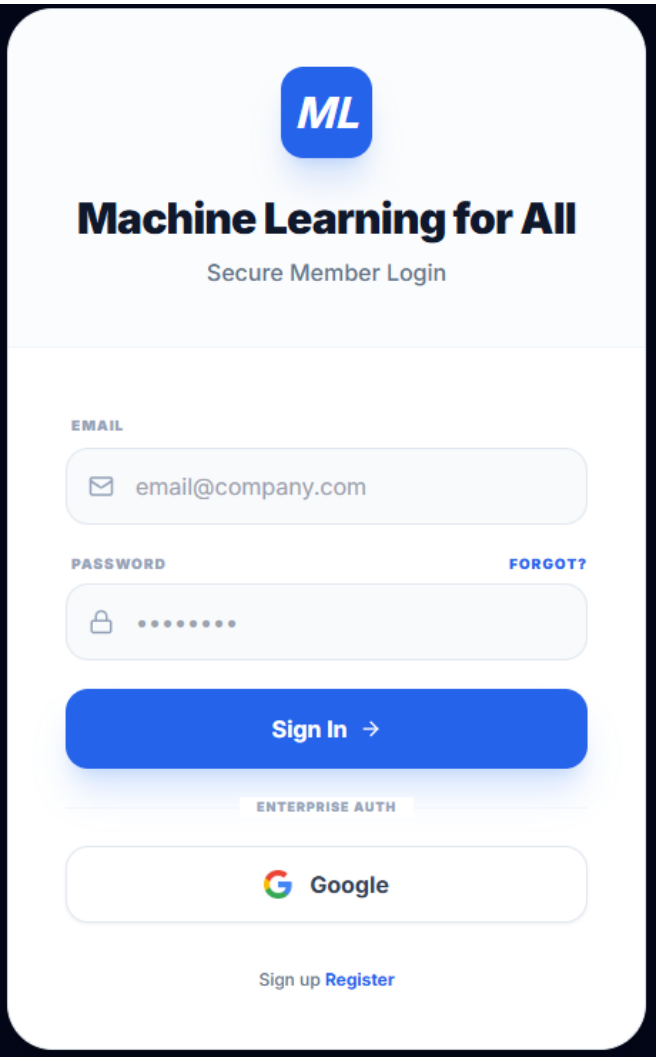
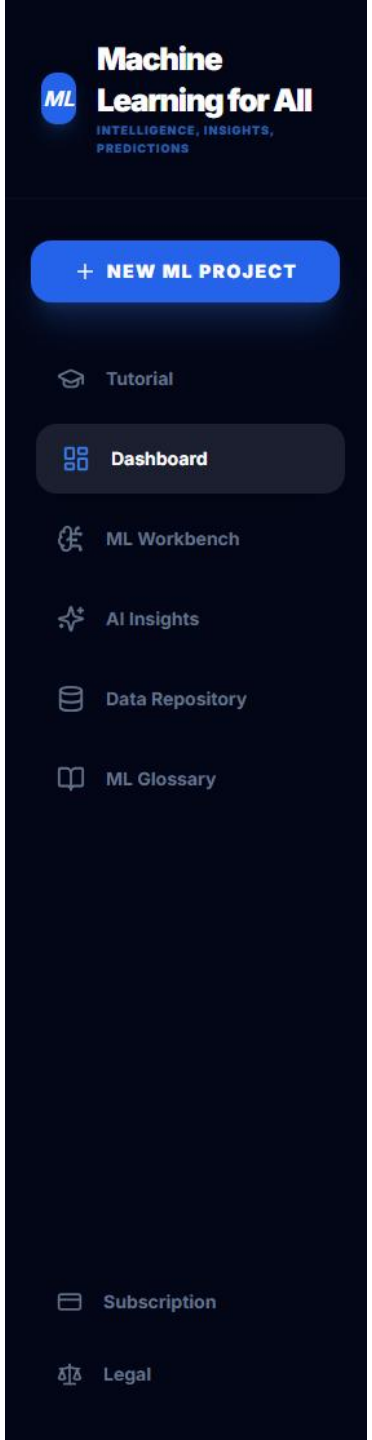
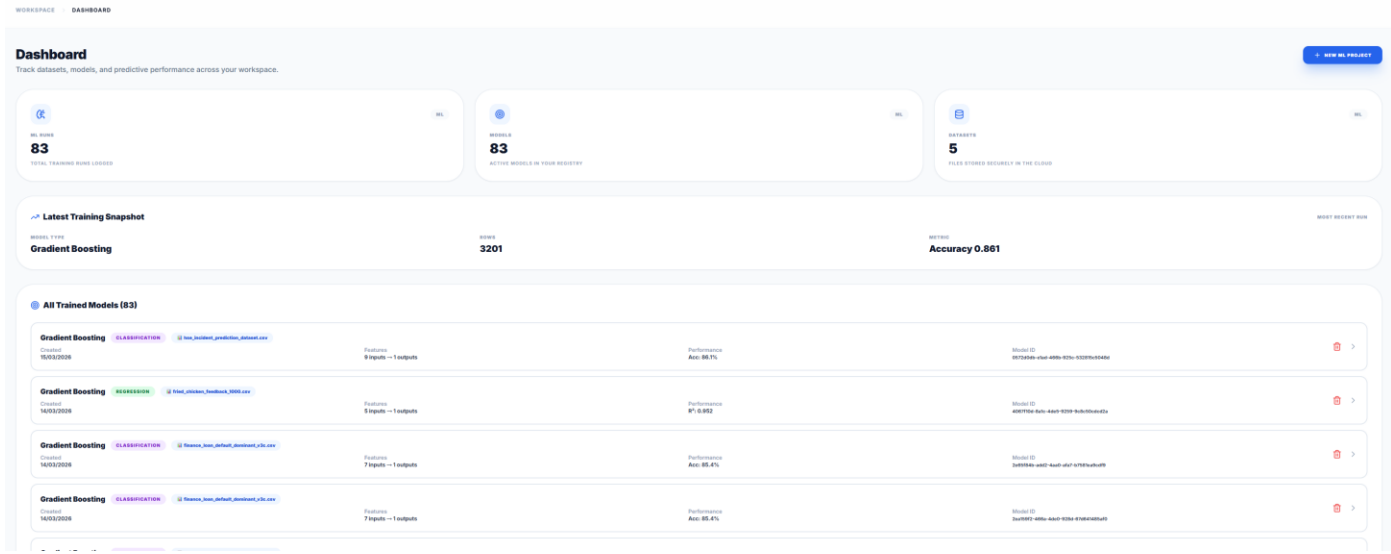
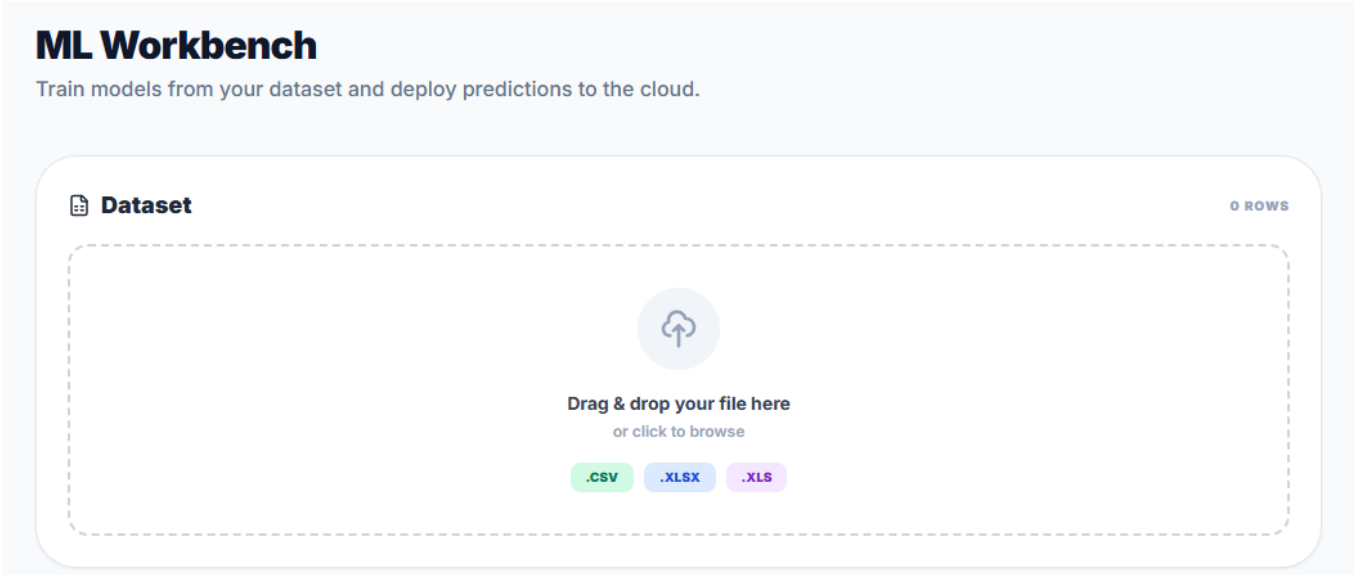








QDES DEVELOPED BY KEMAL DORAK

https://www.qdes.org/

Data Statistics & Preview

ROWS	COLUMNS	NUMERIC	CATEGORICAL
3001	9	8	0

Detailed Column Statistics

vibration_rms_mm_s

float64

COUNT	MEAN	MEDIAN	MODE	STD DEV	VARIANCE
3000	3.46	3.46	0.60	1.21	1.47

MIN	Q1 (25%)	Q3 (75%)	MAX	RANGE	IQR
0.60	2.64	4.28	7.39	6.79	1.64

SKEWNESS	UNIQUE	MISSING
0.03	2187	1 (0.03%)

motor_temp_c

float64

COUNT	MEAN	MEDIAN	MODE	STD DEV	VARIANCE
3000	67.99	68.10	68.80	11.99	143.87

MIN	Q1 (25%)	Q3 (75%)	MAX	RANGE	IQR
35.00	60.10	76.10	112.90	77.90	16.00

SKEWNESS	UNIQUE	MISSING
-0.01	550	1 (0.03%)

hydraulic_pressure_bar

float64

COUNT	MEAN	MEDIAN	MODE	STD DEV	VARIANCE
3000	184.62	184.60	191.40	24.75	612.60

MIN	Q1 (25%)	Q3 (75%)	MAX	RANGE	IQR
98.10	167.90	201.80	260.00	161.90	33.90

Data Labeling

Create Labels from Existing Data

Create a new labeled column based on rules applied to an existing column. Choose manual mode for custom rules or automatic mode for smart labeling.

Labeling Suggestions 0 required

These columns should be labeled/encoded before training. ML models need numeric input — text columns **must** be converted.

crane_failure_30d RECOMMENDED boolean · 2 unique · 1 null

Boolean column — encode to 0/1 for better ML compatibility

Best: Label Encoding (true→1, false→0)

Apply

vibration_rms_mm_s OPTIONAL float64 · 2187 unique · 1 null

Continuous numeric (2187 unique values) — binning into categories can improve classification

Best: Quartiles (divide into 4 meaningful groups)

Apply

LABELING MODE

Manual Rules
Define custom conditions

✨ Automated
Smart labeling

SOURCE COLUMN

✓ Select All ✗ Clear

- [ ] vibration_rms_mm_s
- [ ] motor_temp_c
- [ ] hydraulic_pressure_bar
- [ ] load_ratio
- [ ] wind_speed_m_s
- [ ] cycles_per_day

NEW COLUMN NAME

e.g., category, risk_level

Change Data Types

Convert columns to different data types before training.

All Integer | All Decimal | All Text

Understanding Data Types

INTEGER (int64)

Whole numbers without decimals

✓ Examples:
1, 5, 100, -25, 0, 9999

Use for: Age, Count, Quantity, ID Numbers

DECIMAL (float64)

Numbers with decimal points

✓ Examples:
3.14, 98.6, 0.5, -12.75, 100.0

Use for: Price, Temperature, Weight, Percentage

TEXT (object)

Letters, words, or mixed characters

✓ Examples:
"apple", "New York", "A1B2", "Yes"

Use for: Name, Category, Address, Description

BOOLEAN (true/false)

Only two possible values

✓ Examples:
True, False, Yes, No, 1, 0

Use for: Is Active, Has Feature, Passed/Failed

Important:
Choose the correct data type for better ML model performance. Wrong types can cause errors or poor predictions!

vibration_rms_mm_s: Decimal (float64)	motor_temp_c: Decimal (float64)	hydraulic_pressure_bar: Decimal (float64)
load_ratio: Decimal (float64)	wind_speed_m_s: Decimal (float64)	cycles_per_day: Integer (int64)
maintenance_overdue_days: Integer (int64)	operator_experience_years: Decimal (float64)	crane_failure_30d: Boolean

APPLY TYPE CHANGES | RESET TO ORIGINAL

Dataset

3001 ROWS

INPUT FEATURES 8/9 — ✓ Select All — ✗ Clear

- [x] vibration_rms_mm_s
- [x] motor_temp_c
- [x] hydraulic_pressure_bar
- [x] load_ratio
- [x] wind_speed_m_s
- [x] cycles_per_day
- [x] maintenance_overdue_days
- [x] operator_experience_years
- [ ] crane_failure_30d

8 of 9 selected

OUTPUT TARGETS 1/9 — ✓ Select All — ✗ Clear

- [ ] vibration_rms_mm_s
- [ ] motor_temp_c
- [ ] hydraulic_pressure_bar
- [ ] load_ratio
- [ ] wind_speed_m_s
- [ ] cycles_per_day
- [ ] maintenance_overdue_days
- [ ] operator_experience_years
- [x] crane_failure_30d

1 of 9 selected

MODEL SELECTION MODE

Automatic (Best Model)

- [x] STRATIFIED SPLIT (FOR CLASSIFICATION)

Maintains class distribution in train/test sets

TEST SIZE

0,2

▷ TRAIN MODEL

MODEL
Random Forest
✓ Auto-Selected Best

METRIC
Accuracy 0.899

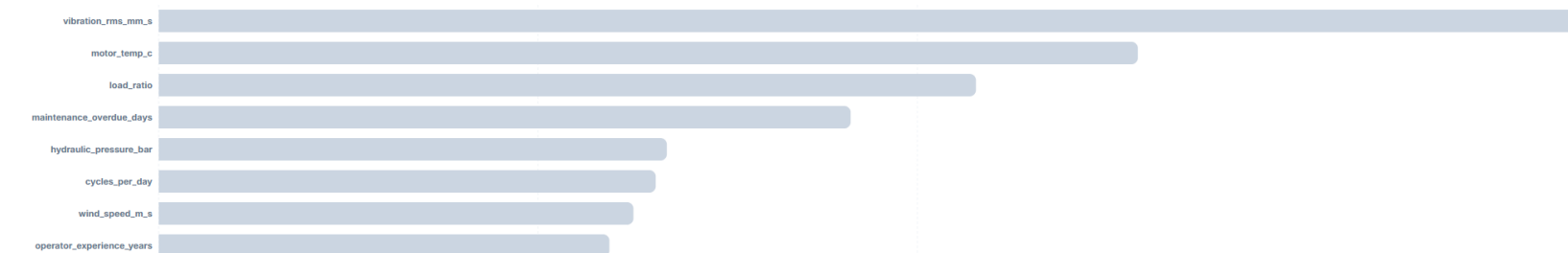
OUTPUTS
1

All Model Scores (Auto Selection)

Logistic Regression 0.884	Random Forest 0.899 ★ BEST	Gradient Boosting 0.894	Decision Tree 0.829
K-Nearest Neighbors 0.847	Naive Bayes 0.880	SVM 0.865	Neural Network (MLP) 0.867

Feature Importance

8 features



QDES DEVELOPED BY KEMAL DORAK

https://www.qdes.org/

Manual Prediction

VIBRATION_RMS_MM_S: 5

MOTOR_TEMP_C: 50

HYDRAULIC_PRESSURE_BAR: 150

LOAD_RATIO: 0,5

WIND_SPEED_M_S: 5

CYCLES_PER_DAY: 500

MAINTENANCE_OVERDUE_DAYS: 50

OPERATOR_EXPERIENCE_YEARS: 5

PREDICT

Prediction Results

CRANE_FAILURE_30D

CLASSIFICATION

0.00

MODEL INFORMATION

crane_failure_30d: classification

🎯 Prediction Optimizer

Fix one input feature and find the top 3 combinations of other features that produce the best predictions for your target output.

999/999 RUNS REMAINING TODAY | ⏳ COOLDOWN: 8S

📊 ~14.962.140.649.768.138.000.000 possible combinations (smart-sampled to 100.000) — Large dataset, may take longer

🎯 CLASSIFICATION — FINDS HIGHEST PROBABILITY FOR TARGET CLASS

FIXED INPUT FEATURE: vibration_rms_mm_s

FIXED VALUE: 5

TARGET OUTPUT: crane_failure_30d

TARGET CLASS (CODE): 1

⏳ WAIT 8S

✓ 50.000 combinations evaluated (of 6.838.272.691.850.154.000 total) | ⚡ Smart sampling used | Fixed: vibration_rms_mm_s = 5 | Class: 1

#1 95% PROBABILITY

vibration_rms_mm_s: 5.0 | motor_temp_c: 89.2 | hydraulic_pressure_bar: 192.6 | load_ratio: 0.954 | wind_speed_m_s: 3.53 | cycles_per_day: 591.0 | maintenance_overdue_days: 79.0 | operator_experience_years: 2.7

#2 95% PROBABILITY

vibration_rms_mm_s: 5.0 | motor_temp_c: 90.8 | hydraulic_pressure_bar: 162.2 | load_ratio: 0.61 | wind_speed_m_s: 5.56 | cycles_per_day: 404.0 | maintenance_overdue_days: 107.0 | operator_experience_years: 5.9

#3 95% PROBABILITY

vibration_rms_mm_s: 5.0 | motor_temp_c: 75.4 | hydraulic_pressure_bar: 161.0 | load_ratio: 0.833 | wind_speed_m_s: 6.88 | cycles_per_day: 392.0 | maintenance_overdue_days: 75.0 | operator_experience_years: 2.5

Global Optimizer

Find the top 10 input combinations across ALL features that produce the best predictions for your target output.

~14.962.140.649.768.138.000.000 possible combinations (smart-sampled to 100.000) — Large dataset, may take longer

CLASSIFICATION — FINDS HIGHEST PROBABILITY FOR TARGET CLASS

TARGET OUTPUT: crane_failure_30d

NUMBER OF RESULTS: Top 10

TARGET CLASS (CODE): 1

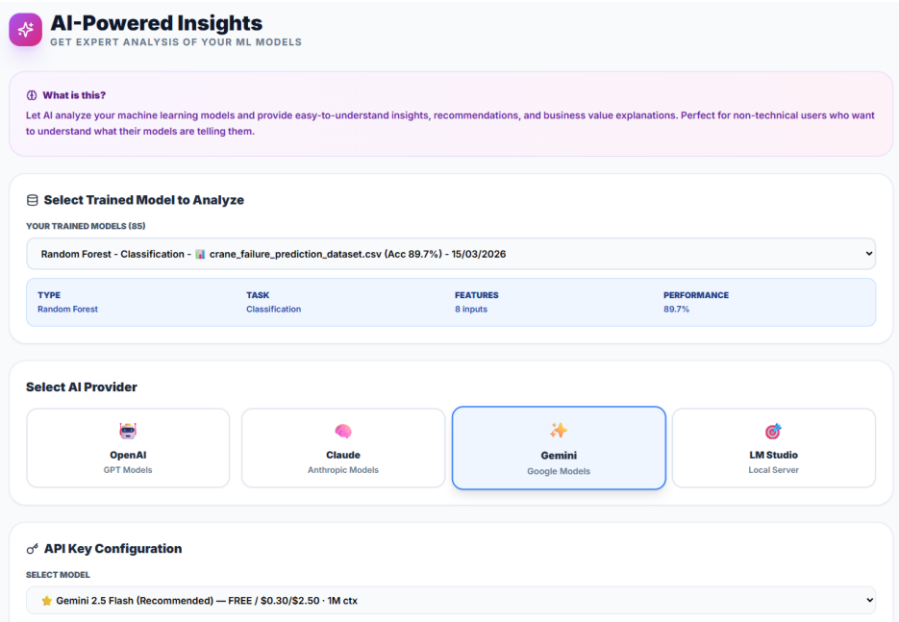
WAIT 11S

✓ 100.000 combinations evaluated (of 14.962.140.649.768.138.000.000 total) | Smart sampling used | Class: 1

RANK	VIBRATION_RMS_MM_S	MOTOR_TEMP_C	HYDRAULIC_PRESSURE_BAR	LOAD_RATIO	WIND_SPEED_M_S	CYCLES_PER_DAY	MAINTENANCE_OVERDUE_DAYS	OPERATOR_EXPERIENCE_YEARS	PROBABILITY
1	6.36	91.70	167.10	0.50	7.72	521.00	45.00	0.20	95%
2	5.40	97.00	160.30	0.75	2.38	495.00	146.00	7.30	95%
3	5.85	93.70	151.70	0.80	5.64	594.00	82.00	8.30	94%
#4	5.26	91.30	152.50	0.63	5.89	445.00	66.00	7.70	94%
#5	5.85	84.70	112.30	0.64	2.81	549.00	131.00	6.80	94%
#6	5.06	89.70	144.10	0.68	7.28	404.00	79.00	2.90	94%
#7	5.93	89.00	174.40	0.63	9.13	422.00	116.00	5.00	93%
#8	5.20	74.00	157.40	0.85	7.52	494.00	122.00	2.00	93%
#9	5.32	88.50	196.30	0.82	8.49	395.00	76.00	1.70	93%
#10	5.83	92.60	174.80	0.89	3.78	380.00	87.00	2.30	93%

Optimization Summary

The #1 input combination has a 95% probability for class 1. Evaluated 100.000 combinations (sampled from 14.962.140.649.768.138.000.000 possible).



ML Data Insights Report

Sunday, March 15, 2026 • 09:25 PM

MODEL OVERVIEW

MODEL TYPE	TASK
Random Forest	Classification

MODEL ID	GENERATED BY
33fa86ac-7f6c-4e8c-abd2-ea3b0d9f3c5a	GEMINI

PERFORMANCE METRICS

METRIC	VALUE
f1	0.8786
best_model	Random Forest
accuracy	0.8968
recall	0.8968
all_model_scores	[object Object]
precision	0.8866

FEATURE IMPORTANCE

RANK	FEATURE	IMPORTANCE
#1	vibration_rms_mm_s	0.0%
#2	motor_temp_c	0.0%
#3	load_ratio	0.0%
#4	maintenance_overdue_days	0.0%
#5	hydraulic_pressure_bar	0.0%
#6	wind_speed_m_s	0.0%
#7	cycles_per_day	0.0%
#8	operator_experience_years	0.0%

AI ANALYSIS & RECOMMENDATIONS

Here's a detailed analysis of your machine learning model, translated into simple, non-technical language for a business user:

AI ANALYSIS & RECOMMENDATIONS

Here's a detailed analysis of your machine learning model, translated into simple, non-technical language for a business user:

Machine Learning Model Analysis: Predicting (Likely Machine Faults/Performance Issues)

Your Goal: To use data to predict a specific outcome, likely classifying whether a machine is about to fail, has a fault, or is performing optimally versus sub-optimally.

Our Tool: We've used a sophisticated prediction system called a "Random Forest" model. Think of it as a committee of many smaller decision-makers (like mini-experts) that each vote on an outcome, and then the final decision is based on the majority vote. This approach makes it very robust and accurate.

---

1. Model Performance Summary (How Good Is It?)

Overall, this model is a **strong performer** and demonstrates excellent capability in predicting the desired outcome.

* **Top Choice:** Among all the different types of prediction models we tested (including K-Nearest Neighbors, Logistic Regression, Neural Networks, etc.), the **Random Forest model was the clear winner**, achieving the highest scores. This means we've picked the best tool for the job based on the data we have.
* **Highly Accurate:** The model is **correct nearly 90% of the time** (specifically, 89.7%). This is a very high level of accuracy for real-world predictions.
* **Reliable in Identifying Problems:** When it says there's a problem or a specific category, it's generally right, and it also does a great job of catching most of the actual problems that occur.

---

2. What the Metrics Mean for Your Use Case

Let's imagine the model is trying to predict "Machine Fault" (the "positive" outcome) versus "Normal Operation" (the "negative" outcome).

* **Accuracy (0.897 or 89.7%):**
* **Meaning:** This is the overall percentage of times the model makes a correct prediction, whether it's correctly identifying a fault or correctly identifying normal operation.
* **In Practice:** Out of 100 predictions, it will be right almost 90 times. This is a solid indicator of overall performance.

* **Recall (0.897 or 89.7%):**
* **Meaning:** This tells us how good the model is at catching **all the actual problems**. If there were 10 actual machine faults, how many of them did the model successfully flag?
* **In Practice:** If 10 machines truly have a fault, our model will detect nearly 9 of them (8.97, to be precise). This is crucial if missing a problem (a "false negative") is costly or dangerous. It means we're doing a good job of *not missing* critical events.

* **Precision (0.887 or 88.7%):**
* **Meaning:** This tells us how often the model is **right when it predicts a problem**. If the model says there's a fault, what's the chance it's truly a fault and not a false alarm?
* **In Practice:** If the model flags 10 machines as having a fault, almost 9 of those will genuinely have a fault. This is important for avoiding unnecessary interventions or wasted resources from "false alarms."

* **F1 Score (0.879):**
* **Meaning:** This is a balanced score that considers both Recall and Precision. It's especially useful when both catching problems and avoiding false alarms are important.
* **In Practice:** An F1 score close to 0.9 means the model achieves a strong balance – it's both good at finding most problems *and* reliable in its predictions, making it a generally trustworthy system.

ML Glossary

TERMS, METRICS & DEFINITIONS

Search terms, metrics, concepts..

ALL | REGRESSION METRICS | CLASSIFICATION METRICS | MODEL TYPES | DATA PROCESSING | MODEL CONCEPTS

22 DEFINITIONS FOUND

R^2 (R-Squared)

REGRESSION METRICS

Coefficient of determination that measures how well the model explains the variance in the target variable.

FORMULA

$R^2 = 1 - (SS_{res} / SS_{tot})$

INTERPRETATION

Range: 0 to 1 (can be negative for poor models). Higher is better. R^2=1 means perfect predictions, R^2=0 means the model is no better than predicting the mean.

EXAMPLE

R^2=0.85 means the model explains 85% of the variance in wine quality scores.

MSE (Mean Squared Error)

REGRESSION METRICS

Average of squared differences between predicted and actual values. Penalizes large errors more heavily.

FORMULA

$MSE = (1/n) \times \Sigma(y_{actual} - y_{predicted})^2$

INTERPRETATION

Range: 0 to ∞. Lower is better. MSE=0 means perfect predictions. Units are squared, so harder to interpret directly.

EXAMPLE

MSE=0.5 for wine quality means average squared error is 0.5 (quality scale²).

ML Glossary

TERMS, METRICS & DEFINITIONS

Search terms, metrics, concepts..

ALL | REGRESSION METRICS | CLASSIFICATION METRICS | MODEL TYPES | DATA PROCESSING | MODEL CONCEPTS

7 DEFINITIONS FOUND

Random Forest

MODEL TYPES

Ensemble method that builds multiple decision trees and combines their predictions. Reduces overfitting and improves accuracy.

INTERPRETATION

Works well for both classification and regression. Handles non-linear relationships. Good default choice for many problems.

EXAMPLE

Used for predicting wine quality based on chemical properties.

Logistic Regression

MODEL TYPES

Statistical model for binary/multi-class classification. Predicts probability of class membership.

INTERPRETATION

Simple, interpretable, fast. Works well for linearly separable data. Good baseline model.

EXAMPLE

Classifying emails as spam or not spam.

Linear Regression

MODEL TYPES

Finds best-fit straight line relationship between input features and continuous target.

FORMULA

$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \ldots + \varepsilon$

INTERPRETATION

Complete Guide

Learn how to predict anything with Machine Learning — no coding required!

This tutorial walks you through every feature step by step. Follow along and you'll train your first AI model in minutes.

What You'll Learn

1. What is Machine Learning?

Machine Learning (ML) is like teaching a computer to make predictions based on examples you give it. You don't write rules — the computer *figures out the rules by itself* from your data.

Simple Example: Fried Chicken

Imagine you want to predict how delicious fried chicken will taste. You collect data about past batches:

Frying Temperature + Cook Time + Sauce Amount + Spice Level + Crispiness → **Predicted: Deliciousness Score**

The AI learns: "Higher temp + longer cook time + more spice = more delicious!" and can predict future batches.

12 Practice Datasets

Ready to practise? Download these **industry-themed synthetic datasets** and train your own models. Each dataset is designed to teach you different ML concepts — from classification to regression.

Pharma — Trial Response

Classification

Predict whether a patient will respond to a clinical trial based on dosage, adherence, biomarkers, and demographics.

`dose_mg` `adherence_rate` `baseline_severity_score` `biomarker_A` `genotype_variant` `patient_age` `sex` → `trial_response`

2,500 rows · 8 columns — Download

Health — Length of Stay

Regression

Predict how many days a patient stays in hospital based on triage severity, infection status, comorbidities, and BMI.

`triage_acuity_level` `infection_status` `comorbidity_index` `bed_pressure` `patient_age` `bmi` `sex` → `length_of_stay_days`

2,500 rows · 8 columns — Download

Finance — Loan Default

Classification

Predict whether a borrower will default on a loan using credit score, debt-to-income ratio, loan amount, and term.

`credit_score` `debt_to_income` `loan_to_income` `loan_amount_usd` `annual_income_usd` `term_months` `borrower_age` → `loan_default`

2,500 rows · 8 columns — Download

Maintenance — Crane Failure

Classification

Predict crane failure within 30 days using vibration, motor temperature, hydraulic pressure, and maintenance history.

`vibration_rms_mm_s` `motor_temp_c` `hydraulic_pressure_bar` `load_ratio` `wind_speed_m_s` `cycles_per_day` `maintenance_overdue_days` `operator_experience_years` → `crane_failure_30d`

3,000 rows · 9 columns — Download

HSE — Incident Prediction

Classification

Predict workplace safety incidents within 30 days using hazard scores, PPE compliance, overtime, training levels, and shift conditions.

`hazard_score` `ppe_compliance` `overtime_hours_week` `training_compliance` `equipment_condition_score` `shift_type` `weather_severity` `contractor_ratio` → `hse_incident_30d`

3,200 rows · 9 columns — Download

How to Use These Datasets

1. Download any dataset above
2. Go to **ML Workbench** and upload the CSV
3. Click **Automatic Clean** to prepare the data
4. Encode text columns (e.g., sex, shift_type, genotype_variant)
5. Select the target column as **Output** and the rest as **Inputs**
6. Train with **Auto mode** first — then experiment with different models!

And many other functions ....

Developed by Kemal Dorak / QDES

https://www.qdes.org/