises to enforce fairness in their model's outcome by analyzing transactions in production and finding biased behavior by the model

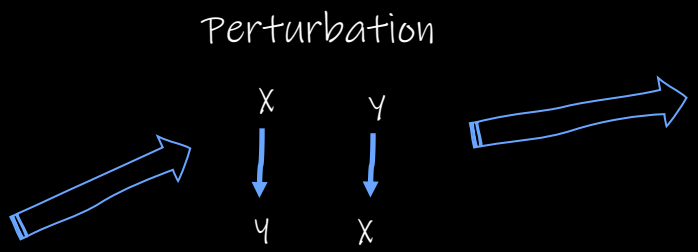
It pinpoints the source of bias and actively mitigates the biases found in production environment

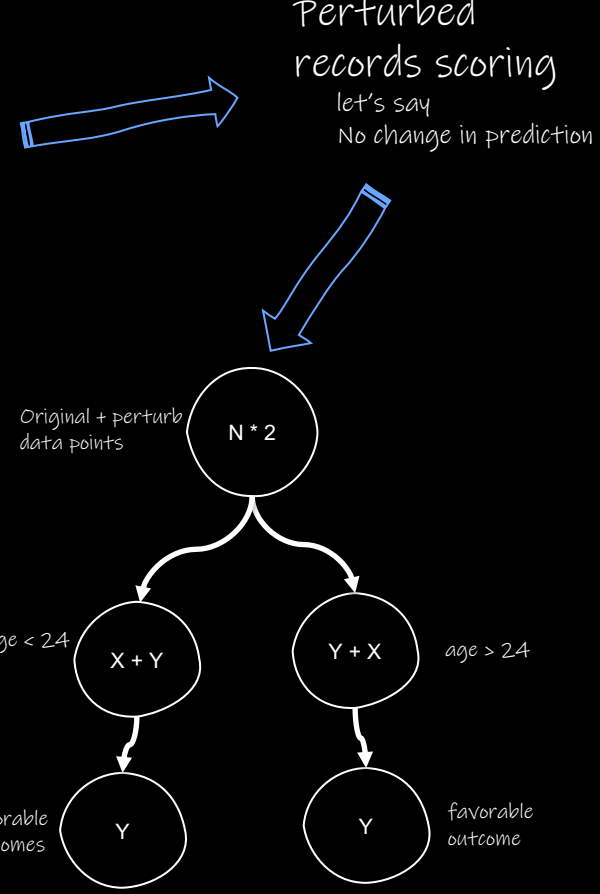
Value:

- Automatically recommend common protected attributes to monitor during production
- Detect biases in runtime in order to catch impacts on business applications and compliance requirements without time consuming, manual data analysis
- Metrics and data to help data scientists further troubleshoot issues in data sets or models
- Mitigate biases in runtime in order to enforce regulatory or enterprise fairness guardrails in real time









disparate impact ratio = (0 / X) / (Y / Y) = 0%

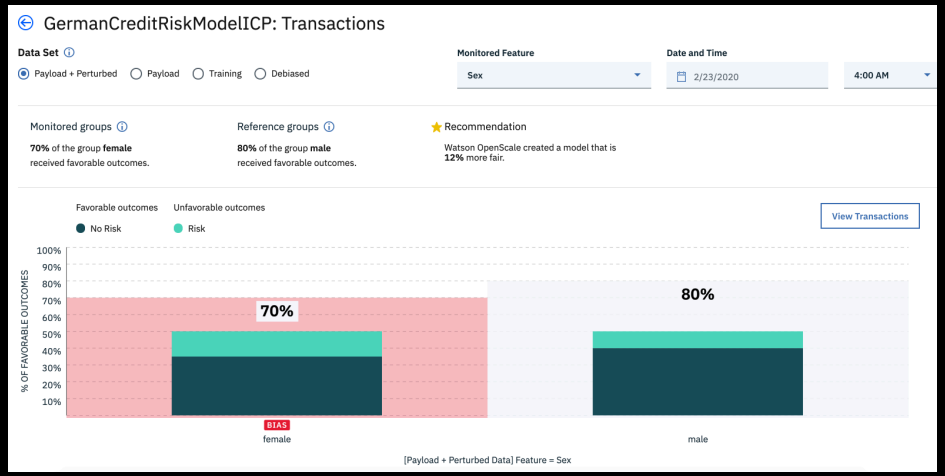
So, according to DI ratio, Model is highly biased.

But, is it really biased ??

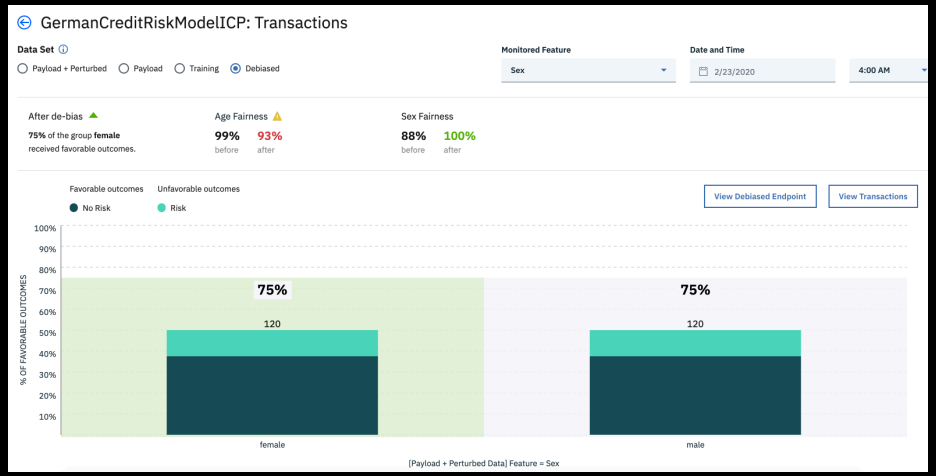
disparate impact ratio = (Y / (X + Y)) / (Y / (Y + X)) = 1000%

You see.. model is not actually biased!

Bias Mitigation – Original Output



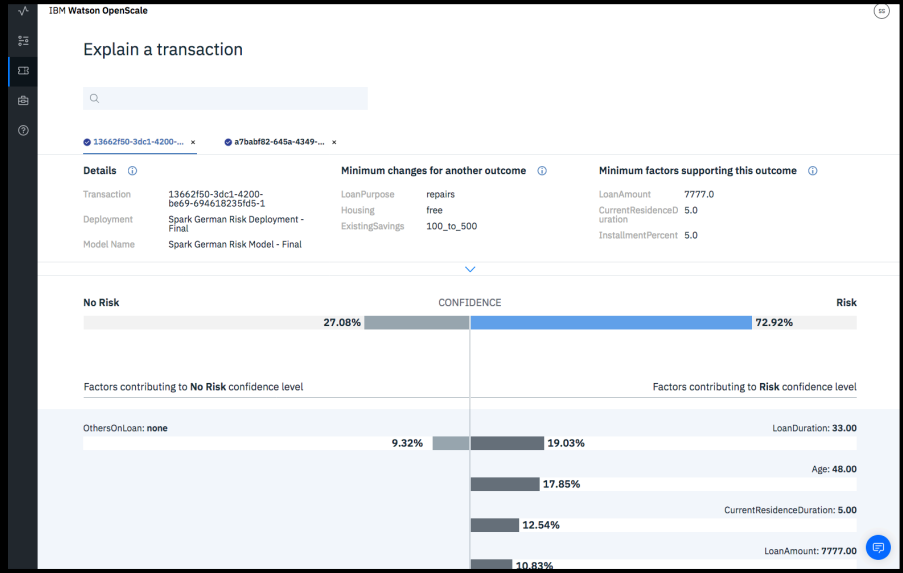
Bias Mitigation – De-biased output



Explainability

OpenScale records every individual transaction and drills down into its working to explain how the model makes decisions

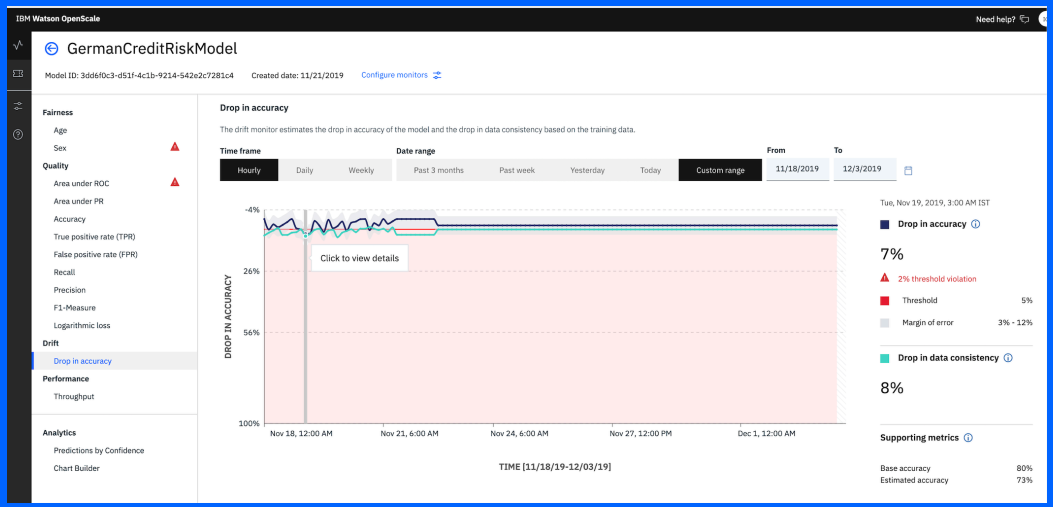
It provides a simple explanation that is user friendly and interactive

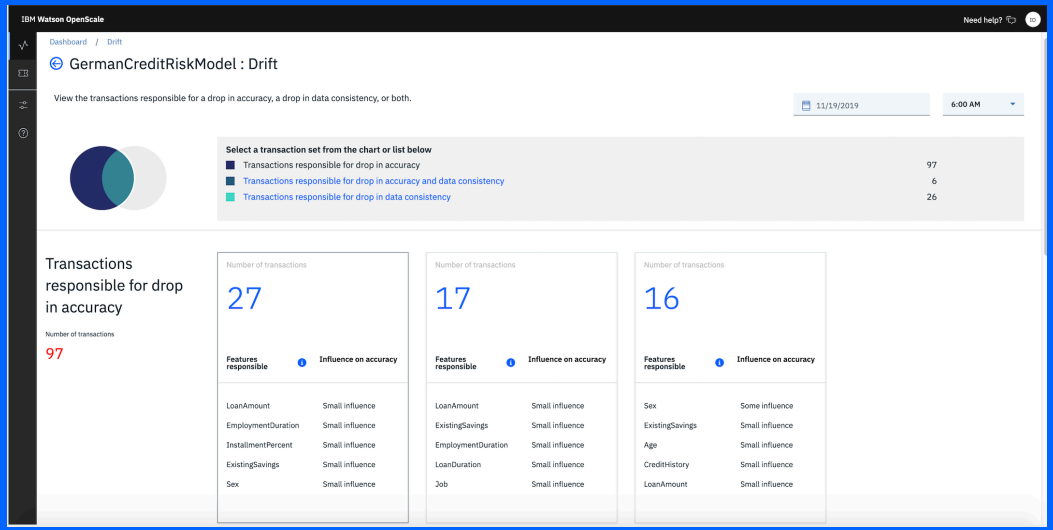


Value:

- Explain individual transaction level decisions made by the model in run time, including details about most important attributes and their values in order to assist in compliance and customer care situations
- Analyze individual transactions in a what-if manner in order to understand how model behavior will change in different business situations

Watson OpenScale will **automatically detect drifted transactions and pinpoint datapoints that contribute to drift**





Emerging use case:

Model Risk Management in Financial Services

Problem:
Current risk management practices are not optimized for AI

- **Open source frameworks** not supported
- Additional **data science skills** required for validating AI models
- Processes rely on **manual interaction** between validator and model developer
- Current systems **focus more on the documentation and workflow** aspects of model validation, **no active testing**
- No focus on **active production monitoring**

Watson OpenScale will **automate active testing** of models for **validation and monitoring** and **synchronize results with governance platforms**

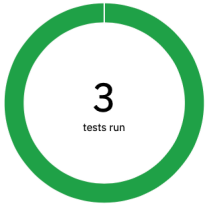
Credit Risk pre-prod deployment in B2 Evaluations

Actions

Model
Credit Risk pre-prod deployment in B2 Pre-production

Description
Credit Risk pre-prod deployment in B2

Model ID
21b4fe7b-5801-4266-9190-609ffe449646



Tests run
3

Tests passed
3

Tests failed
0

Evaluation date
Wed, Nov 27, 2019, 4:17 PM IST

Test data set
german_credit_data_biased_test.csv

Number of test records
200

Number of explanations
10

Fairness

Configure

95.10%

Green within threshold

100 records evaluated

Fairness by feature

Sex	95.10%
Age	95.20%

Quality

Configure

0.74

Green within threshold

100 records evaluated

Quality metrics

True positive rate (TPR)	0.58
Area under ROC	0.74
Precision	0.74
F1-Measure	0.65
Accuracy	0.81
Logarithmic loss	0.42
False positive rate (FPR)	0.09
Area under PR	0.65
Recall	0.58

Drift

Configure

1.30%

Green within threshold

100 records evaluated

Drift metrics

Drop in data consistency	7.75%
Drop in accuracy	1.30%
Predicted accuracy	78.20%
Base accuracy	79.50%

IBM Watson OpenScale + IBM OpenPages

Closed beta

Model Risk Management Solution for Financial Services

IBM OpenPages

Model Risk Governance

Store, manage and monitor a comprehensive model inventory

+

IBM Watson OpenScale

Active testing for model validation and continuous monitoring

OpenScale Demo

IBM