

Internship Task 1

Introduction to Data Science, AI, ML & Python Programming

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What is Data Science, AI & ML?

Data Science

An interdisciplinary field that extracts insights and knowledge from structured and unstructured data using scientific methods, algorithms, and systems. It combines statistics, programming, and domain expertise to solve real-world problems.

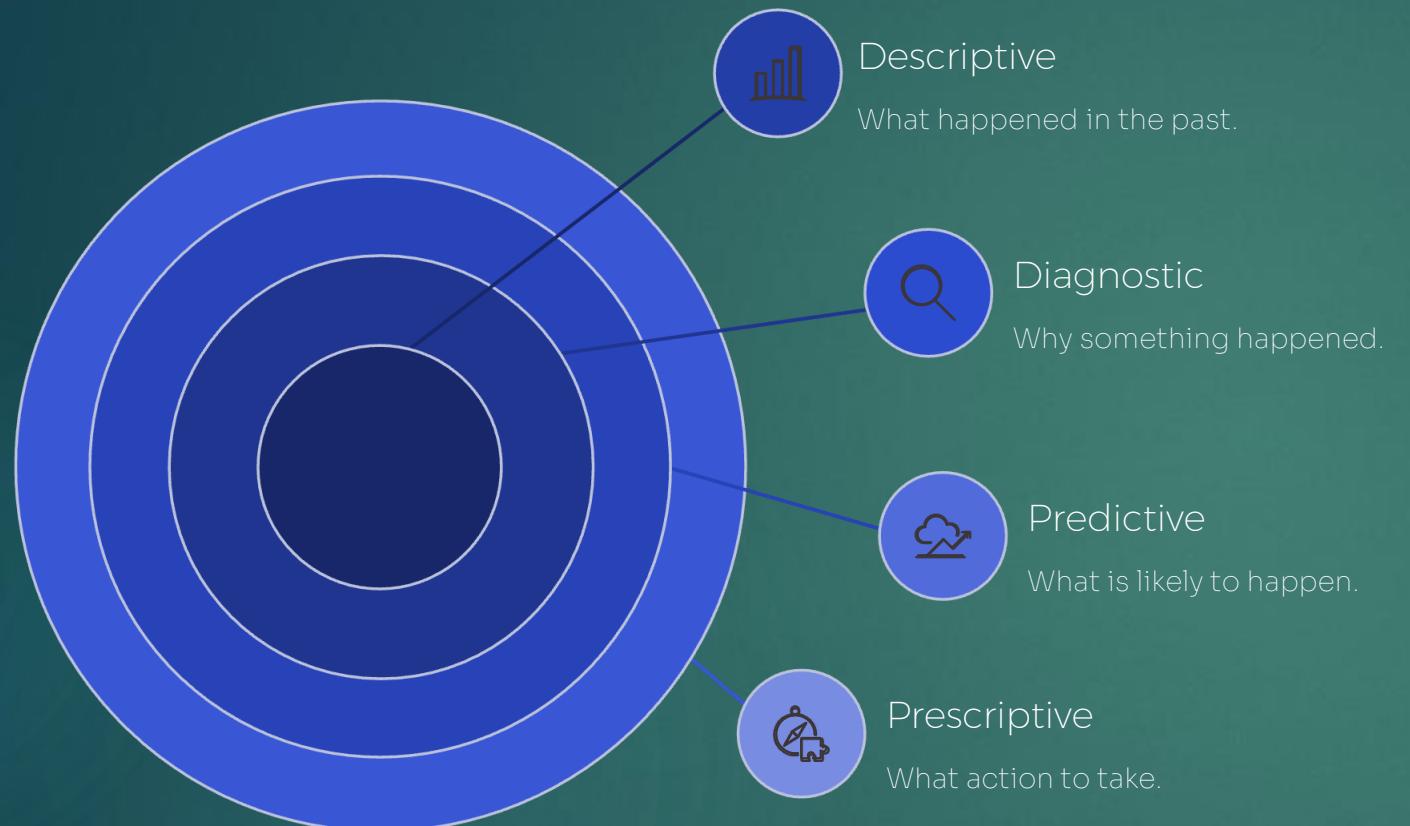
Artificial Intelligence (AI)

The simulation of human intelligence in machines programmed to think, learn, and solve problems. AI systems can perform tasks like speech recognition, decision-making, and visual perception that typically require human intelligence.

Machine Learning (ML)

A subset of AI that enables systems to automatically learn and improve from experience without being explicitly programmed. ML algorithms build mathematical models based on training data to make predictions or decisions.

Types of Data Analysis

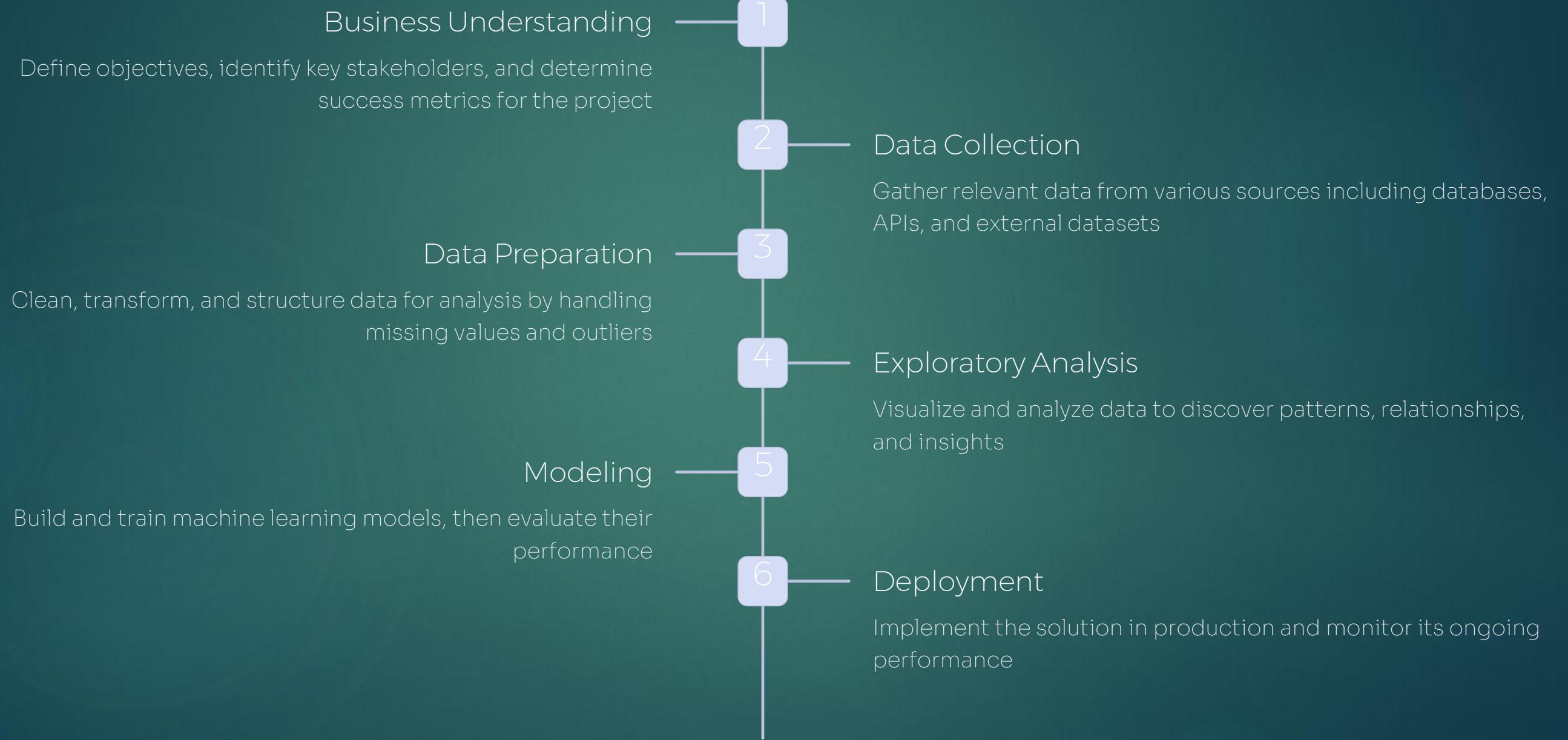


Data analysis evolves from understanding past events to predicting and shaping future outcomes through increasingly sophisticated techniques.

Understanding the Analysis Spectrum

- **Descriptive:** Summarizes historical data to identify patterns and trends
- **Diagnostic:** Examines data to determine why something happened
- **Predictive:** Uses statistical models to forecast future outcomes
- **Prescriptive:** Recommends actions to achieve desired results

Data Science Project Lifecycle



Real-World Applications of Data Science



Healthcare

Disease prediction, drug discovery, personalized treatment plans, and medical imaging analysis



Finance

Fraud detection, risk assessment, algorithmic trading, and credit scoring systems



E-Commerce

Product recommendations, dynamic pricing, customer segmentation, and inventory optimization



Smart Cities

Traffic optimization, energy management, public safety monitoring, and urban planning

What is Python Programming?

Python is a high-level, interpreted programming language known for its simplicity and readability. Created by Guido van Rossum in 1991, Python emphasizes code readability with its use of significant indentation and clean syntax.

Python supports multiple programming paradigms including procedural, object-oriented, and functional programming. Its versatility makes it ideal for beginners while remaining powerful enough for complex applications in data science, web development, and automation.

"Python is an easy to learn, powerful programming language with efficient high-level data structures."

Why Python for Data Science?

- Simple, readable syntax
- Extensive library ecosystem
- Strong community support
- Cross-platform compatibility
- Rapid prototyping capabilities

Python: Features, Advantages & Libraries



Key Features

- Easy to learn and read with English-like syntax
- Interpreted language with dynamic typing
- Object-oriented and supports multiple paradigms
- Automatic memory management



Core Advantages

- Massive community and documentation
- Free and open-source
- Platform independent (Windows, Mac, Linux)
- Integrates easily with other languages



Essential Libraries

- **NumPy**: Numerical computing and arrays
- **Pandas**: Data manipulation and analysis
- **Scikit-learn**: Machine learning algorithms
- **TensorFlow/PyTorch**: Deep learning frameworks
- **Matplotlib/Seaborn**: Data visualization

Career Roles in Data Science



Data Analyst
Interprets data, creates reports, and provides actionable insights using statistical tools and visualization techniques



Data Engineer
Builds and maintains data pipelines, databases, and infrastructure for data processing and storage



Machine Learning Engineer
Designs and implements ML models, optimizes algorithms, and deploys AI solutions in production



Data Scientist
Combines statistics, programming, and domain knowledge to solve complex problems and build predictive models



BI Developer
Creates dashboards and reporting tools to help organizations make data-driven business decisions



AI Researcher
Develops cutting-edge AI algorithms, publishes research, and advances the field of artificial intelligence

Rules of Python Programming

1 Indentation is Mandatory

Python uses whitespace indentation (4 spaces) to define code blocks instead of braces

2 Case Sensitivity Matters

Variables like 'name' and 'Name' are treated as completely different identifiers

3 Use Meaningful Names

Variable and function names should be descriptive and follow snake_case convention

4 Comment Your Code

Use # for single-line and """ for multi-line comments to explain complex logic

PEP 8 Style Guide

Python Enhancement Proposal 8 (PEP 8) provides coding conventions for writing clean, readable Python code.

Additional Guidelines

- Keep lines under 79 characters
- Import statements at the top of files
- Avoid using reserved keywords as names
- Follow the Zen of Python: "Simple is better than complex"



THANK YOU....!