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Smartphone Advisor : A Chatbot for Mobile Recommendation and Comparison

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Abstract: *Smartphone selection has become a complex, high-involvement process due to fragmented model lineups, short product cycles, and inconsistent marketing of features under different labels. Traditional e-commerce catalogue filters—based on brand, price, RAM, battery, or display— require users to interpret technical specifications and manually balance trade-offs, which often leads to decision fatigue and sub-optimal choices. This work presents Prompt-Driven Mobile Specification Chatbot, a lightweight conversational assistant that bridges natural-language user intent with structured smartphone specifications. The system combines a TF-IDF–based intent classifier, a rule- guided constraint parser, and a learning-to-rank module to deliver concise, personalized recommendations from a curated smartphone catalogue. Recommendation prompts are parsed into structured constraints such as budget (with Indian numeral support), RAM, battery, refresh rate, camera resolution, OS preference, and display size. Hard filters prune the catalogue, while a RandomForest regressor scores candidates using engineered gap features, OS match, and TF-IDF similarity between user prompts and device specifications. Additional modules handle fuzzy model resolution for comparison, specification lookup, and price queries. The design emphasizes determinism, explainability, and low latency, returning recommendations with transparent rationales. By enabling users to express needs naturally—e.g., "Android under 30k with good camera and long battery"—the chatbot reduces friction, improves decision confidence, and demonstrates a scalable, auditable pipeline for intent-driven product recommendation.*

Keywords: Smartphone recommendation, Natural Language Understanding (NLU), Constraint extraction, Learning-to-rank, TF-IDF, RandomForest regressor, Conversational assistant, Fuzzy model resolution, Human- computer interaction, Explainable AI

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