Comprehensive Model Performance Analysis: Pre-Training vs Fine-Tuning **Multi-Dimensional Performance Profile** TF-IDF Post **Embedding Performance Comparison 1.7B TF-IDF Performance Comparison** 0.930 0.289 **4**B 0.30 0.285 Pre-Training Fine-Tuning 0.925 0.9219 0.25 0.920 0.211 0.209 0.9178 Similarity 02.0 0.9159 0.8 0.191 0.915 0.6 0.4 0.9115 0.910 TF-IDF Pre Embedding **gin** 0.905 0.9024 0.9002 0.900 0.05 0.895 **Pre-Training** Fine-Tuning 0.890 0.00 8B 1.7B 1.7B **Embedding Post Model Size Model Size TF-IDF Performance Improvement Embedding Performance Improvement Performance Delta Matrix** 0.6 0.08 37.3% 36.5% 0.07 35 0.49% 0.5 1.7B 0.45% 0.06 30 0.05 20 15 0.04 0.25% 0.03 0.02 0.01 8B 0.1 0.00 1.8% -0.01 0.0 4B 8B 1.7B 8B 1.7B TF-IDF Embedding **Model Size Model Size Overall Model Ranking Absolute Performance Gains** 0.0786 0.0761 TF-IDF Gain Embedding Gain 0.6057 ☐ PERFORMANCE SUMMARY 8B -----0.06 Average Improvements: • TF-IDF: 25.20% 0.05 • Embedding: 0.40% 0.6003 4B Best Performers: • TF-IDF Improvement: 8B (37.3%) **Š** 0.03 • Embedding Improvement: 4B (0.49%) • Overall Performance: 8B 0.02 Key Insights: 0.5468 1.7B Fine-tuning shows significant TF-IDF gains 0.01 for 4B and 8B models (36-37%) 0.0045 0.0042 0.0034 Embedding improvements are minimal (<0.5%) 0.0022 due to high baseline performance 0.00 0.0 0.1 0.2 0.3 0.4 0.5 0.6 Larger models (4B, 8B) benefit more from **Model Size Combined Score** fine-tuning than smaller models (1.7B) Recommendation: Deploy 8B model for optimal performance Generated: 2025-08-11 10:44:05