Here's a **detailed study guide** for **Task Statement 1.1** of the **AWS Certified AI Practitioner (AIF-C01)** exam. This guide includes explanations, comparisons, and examples to help you prepare effectively.

Task Statement 1.1: Explain Basic AI Concepts and Terminologies

◈ 1. Define Basic AI Terms

Term	Definition
AI (Artificial Intelligence)	A broad field of computer science focused on creating systems capable of tasks that typically require human intelligence (e.g., reasoning, learning, perception).
ML (Machine Learning)	A subset of AI that enables systems to learn from data and improve performance over time without being explicitly programmed.
Deep Learning	A subset of ML that uses artificial neural networks with multiple layers (deep networks) to model complex patterns in data.
Neural Networks	A model inspired by the structure of the human brain, composed of layers of nodes (neurons) that process data inputs and outputs.
Computer Vision	A field of AI that enables computers to interpret and make decisions based on visual input (e.g., images, videos).
Natural Language Processing (NLP)	A field of AI that allows machines to understand, interpret, and generate human language (e.g., chatbots, translation).
Model	A trained system that can make predictions or decisions based on input data.
Algorithm	A step-by-step procedure used for calculations, data processing, and automated reasoning (e.g., training a model).
Training	The process of feeding data into an ML algorithm so it can learn patterns.
Inferencing	Using a trained model to make predictions on new, unseen data.
Bias	Systematic errors in AI models caused by prejudiced assumptions or unrepresentative training data.
Fairness	The absence of any prejudice or favoritism toward an individual or group in AI predictions.
Fit (Underfit/Overfit)	Describes how well a model learns from the data. Underfitting: too simple. Overfitting: too complex.
LLM (Large Language Model)	A deep learning model trained on massive text datasets, capable of generating human-like language (e.g., GPT-4).

◈ 2. AI vs ML vs Deep Learning

Aspect	AI	ML	Deep Learning

Aspect	AI	ML	Deep Learning
Scope	Broad	Narrower subset of AI	Narrowest subset of ML
Definition	Simulates human intelligence	Algorithms that learn from data	Neural networks with many layers
Example	Chatbot	Email spam detection	Self-driving cars, facial recognition
Data Needs	Varies	Requires structured data	Requires large amounts of data

◈ 3. Types of Inferencing

Type	Description	Use Case
Batch Inferencing	Predictions made on a batch of data at once, typically offline or on a schedule.	Running predictions on all user data once per day.
Real-Time Inferencing	Immediate predictions made as data is received, usually with low latency.	Fraud detection, voice assistants.

◈ 4. Types of Data in AI Models

Data Type	Description	Example
Labeled Data	Data with input-output pairs (used for supervised learning).	Images with tags ("cat", "dog").
Unlabeled Data	Data without explicit outputs.	Unsorted customer reviews.
Tabular Data	Data arranged in tables.	CSV files, spreadsheets.
Time-Series Data	Data points collected over time intervals.	Stock prices, sensor data.
Image Data	Pixel data representing pictures.	X-rays, selfies.
Text Data	Raw or processed natural language.	Tweets, emails.
Structured Data	Organized into rows and columns.	Database records.
Unstructured Data	No predefined format.	Videos, audio, free-text documents.

◈ 5. ML Learning Types

Learning Type	Description	Example
Supervised Learning	Model learns from labeled data.	Email classification (spam/ham).

Learning Type	Description	Example
Unsupervised Learning	Model finds patterns in unlabeled data.	Customer segmentation.
Reinforcement Learning	Model learns by interacting with an environment and receiving feedback (rewards/punishments).	Game-playing AI, robotic control.

☑ Study Tips

- **Flashcards**: Use Anki or Quizlet to memorize terms.
- **Real-world examples**: Match each concept with an example from AWS services (e.g., Amazon Rekognition = computer vision).
- **Videos**: Watch AWS tutorials on topics like SageMaker, Rekognition, and Comprehend.
- **Practice Questions**: Use AWS sample questions and exam readiness quizzes.

Would you like this in a printable PDF or formatted as flashcards or slides?