Industry 4.0 - AI, ML, Cybersecurity & Data Science Roadmap

Stage 1: Basics (Month 1-2)

Skills: Python, Git, Linux basics, Networking Concepts

Challenges:
- Set up Linux VM and navigate using CLI.
- Build a personal website using HTML/CSS/JS.

Mini Projects:
- CLI To-do App
- Basic Port Scanner using `socket`

Stage 2: Data Science & ML (Month 3-5)

Skills: Numpy, Pandas, Matplotlib, Scikit-learn, Data Cleaning, Exploratory Data Analysis

Challenges:
- Clean raw CSV files and create a report.
- Train ML models with proper evaluation (accuracy, confusion matrix).

Projects:
- Disease Prediction System (SVM, Logistic Regression)
- Movie Recommendation System
- Real-time Dashboard using Streamlit

Stage 3: Artificial Intelligence (Month 6-8)

Skills: Neural Networks, Deep Learning, TensorFlow, Keras, OpenCV, NLP Basics

Challenges:
- Train CNN for digit recognition.
- Extract text from images using OCR.
- Build chatbot using NLP.

Projects:
- Face Mask Detector (CNN + OpenCV)
- Handwritten Digit Recognizer (MNIST)
- Voice-controlled AI Assistant (SpeechRecognition + Pyttsx3)

Stage 4: Cybersecurity (Month 8-9)

Skills: Ethical Hacking Basics, Hashing, Encryption (AES), Network Security, OWASP Top 10

Challenges:
- Simulate phishing page (educational).
- Implement login system with hashed passwords.
- Analyze network traffic using Wireshark.

Projects:
- Encrypted Chat Application (AES)
- Keylogger (educational/local use)
- Web Vulnerability Scanner (Python requests/bs4)

Stage 5: Integration & Capstone (Month 10-12)

Goal: Combine AI, ML, Data Science & Security into real-world solutions.

Capstone Project Ideas:
1. Smart Surveillance System: Face recognition + Logging + Notification.
2. Predictive Maintenance System: Time series + IoT + Alerts.
3. Cyber Threat Detection: ML to classify threats + dashboard.
4. Industrial Data Analysis Suite: Sensor logs -> Anomaly detection + visualization.

Tips:
- Host projects on GitHub
- Write READMEs and create demo videos
- Use Heroku/Streamlit/Firebase for deployment