A Living Interactive Evidence Synthesis Framework and Applications for Creating and Maintaining Living Systematic Reviews and Meta-Analysis

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Introduction

Systematic Reviews (SRs) and meta-analyses (MAs) are tools to synthesize evidence and provide precise estimates of effects for benefits and harms outcomes with associated certainty of evidence.

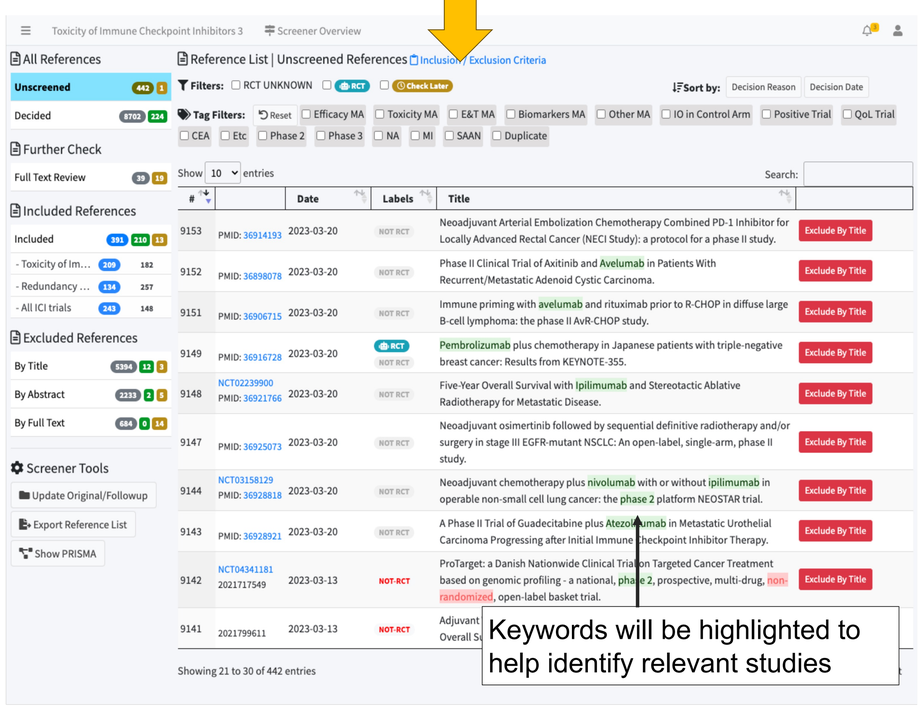
However, when the research field rapidly evolves, it requires frequent labor-intense updates to keep pace with new evidence to keep the systematic reviews and meta-analyses “living” (SRMAs). For truly living SRMAs, several laborious steps still must be done by researchers manually, such as data collection, study screening, and information extraction. Thus, a system that facilitates the steps in SRMA is urgently needed to reduce the time and effort spent on repetitive tasks.

To address this need, we propose a living interactive evidence synthesis (LIvE) framework that integrates open-source web techniques and MA libraries to maintain living and interactive SRMA.

Study Screener

Study screener can help researchers to screening studies based on inclusion/exclusion criteria.

Data Sources: OVID / Embase / PubMed / Others

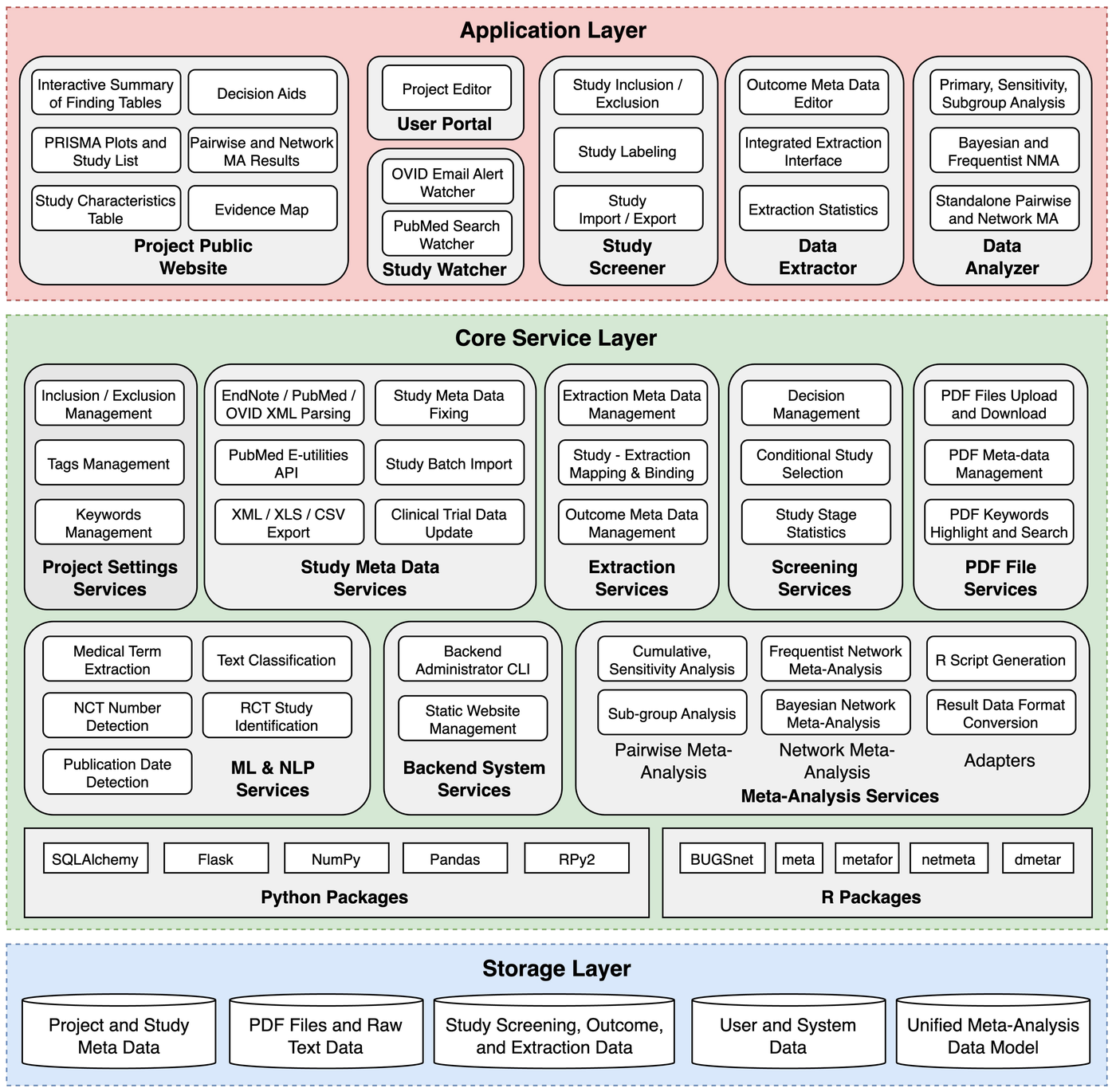


After screening, the included studies will be further sent to next step to extract information such as treatment, control, cohort characteristics, etc.

System Architecture

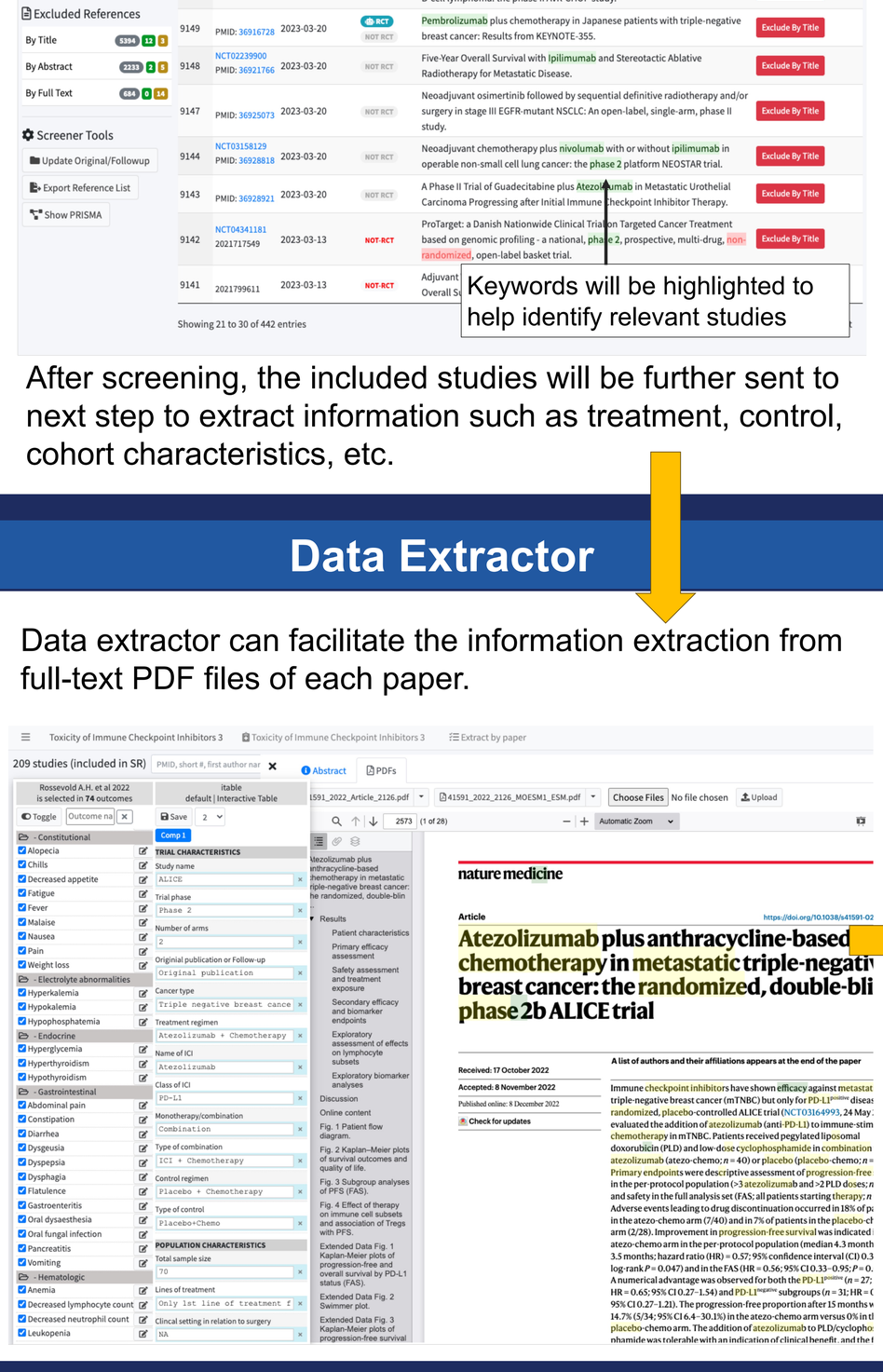
As shown in the following figure, we designed a multi-layer architecture to implement the functions needed by the living SRMA, including:

1) **application layer**, which provides the user interface for researchers to screen studies, extract information from selected studies, and conduct MAs to understand the benefits and harms of treatments.
2) **core service layer**, which implements the functionalities needed for conducting the tasks of SRMA, such as project data management, screening decision management, extraction management, and meta-analyses.
3) **storage layer**, which saves all the data generated in the living SRMA process.



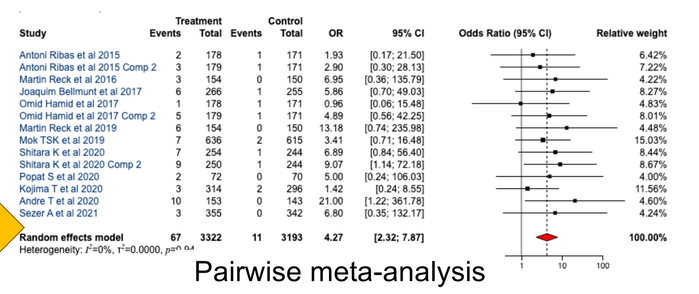
Data Extractor

Data extractor can facilitate the information extraction from full-text PDF files of each paper.

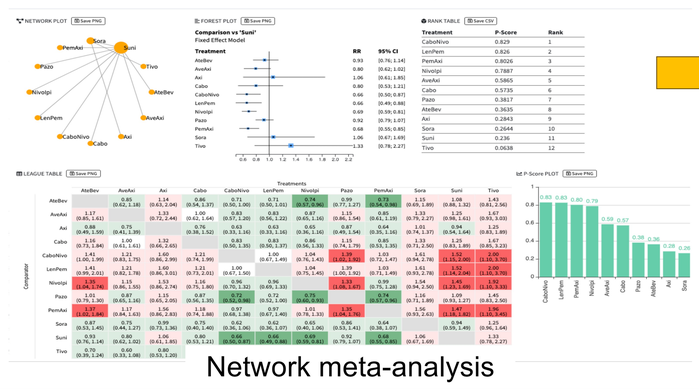


Data Analyzer and Public Websites

The extracted data will be sent to data analyzer for conducting pairwise meta-analysis and network meta-analysis.

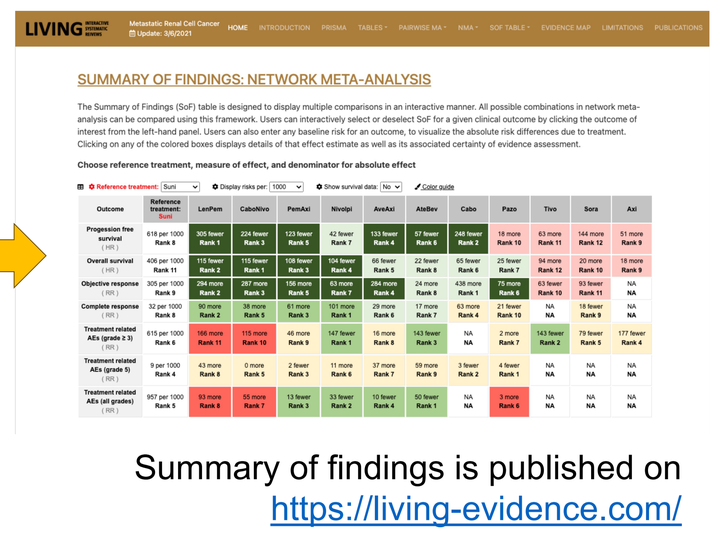


Pairwise meta-analysis



Network meta-analysis

The screening results, extracted information, and the final meta-analysis results are exported as plots and summary of finding tables in the project public website for public access and exploration.



Summary of findings is published on https://living-evidence.com/