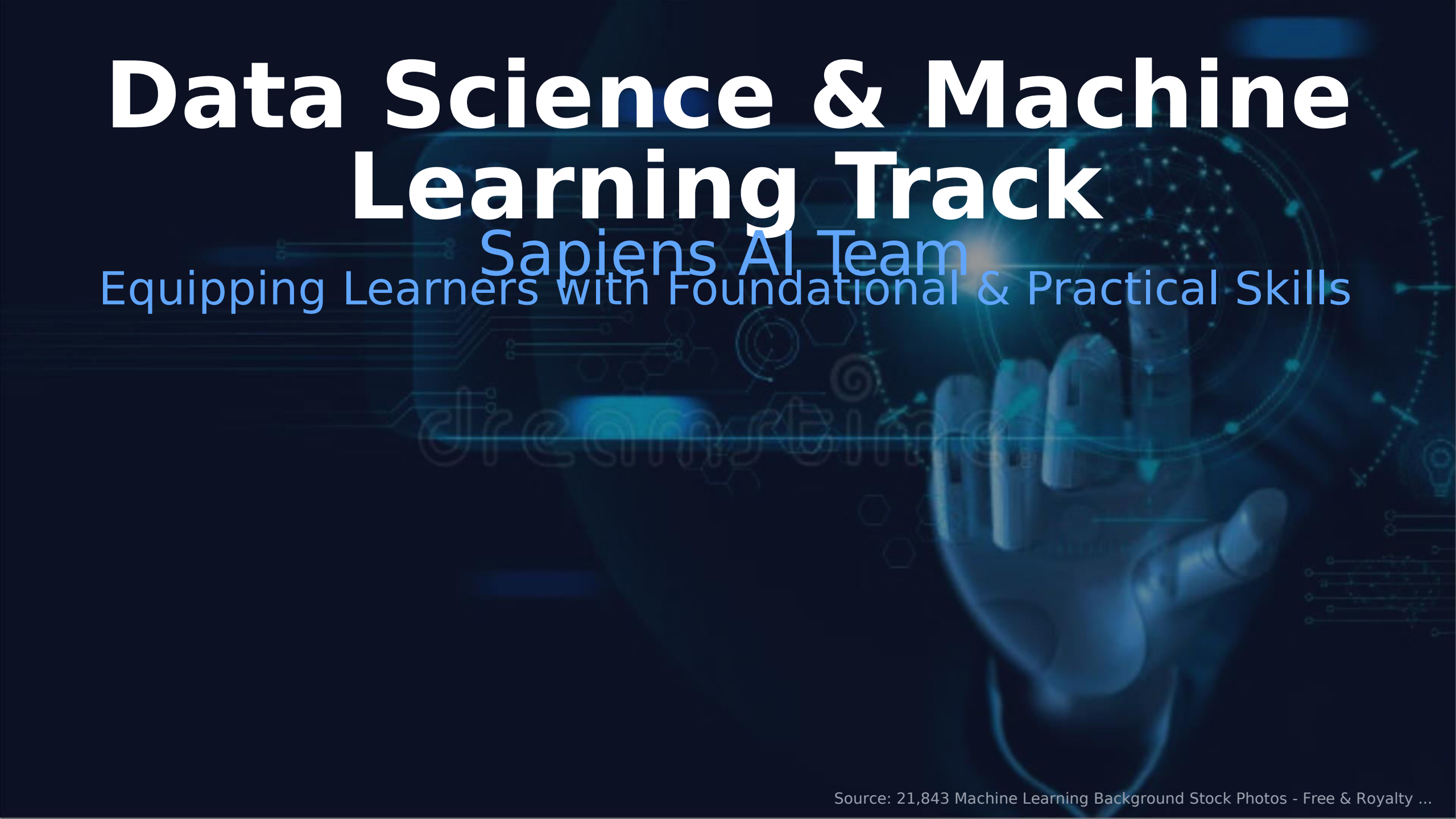
Data Science & Machine Learning Track

Sapiens AI Team

Equipping Learners with Foundational & Practical Skills



Source: 21,843 Machine Learning Background Stock Photos - Free & Royalty ...

Program Goal & Core Competencies

Program Goal

The primary goal of this track is to empower learners with the practical skills necessary to **execute real-world data science projects**, specifically focusing on advanced analytical applications that drive business value.

Predictive Analytics

Developing robust models to forecast future trends and outcomes. This enables organizations to make proactive, data-driven decisions and anticipate market shifts, moving beyond descriptive analysis to provide critical foresight.

Core Competencies

Data Wrangling & Visualization

Mastering techniques to collect, clean, transform, and visually represent complex datasets for extracting actionable insights.

PANDAS & MATPLOTLIB

Statistical Analysis

Applying foundational and advanced statistical methods to interpret data patterns, test hypotheses, and validate model assumptions.

HYPOTHESIS TESTING

ML Algorithms

Proficiency in both supervised and unsupervised machine learning algorithms, including specific applications like K-Means clustering for segmentation.

Model Evaluation

Utilizing diverse metrics and methodologies to rigorously assess model performance, ensure reliability, and enhance interpretability.

Phase 1: Foundational & Core Concepts (Months 1 & 2 - Online)

Month 1: Foundational Skills

Goal: Master Data Handling, Visualization & Statistical Concepts

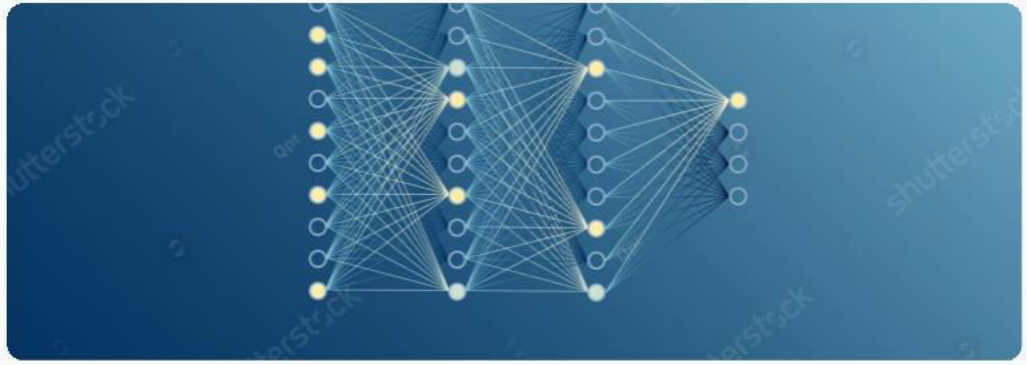
Data Handling & Preprocessing: Techniques for data collection, cleaning, transformation, and structuring to ensure data quality and usability, including handling missing values and outliers.

Data Visualization & EDA: Principles for exploratory data analysis (EDA), creating informative charts with libraries like Matplotlib and Seaborn to uncover patterns and trends.

Statistical Concepts: Understanding fundamental methods

Month 2: Core ML Implementation

Goal: Implement & Evaluate Core ML Algorithms using scikit-learn



Core ML Algorithms: In-depth application of essential algorithms, covering supervised learning (Regression, Classification) and unsupervised learning (Clustering like K-Means).

Scikit-learn Proficiency: Hands-on experience with scikit-learn, the leading Python library for machine learning, to build, train, and fine-tune models efficiently.

Month 1: Data Foundations & Statistical Insights

Σ Week 3: Statistical Foundations

Descriptive Statistics: Calculate measures of central tendency and dispersion.

Probability Theory: Understand core concepts, random variables, and distributions.

Inferential Statistics: Learn to draw conclusions about populations from samples.

Week 4: Hypothesis Testing

Hypothesis Testing: Use t-tests and chi-squared tests to make data-driven decisions.

Confidence Intervals: Estimate population parameters with certainty.

Mini-Project: Apply all learned skills to a practical data analysis project.

Source: Data Science and Marketing: leveraging Customer Data; How To Build Customer Segmentation Models In Python; Customer Segmentation using Unsupervised Machine Learning in Python

Month 2: Machine Learning Algorithms & Practice

Week 5: Intro to ML & Regression

ML Fundamentals Grasp core concepts of Machine Learning, understanding the ML workflow from data preparation to model deployment.

Regression Deep dive into regression problems to predict continuous values using Linear, Multiple, and Polynomial Regression.

Metrics Evaluate models using Mean Absolute Error (MAE), Mean Squared Error (MSE), and R-squared for reliability.

Week 6: Classification & Model Evaluation

Classification Explore algorithms like Logistic Regression, Decision Trees, SVM, and KNN to predict categorical outcomes.

Evaluation Master advanced evaluation with Confusion Matrices, Precision, Recall, F1-Score, and ROC/AUC curves.

Validation Implement robust K-fold cross-validation to assess model generalization and prevent overfitting.

Phase 2: Project Application & Industry Immersion (Month 3 - Offline)

Month 3 Goal: Execute a Complete Data Science Project & Prepare for the Job Market

Real-World Application

Undertake an end-to-end data science project, applying all

Career Workshops

Skill Enhancement

Focus on resume building, technical interview prep, and crafting compelling cover

Industry Networking

Professional Connections

Connect with data science professionals, alumni, and recruiters through organized

Month 3: Capstone Project Development

Bringing Concepts to Life: End-to-End Data Science Project Application

Week 9: Project Kick-off & Advanced Data Preparation

- **Project Kick-off:** Defining clear **project scope**, objectives, and deliverables. This phase involves

Week 10: Model Development & Optimization

- **Algorithm Implementation:** Selecting and implementing appropriate ML algorithms (e.g., **K-**

Month 3: Project Showcase & Career Launchpad

Culminating Projects & Launching Data Science Careers

Project Showcase: Final Steps

Week 11: Evaluation, Interpretation & Reporting

Model Assessment: Focus on comprehensive evaluation using key metrics, error analysis, and robust validation.

Explainable AI (XAI): Interpret complex model decisions and feature importance for stakeholders.

Documentation: Best practices for documenting code, methodology, and creating impactful reports.

Career Launchpad: Professional Development

Resume Building

Crafting compelling resumes tailored for data science roles.

LinkedIn Optimization

Strategies to showcase expertise and leverage the platform.

Certification & Future Readiness

Program Culmination: Project Execution Mastery

Executing Predictive Analytics

- Graduates can design, develop, and deploy robust **predictive analytics models** to forecast trends and enable proactive decisions.
- The program emphasizes hands-on application of Python and ML to solve complex forecasting challenges.

Leading Customer Segmentation

Career Preparedness: Ready for the Job Market

Practical Skills Advantage
Graduates gain immediately applicable skills for the data science job market through hands-on project work.

Job Market Entry Readiness
A robust portfolio from real-world case studies ensures they are ready to contribute from day one in diverse data science roles.

Mentorship & Networking
Career workshops and industry networking position graduates to confidently navigate the job market.