Cutting-Edge ML Outline (ReportLab)

Core ML Techniques

1. ✴️ **Mixture of Experts (MoE)**
   - Conditional computation techniques
   - Sparse gating mechanisms
   - Training specialized sub-models
2. 🔥 **Supervised Fine-Tuning (SFT) using PyTorch**
   - Loss function customization
   - Gradient accumulation strategies
   - Learning rate schedulers
3. 🤖 **Large Language Models (LLM) using Transformers**
   - Attention mechanisms
   - Tokenization strategies
   - Position encodings

Training Methods

4. 📊 **Self-Rewarding Learning using NPS 0-10 and Verbatims**
   - Custom reward functions
   - Feedback categorization
   - Signal extraction from text
5. 👍 **Reinforcement Learning from Human Feedback (RLHF)**
   - Preference datasets
   - PPO implementation
   - KL divergence constraints
6. 🔗 **MergeKit: Merging Models to Same Embedding Space**
   - TIES merging
   - Task arithmetic
   - SLERP interpolation

Optimization & Deployment

7. 📏 **DistillKit: Model Size Reduction with Spectrum Analysis**
   - Knowledge distillation
   - Quantization techniques
   - Model pruning strategies
8. 🧠 **Agentic RAG Agents using Document Inputs**
   - Vector database integration
   - Query planning
   - Self-reflection mechanisms
9. ■ **Longitudinal Data Summarization from Multiple Docs**
   - Multi-document compression
   - Timeline extraction
   - Entity tracking

Knowledge Representation

10. 📄 **Knowledge Extraction using Markdown Knowledge Graphs**
    - Entity recognition
    - Relationship mapping
    - Hierarchical structuring
11. 🗺️■ **Knowledge Mapping with Mermaid Diagrams**
    - Flowchart generation
    - Sequence diagram creation
    - State diagrams
12. 💻 **ML Code Generation with Streamlit/Gradio/HTML5+JS**
    - Code completion
    - Unit test generation
    - Documentation synthesis