TECHCRUSH AI BOOTCAMP SYLLABUS

8-Week Program

WEEK ONE: INTRODUCTION TO ARTIFICIAL INTELLIGENCE

Day 1: Welcome & Orientation

- Get motivated
- Overview of participants' backgrounds and expectations
- Introduction to AI
- What is AI? Why AI now?
- AI vs. Machine Learning vs. Deep Learning
- Applications in real life (business, health, agriculture, etc.)
- AI workflow overview (data → model → deployment)

Day 2: Tools Setup

- Setting up Google Colab / Jupyter Notebooks
- Python recap: syntax, variables, loops
- Installing common libraries: Numpy, Pandas, Sklearn

Day 3: Recap Quiz and Discussion

- Community building and Slack/Discord onboarding
- Mini Project: Hello AI World (basic automation or decision logic)

WEEK TWO: FOUNDATIONS OF MACHINE LEARNING

Day 1: Understanding Machine Learning

- Supervised vs. Unsupervised vs. Reinforcement Learning
- Features, labels, models
- Types of problems: regression, classification, clustering

Day 2: First ML Model in Scikit-learn

- Linear regression with real-world data
- Train-test split
- Model evaluation metrics (MSE, R^2)

Day 3: Hands-on Project

- Predict housing prices (regression mini-project)
- Quiz and Q&A

WEEK THREE: CLASSIFICATION MODELS & EVALUATION

Day 1: Classification Basics

- Logistic regression, decision boundaries
- Confusion matrix, accuracy, precision, recall, F1-score

Day 2: Tree-Based Methods

- Decision Trees, Random Forests
- Overfitting and underfitting

Day 3: Classification Project

- Mini Project: Email spam classifier
- Model evaluation and tuning basics

WEEK FOUR: DATA PREPROCESSING & FEATURE ENGINEERING

Day 1: Data Cleaning and Preprocessing

- Handling missing data, outliers
- Encoding categorical variables (Label/One-hot)

Day 2: Feature Engineering

- Creating new features
- Feature scaling (Standardization, Normalization)
- Feature selection (correlation, univariate tests)

Day 3: Data Preparation Project

- Mini Project: Clean and prepare a real-world dataset
- Practice quiz

WEEK FIVE: UNSUPERVISED LEARNING AND CLUSTERING

Day 1: Introduction to Clustering

- K-Means, DBSCAN, Hierarchical clustering
- Dimensionality reduction with PCA

Day 2: Applications of Unsupervised Learning

- Customer segmentation
- Anomaly detection

Day 3: Clustering Project

- Mini Project: Image Colour segmentation using clustering
- Quiz and feedback session

WEEK SIX: INTRODUCTION TO DEEP LEARNING

Day 1: What is Deep Learning?

- Introduction to Neural Networks
- Perceptrons, Activation Functions, Layers

Day 2: Building Neural Networks with Keras

- Dense layers, compiling, training
- Overfitting and regularization

Day 3: Neural Network Project

- Mini Project: Digit classification with MNIST
- Code walkthrough and discussion

WEEK SEVEN: COMPUTER VISION ESSENTIALS

Day 1: Introduction to Computer Vision

- Image data, filters, and kernels
- CNN (Convolutional Neural Networks) basics

Day 2: CNNs in Practice

- Image classification with CNN
- Transfer Learning (ResNet/VGG)

Day 3: Computer Vision Project

- Mini Project: Classify images using pre-trained models
- Group discussion: AI in robotics, surveillance, and beyond

WEEK EIGHT: ADVANCED COMPUTER VISION & FINAL PROJECTS

Day 1: Advanced CNN Techniques

- Data augmentation for better model performance
- Fine-tuning pre-trained models
- Handling different image sizes and formats

Day 2: Real-world Computer Vision Applications

- Object detection basics
- Image segmentation concepts
- Practical applications in industry

Day 3: Final Project Presentations

- Present individual computer vision projects
- Peer review and feedback
- Course wrap-up and next steps discussion

WEEK 9-12: CAPSTONE PROJECT + CAREER PATHS

- Capstone Planning
- Choose from: AI for healthcare, NLP, recommendation systems, etc.
- Formulate the problem, prepare the dataset
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- Capstone Execution
- Model building, evaluation, and visualization
- Peer review and feedback

- Final Presentations
- Showcase project
- Career roadmap in AI: job roles, resume tips, portfolio building
- Graduation and certificate award
- Ongoing Throughout the Bootcamp