Sample PDF Document 2 - Multi-Page Example

Page 1: Machine Learning Fundamentals

Machine Learning is a subset of artificial intelligence that enables systems to learn and improve from experience without being explicitly programmed.

Types of Machine Learning:

1. Supervised Learning - Classification - Regression 2. Unsupervised Learning - Clustering - Dimensionality reduction 3. Reinforcement Learning - Agent-based learning - Reward optimization

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Page 2: Deep Learning

Deep learning uses neural networks with multiple layers to progressively extract higher-level features from raw input.

Popular Deep Learning Architectures:

- Convolutional Neural Networks (CNNs) for image processing - Recurrent Neural Networks (RNNs) for sequential data - Transformers for natural language processing - Generative Adversarial Networks (GANs) for generation tasks

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Page 3: Vector Embeddings

Vector embeddings represent text, images, or other data as numerical vectors in high-dimensional space. Similar items have similar vector representations.

Applications of Embeddings:

- Semantic search - Document similarity - Recommendation systems - Clustering and classification

The quality of embeddings is crucial for RAG systems because they determine how well relevant information can be retrieved.