AIDME: A Scalable, Interpretable Framework for AI-Aided Scoping Reviews

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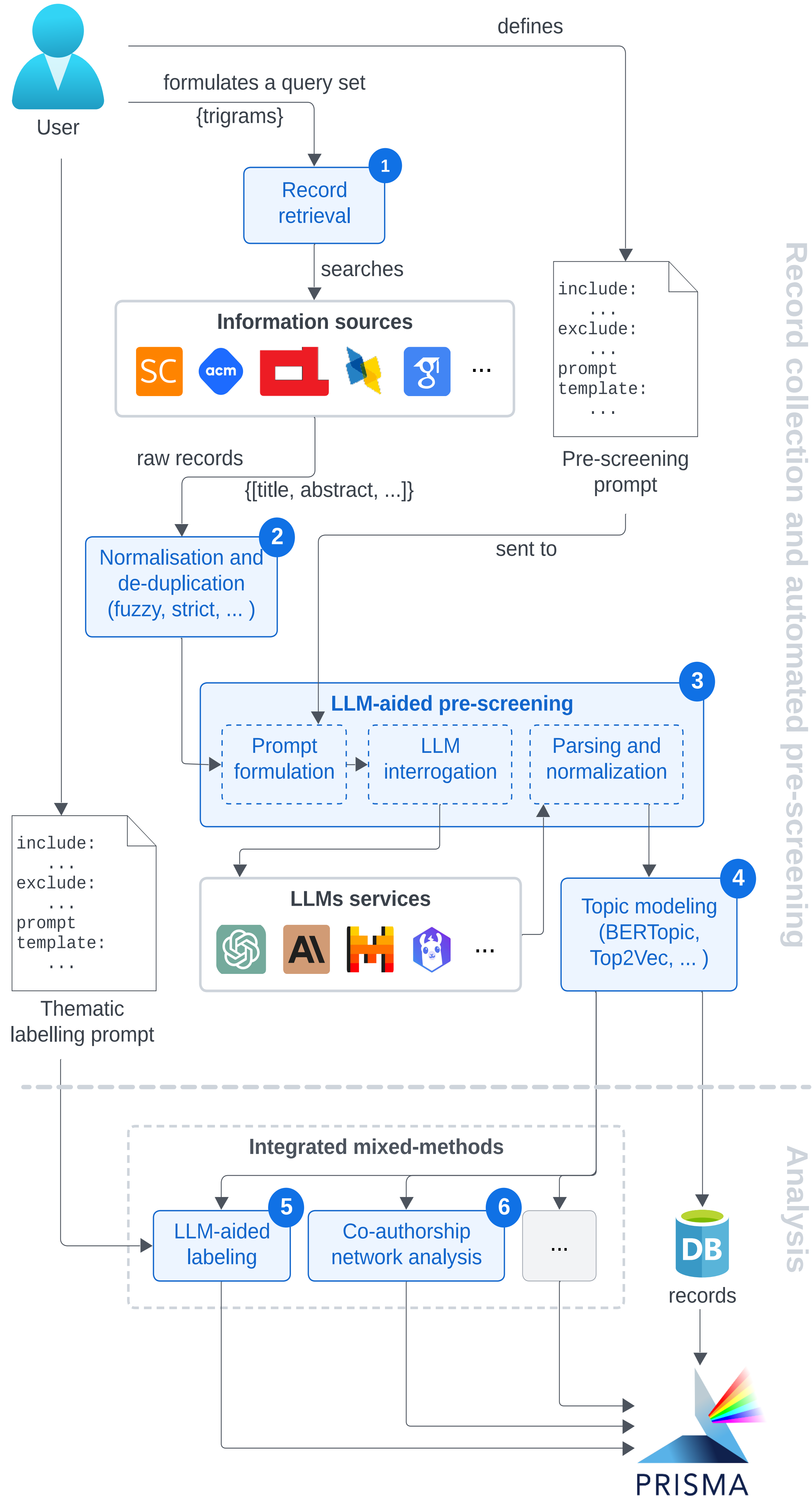[1] University of Udine   [2] University of Milano-Bicocca

AI-Aided Document Mapping and Evaluation (AIDME) automates and streamlines evidence mapping in fast-growing research fields, integrating LLMs, topic modeling, and network analysis to support interpretable reviews

Research Overview

- AIDME is a framework that supports the **scoping review phase** preceding PRISMA-compliant **systematic reviews**, improving efficiency while ensuring transparency and oversight
- When applied to the **evaluation** of **truthfulness assessment methods** in **fact-checking**, the framework maps their distribution across approaches, metrics, and framings, reduces manual effort, and yields structured outputs.

The AIDME Framework

- Modular six-step pipeline

Steps 1–6

1. Retrieve records via structured queries from four sources
2. Normalize and de-duplicate using exact and fuzzy matching
3. LLM-assisted pre-screening (GPT-4o-mini)
4. Topic modeling: BERTopic + MPNet
5. LLM-aided labeling: Human, Automated, Combination
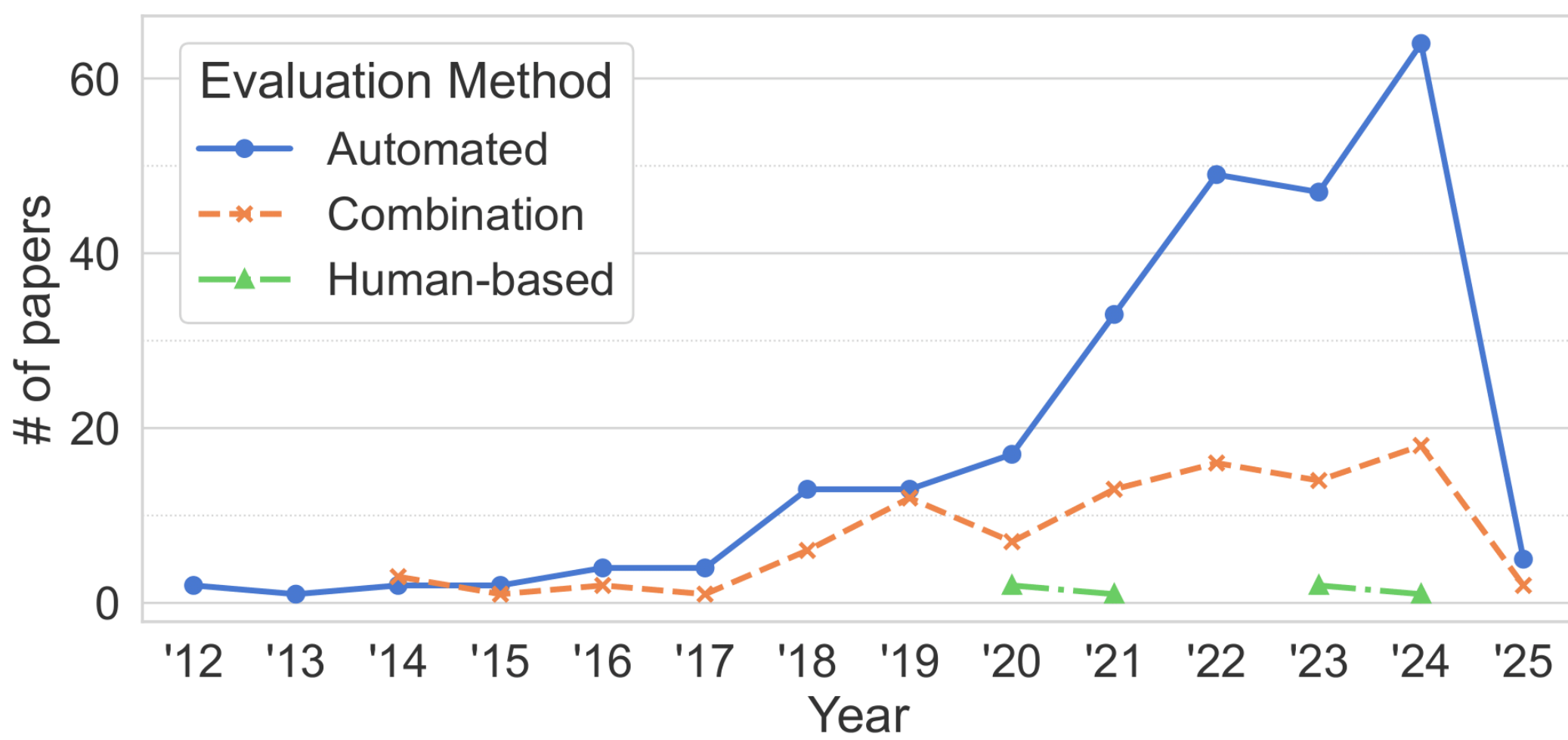6. Co-authorship network analysis: map collaboration patterns

Case Study: Evaluation of Truthfulness Assessment

Efficiency and Scalability

- Raw records: ~14,000
- After normalization: 12,259 (88%)
- After LLM pre-screening: 497 (3%)
- Estimated time saved: 110–220 hours

(AI pre-screening reduces manual screening effort by 97%)
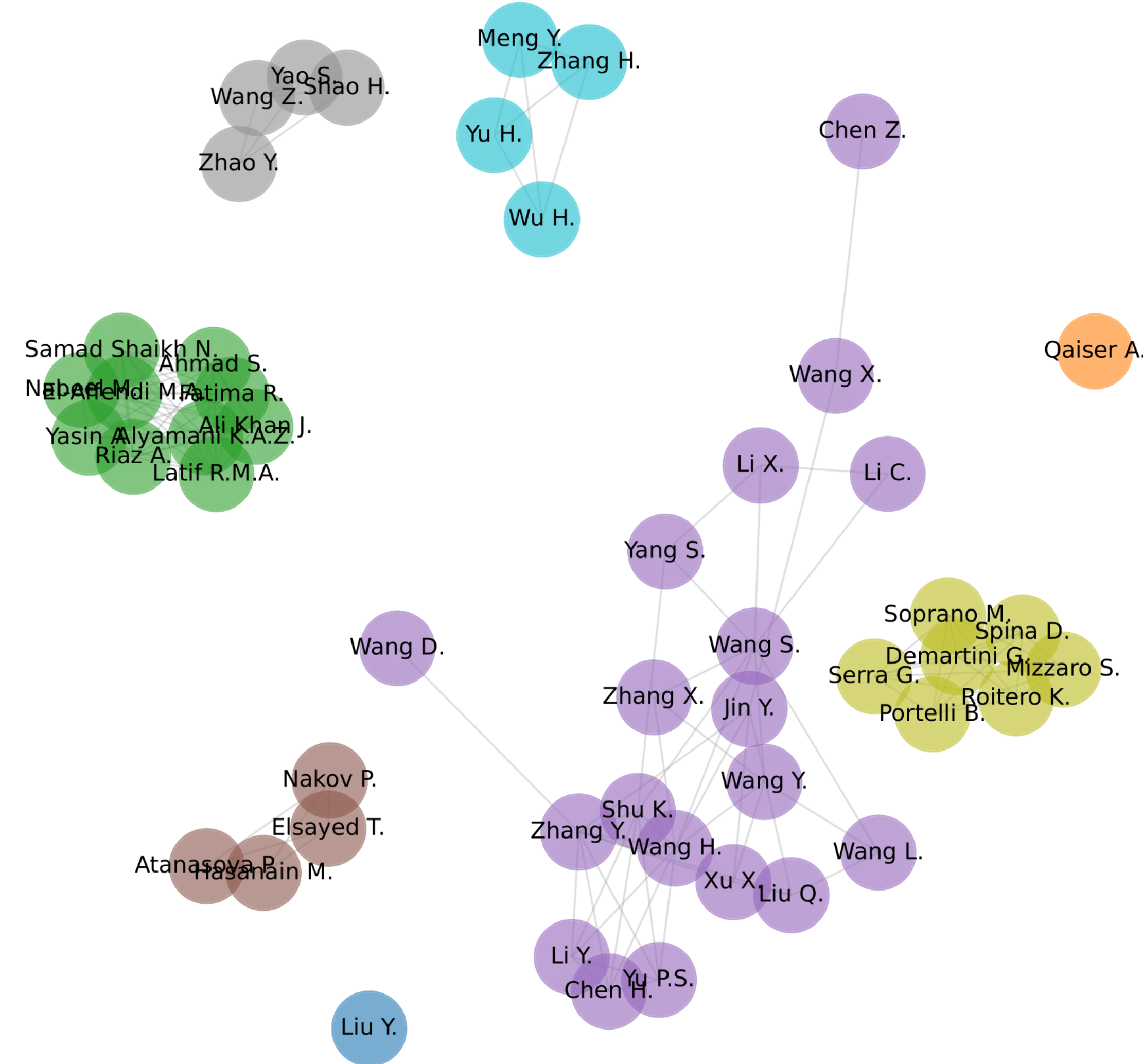
Method Types

- Automated methods: 84%
- Combination (human + AI): 14%
- Human-based: 2%

(Automated approaches dominate, hybrid strategies are increasing)

Collaboration Landscape

- Major China/US cluster
- Qatar/Bulgaria as bridging hubs
- Italy/Australia link (Udine + Queensland)

(Louvain-detected communities in the co-authorship network)
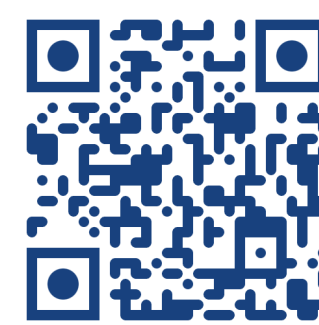
Key Takeaways

- AIDME brings AI-based, transparent pre-screening to systematic review workflows
- Fully auditable, PRISMA-aligned outputs
- Significant reduction in manual effort required

Future Directions

- Full-text analysis, living reviews, in-depth citation analysis
- Prompts for diverse domains, false negatives evaluation

Resources

- Repository: https://osf.io/8t27c/
- Prompts, embedding visualization, and more