

SUBDOMAINS	FOCUS	KEY TECHNOLOGIES	SKILLS	APPLICATIONS	EXAMPLE COMPANIES
MACHINE LEARNING (ML)	Developing algorithms that allow computers to learn from and make predictions or decisions based on data	<ul style="list-style-type: none"> Neural Networks Decision Trees Support Vector Machines Clustering Algorithms, Reinforcement Learning 	<ul style="list-style-type: none"> Programming (Python, R) Statistics Data Analysis Familiarity with ML Frameworks (TensorFlow, PyTorch) Understanding of Algorithms and Data Structures 	<ul style="list-style-type: none"> Spam Detection Recommendation Systems Fraud Detection Predictive Maintenance 	<ul style="list-style-type: none"> Google (DeepMind) Amazon (AWS ML) IBM (Watson) Netflix (Recommendation System)
NATURAL LANGUAGE PROCESSING (NLP)	Enabling machines to understand, interpret, and generate human language	<ul style="list-style-type: none"> Sentiment Analysis Machine Translation Speech Recognition Text Generation (GPT-3) 	<ul style="list-style-type: none"> Linguistic Machine Learning Programming (Python, Java, R, Javascript, C++, Julia, Scala) Knowledge of NLP libraries (NLTK, spaCy, Hugging Face Transformers) 	<ul style="list-style-type: none"> Chatbots Virtual Assistants Sentiment Analysis Language Translation 	<ul style="list-style-type: none"> OpenAI Google (BERT) Microsoft (Azure Cognitive Services) Nuance Communications
COMPUTER VISION	Enabling machines to interpret and make decisions based on visual inputs	<ul style="list-style-type: none"> Convolutional Neural Networks (CNNs) Object Detection Image Segmentation Facial Recognition 	<ul style="list-style-type: none"> Image Processing Machine Learning Deep Learning Programming (Python, C++, MATLAB, Javascript, Java, R, Julia, C#) Familiarity with Computer Vision libraries (OpenCV, TensorFlow, Keras) 	<ul style="list-style-type: none"> Autonomous Vehicles Facial Recognition Systems Medical Image Analysis Surveillance 	<ul style="list-style-type: none"> NVIDIA Tesla (Autopilot) Meta (image tagging) Adobe (Photoshop's AI features)
ROBOTICS	Designing and creating robots that can perform tasks autonomously or semi-autonomously	<ul style="list-style-type: none"> Robotic Operating Systems (ROS) Control Systems, Sensors Actuators Machine Learning 	<ul style="list-style-type: none"> Mechanical Engineering Electronics, Programming (C++, Python) Understanding of Control Systems AI 	<ul style="list-style-type: none"> Manufacturing Automation Medical Robots Service Robots Drones 	<ul style="list-style-type: none"> Boston Dynamics iRobot KUKA ABB Robotics
GENERATIVE AI	Creating models that can generate new content (text, images, music) based on learned patterns from existing data	<ul style="list-style-type: none"> Generative Adversarial Networks (GANs) Variational Autoencoders (VAEs) Transformers (GPT-3, DALL-E) 	<ul style="list-style-type: none"> Deep Learning Programming (Python, Julia, Node.JS, C++, Java) Understanding of Generative Models Creativity 	<ul style="list-style-type: none"> Art Creation Music Composition Synthetic Data Generation Content Creation 	<ul style="list-style-type: none"> OpenAI (GPT-3, DALL-E) NVIDIA (StyleGAN) Adobe (Content-Aware Fill) Google DeepMind
REINFORCEMENT LEARNING (RL)	Training models to make a sequence of decisions by rewarding them for desirable actions and penalizing them for undesirable ones	<ul style="list-style-type: none"> Q-learning Policy Gradients Monte Carlo Methods 	<ul style="list-style-type: none"> Probability Theory Machine Learning Programming (Python, C++, Java, Julia, R) Familiarity with RL frameworks (OpenAI Gym, RLlib) 	<ul style="list-style-type: none"> Game playing (AlphaGo) Robotics Resource Management Recommendation Systems 	<ul style="list-style-type: none"> DeepMind (AlphaGo) OpenAI (OpenAI Five) Uber AI Labs Microsoft Research
AI IN HEALTHCARE	Applying AI technologies to diagnose diseases, suggest treatments, and manage patient care	<ul style="list-style-type: none"> Predictive Analytics Medical Imaging Analysis Personalized Medicine Natural Language Processing 	<ul style="list-style-type: none"> Medical Knowledge Machine Learning Data Analysis Programming (Python, R, C++, Matlab, SQL, Julia, Java) Bioinformatics 	<ul style="list-style-type: none"> Diagnostic Tools Treatment Recommendation Systems Patient Monitoring Drug Discovery 	<ul style="list-style-type: none"> IBM Watson Health PathAI Tempus Zebra Medical Vision