

AI

- Inson aql-mantiq faoliyatini dastur orqali modellashtirish
- Maqsadi: tasniflash, bashorat, qaror qabul qilish va boshqalar

AI → Machine Learning (ML)

- Ma'lumot asosida o'rgatiladigan tizim

Machine Learning turlari

1. Supervised ML (SML)
 - Classification
 - Binary (target ikkita qiymat)
 - Multi-class (target 3+ qiymat)
 - Regression (target uzluksiz qiymat)
2. Unsupervised ML (USML)
 - Kategoriyalanmagan ma'lumotlarni guruhlariga ajratish
3. Reinforcement ML (RML)
 - Muhitdan feedback olib qarorlarni optimallashtirish

ML Model Structure

1. Data collection (raw data)
2. Data preprocessing
 - Missing value handling
 - Encoding
 - Scaling / normalization
3. Algorithm selection
4. Model training (fitting)
5. Prediction (yangi ma'lumotga natija chiqarish)
6. Evaluation (model sifati baholanishi)
7. Testing (yakuniy natija)
8. Deployment (real ishlashga chiqarish)
 - Agar score past bo'lsa → Model improvement bosqichi

Data Preprocessing

1. Handling missing values
 - Mean (numerical)
 - Median (numerical)
 - Mode (object/numerical)
 - Drop (row/col)
 - Fixed (constant qiymat)
2. Encoding (categorical → numerical)
 - One-hot encoding (classlar sonicha ustun)
 - Label encoding (alfavit tartibida)
 - Frequency encoding (takrorlanish nisbati)
 - Target encoding (mean qiymati bo'yicha)
 - Ordinal encoding (tartibga qarab)
3. Scaling (qiymatlarni balanslashtirish)
 - Standart
 - MinMax (0–1 oraliq)
 - Robust (outlierlarga chidamli)

Algorithm Selection

- ML algoritmlar: linear va non-linear

Linear:

- Linear Regression (Regression)
- Logistic Regression (Classification)

Non-linear:

1. Tree-based
 - Decision Tree
 - Random Forest
2. Distance-based
 - KNN
 - SVM
3. Ensemble
 - Random Forest
 - Gradient Boosting

Logistic Regression

- Classification uchun ishlatiladi
- Bosqichlari:
 - Data preprocessing (cleaning, encoding, scaling)
 - x, y (feature + target)
 - Train–test split
 - Training (fitting)
 - Predicting
 - Evaluating

Linear Regression

- Input-output o‘rtasidagi chiziqli bog‘liqlik
- Formula: $y = B_0 + B_1x + e$
 - x: input
 - y: output
 - B: parametrlar (beta)
 - e: error (hech qachon 0 bo‘lmaydi)
- Turlari:
 - Simple
 - Multiple

Library (Python ML uchun)

- NumPy
- Pandas
- Matplotlib
- Seaborn
- Scikit-learn (eng muhim kutubxona)

Python Fundamentals

Data Types:

- int, float, str, bool

Operations:

- Arithmetic: +, -, *, /
- Comparison: ==, !=, >, <
- Logical: and, or, not

Conditions:

- if
- elif
- else

For Loop:

- Takroriy amallarni bajarish uchun