When to Use Which NLP Method: Decision Framework

What's your priority?

SPEED & SIMPLICITY	BALANCED PERFORMANCE	MAXIMUM ACCURACY

Known keywords
Simple patterns
Real-time needed
No training data

Simple language
Limited context
Moderate data
Fast inference

Complex context
Sarcasm/nuance
Large dataset
Production critical

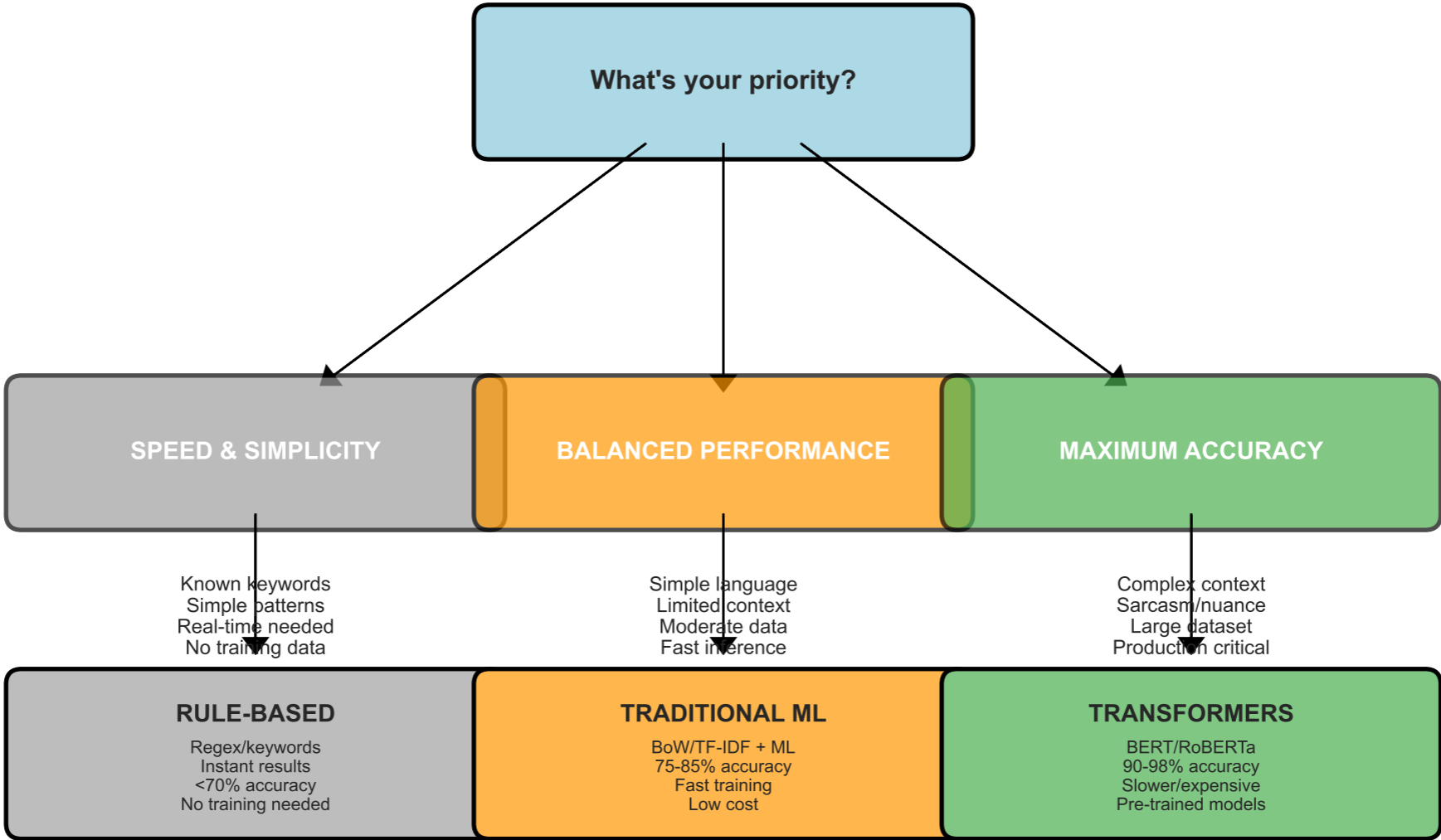| RULE-BASED	TRADITIONAL ML	TRANSFORMERS
Regex/keywords Instant results <70% accuracy No training needed	BoW/TF-IDF + ML 75-85% accuracy Fast training Low cost	BERT/RoBERTa 90-98% accuracy Slower/expensive Pre-trained models

Additional Considerations

Data Volume: <1K samples → Rule-based or few-shot; 1K-10K → Traditional ML; >10K → Transformers viable
Languages: Multi-lingual needs → Multilingual BERT (mBERT, XLM-RoBERTa); English only → simpler models
Domain: Medical/Legal → Fine-tune domain-specific transformer; General → Use pre-trained as-is
Latency: Real-time (<100ms) → Rule-based or cached ML; Batch processing → Transformers acceptable
Budget: Limited → Traditional ML (10-100x cheaper); Enterprise → Transformers for best results
Explainability: High need → Rule-based (transparent) or LIME/SHAP on ML; Black box OK → Transformers

Principle: Start simple (rules/traditional ML), upgrade to transformers only when context/nuance critical