



CureFlow: An AI Engine for Complex Medication Decision-Making

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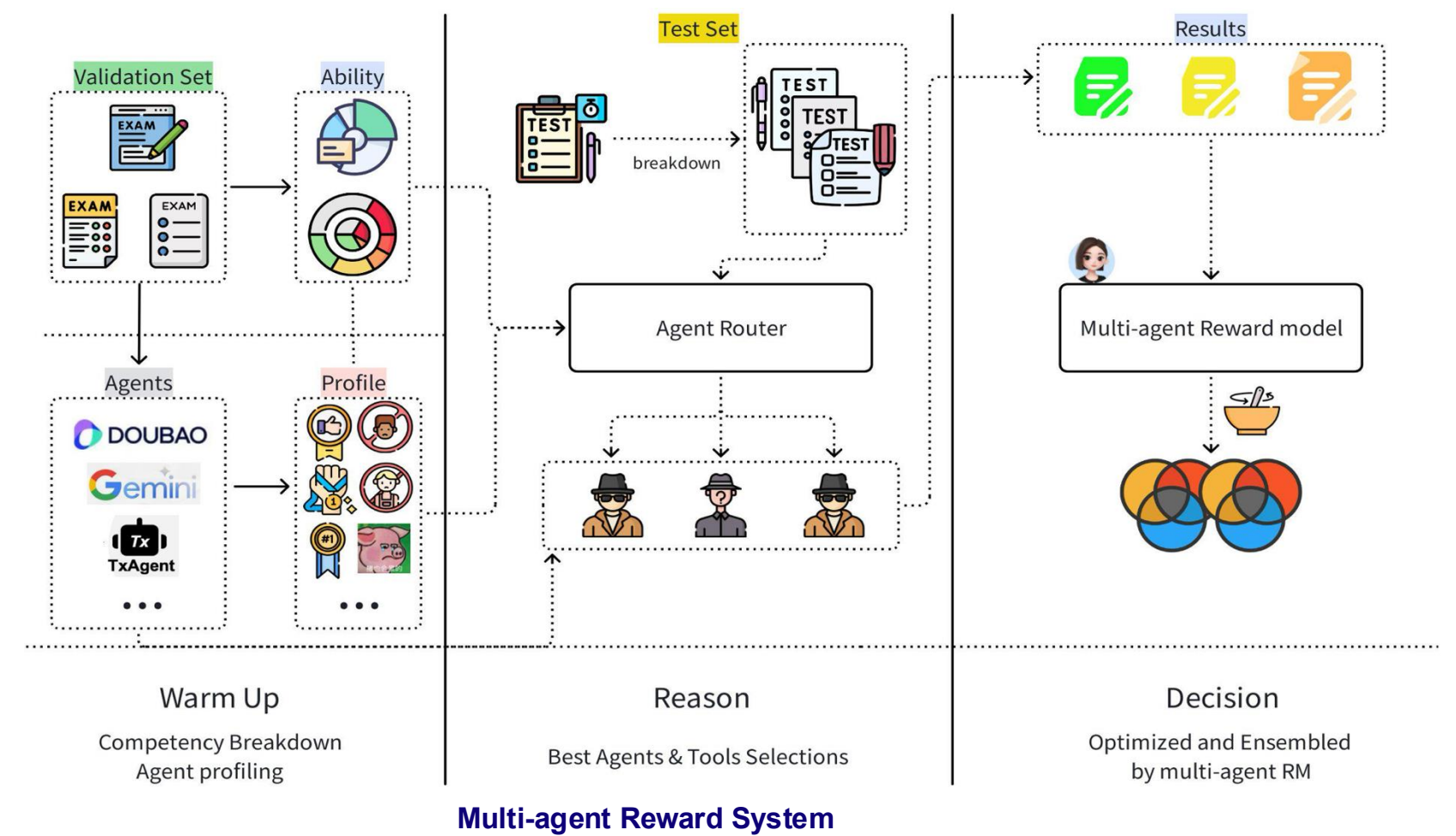
Overall Contributions & System Overview

Propose a **multi-layer CureFlow architecture** that optimizes complex prescribing through **tool light-weighting, information structuring and multi-agent reward system**.

Track 2: Resolve problems by invoking tools to retrieve and apply information.

Track 1: Train the model through the internalization of knowledge.

Achieve leading performance in **two key tracks of the Cure-Bench challenge**, validating effectiveness in complex prescribing tasks.



Tool Layer – De-duplication & Scenario-Focused Design

Objective: increase retrieval efficiency and reduce cross-database calls

1. Integration of heterogeneous data sources

Drug labels, disease–drug association databases and symptom–contraindication repositories are unified in a **centralized data platform**, removing data silos.

2. Four core functional modules

- **One-Click Drug Lookup:** full information for a single drug (indications, contraindications, dosing, metabolism, etc.).
 - `get_all_info_by_drug`
- **Disease-Based Drug Search:** recommended medications based on diagnosis / indication.
 - `get_all_info_by_disease`
- **Symptom-Based Drug Filtering:** matching symptoms to suitable drugs via symptom–drug mappings.
 - `get_drugs_list_by_features`
- **Symptom-to-Disease Search:** infer possible diseases from symptoms and suggest corresponding therapies.
 - `get_diseases_list_by_features`

reducing tool calls for complex queries to **fewer than 10**.

Information Layer – Text Structuring & Key Information Extraction

Objective: distill the 10–15% of text that truly matters for decisions

Text structuring

Drug labels, guidelines and protocols are converted from free text into **field–value pairs**.

Example: the phrase “contraindicated in children” is mapped to a normalized field:

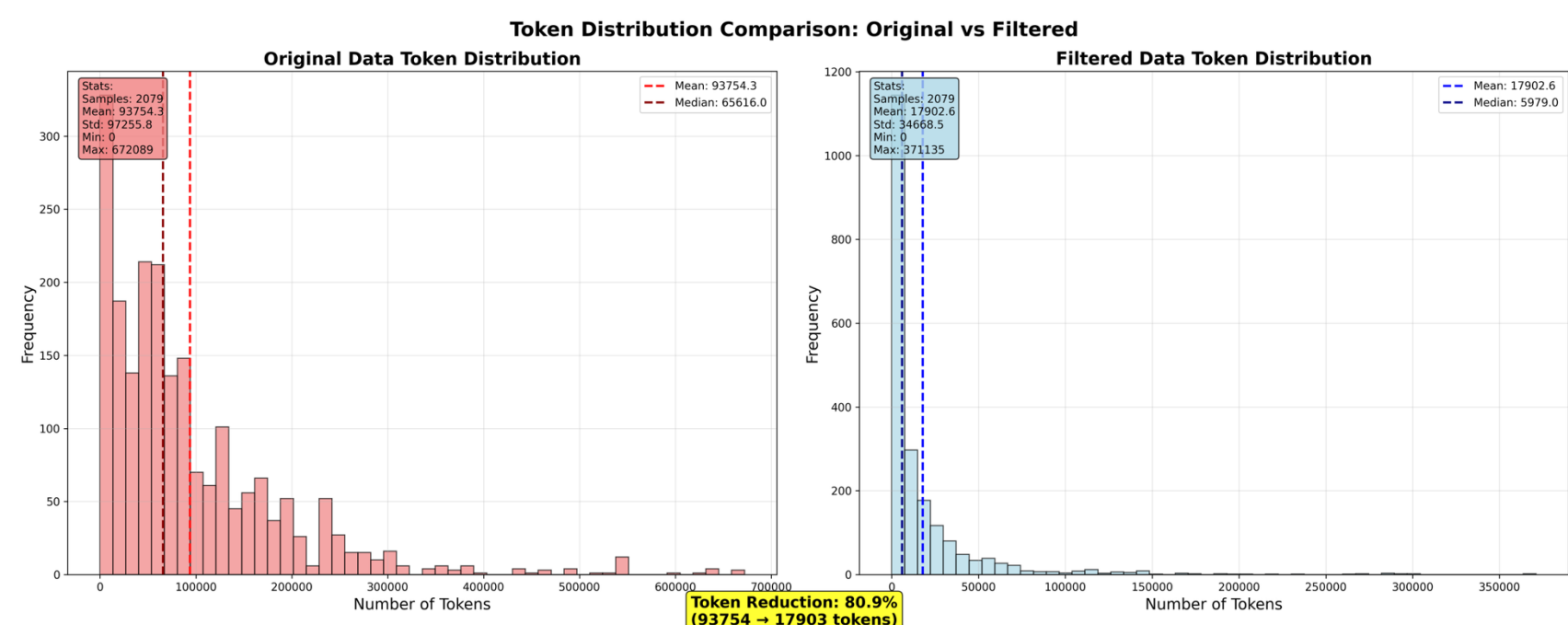
Population = Children (contraindicated)

Key information extraction model

Automatically extracts fields linked to prescribing decisions:

- Age limits / special populations
- Contraindications and cautions
- Drug–drug interactions
- Metabolic pathways and organ burden
- Maximum doses and titration rules

De-emphasizes experimental details and long statistical sections that add little to decisions.



A Case Illustration

Question: A 35-year-old man with moderate hepatic impairment (Child-Pugh class B), who is currently taking a moderate CYP3A inhibitor, presents with moderate to severe acute pain due to a traumatic injury. What is the most appropriate medication and dosing regimen to control his pain?

