

Case study 1: LRM-based Unified Data Model and Applications

Miao Qing (苗青)
Fudan University Library
March 25, 2026

Outline

01 | Background

02 | Design
Philosophy

03 | Implementation

04 | Applications

1 Background

1 背景

1.1 Challenges & Opportunities

- **Challenges**

Limitations of MARC (record-centered)

Users' need for semantic navigation and relationship-based discovery

Libraries require interoperable, system-agnostic data

- **Opportunities**

Linked Data, Knowledge Graphs, entity-centered models

1.2 Challenges at Fudan University Library



图书种数
2349362
records:
3,091,979

馆藏册数
710743
4491484
20346
1056834
item:
11528
528352

6,518,874
44404
3091979

6518874

2 Design Philosophy

2 设计理念

2.1 Design Principles

- **Entity-centered Modeling**
 - beyond record-based descriptions;
 - capture entities explicitly & describe the relationships
- **Relationship Networks**
 - Relationships are central to discovery and analysis
- **Extensibility and Interoperability**
 - accommodate local needs and legacy data;
 - compatible with international standards.....

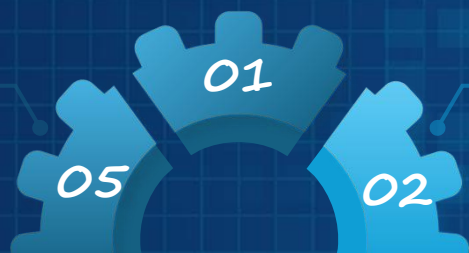
2 Design Philosophy--Why LRM?

Conceptual
Foundation

Entity analysis

Consistency &
Continuity

ISBD and RDA are revised in
alignment with LRM



Rich Semantic
Ecosystem

RDA built on LRM
Rich element vocabularies

IFLA LRM provides a number of mechanisms that permit the expansions that are likely to be needed in any actual implementation. The definition of a category attribute for the entity 'res' permits implementations to create, for any of the entities, those subclasses that might be useful.--IFLA Library Reference Model: A Conceptual Model for Bibliographic Information

permitted expansions

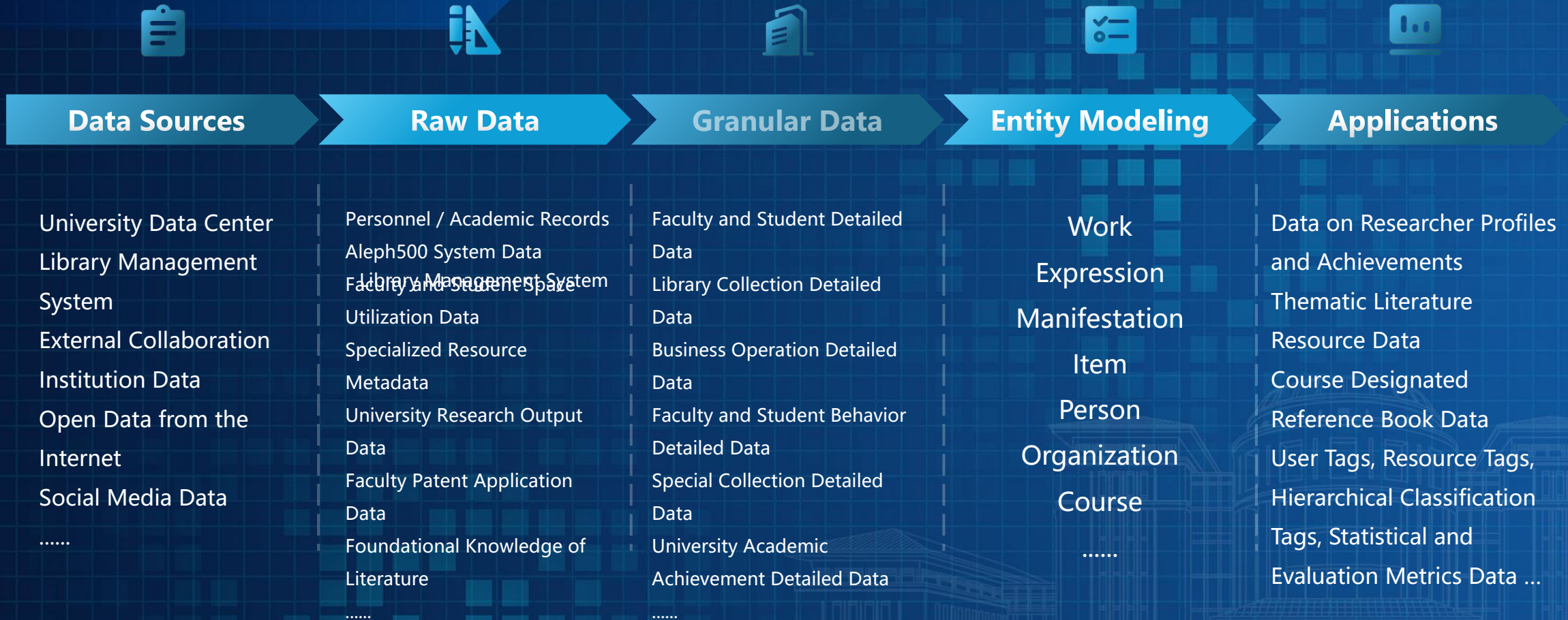
cultural heritage model

LRM enables a unified, extensible, and semantically rich data model for modern library infrastructures.

3 Implementation

3 实施

3.1 Implementation Workflow



3.1 Collection Review and Analysis

Bibliographic resources

all platforms or systems storing bibliographic data; metadata standards; content standards; forms of data storage; associated authority files; relationships between different platforms; local versus external data

Users

faculty and students; person agents; donors.....

Operational Log

user activity records, such as borrowing history, access to electronic resources, and other interactions with library systems.....

3.2 Entity-based Model Construction

- Horizontal extensions

user behaviors, library facilities & equipments, course.....

- Vertical extensions

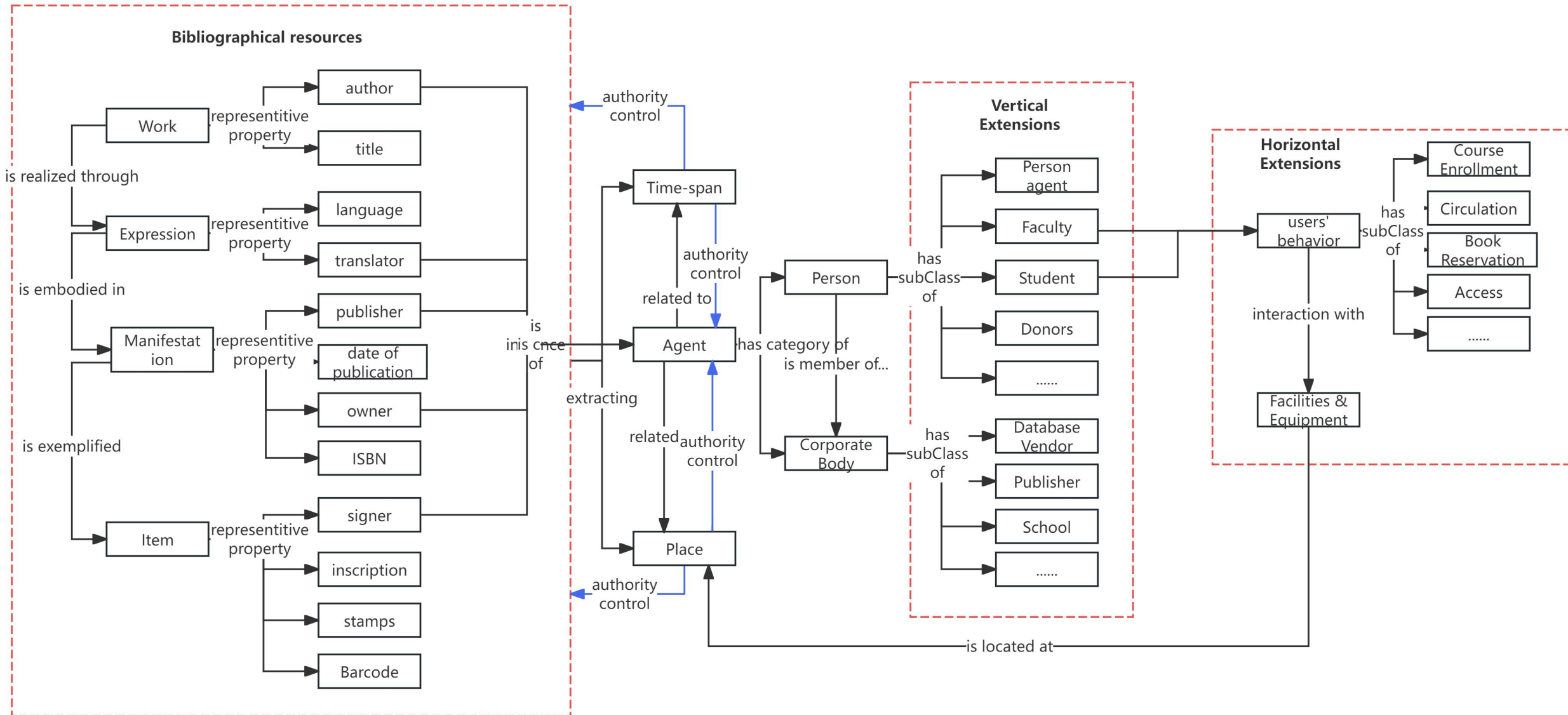
library users, person agent, faculty, students, donors....

The screenshot displays a library search interface with the following components:

- Navigation:** Tabs for Books & Journals, Ancient books, Articles, Fudan Theses, and Fuda Research.
- Search Controls:** A search bar with the query "Main Search: All = 葛剑雄(contains)" and "Found 201 results". Buttons for "Select All", "Export", and "Export All" are visible.
- Search Results:** Two results are shown:
 - Result 1:** "葛剑雄自选集" (Selected Works of Ge Jianxiong), Author: 葛剑雄(著), Source: 桂林: 广西师范大学出版社, 1999, ISBN: 7-5633-2774-6.
 - Result 2:** "葛剑雄文集: 亿兆斯民. 2, 亿兆斯民" (Ge Jianxiong Collected Works: Billion People), Author: 葛剑雄(著), Source: 广州: 广东人民出版社, 2014, ISBN: 978-7-218-09473-1.
- Profile Sidebar:** A "Profile" window for the author 葛剑雄, including:
 - Data source:** National Library Name Authority Data.
 - Name:** 葛剑雄
 - Gender:** 男
 - Lifespan:** 1945-
 - Birthplace:** 浙江绍兴
 - Affiliation:** 中国历史地理研究所 复旦大学 教育部社会科学委员
 - Biography:** 历史地理学家, 香港中文大学(深圳)图书馆馆长, 曾任复旦大学中国历史地理研究所教授, 复旦大学图书馆馆长, 中央文史研究馆馆员, 教育部社会科学委员会委员, 中国地理学会历史地理专业委员会主任, 中国秦汉史研究会副会长, 上海市历史学会副会长, 国际地圈生物圈中国委员会委员等。浙江绍兴人。从事历史地理、中国史、人口史、移民史、文化史、环境史等方面研究。著有《生生不息的中国人》《西汉人口地理》《中国人口发展史》《中国人口史》《中国移民史》《中国历代疆域变迁》等。
 - List of Works:**
 1. 望尽天涯路: 当代学人自述
 2. 海纳百川上海源
 3. 三峡: 我们的记忆. 我们的记忆#memo...
 4. 中国移民史: 辽宋金元时期. 第四卷, 辽...
 5. 谭其骧全集
 6. 天下泰山

BEYOND BOUNDARIES:

New Modes of Access and Accessibility through Emerging Technologies Symposium



3.3 Data Transformation Process

Relationship construction

Person→Work: author, editor,
is subject of.....

Work→Work: adaptation,
influenc

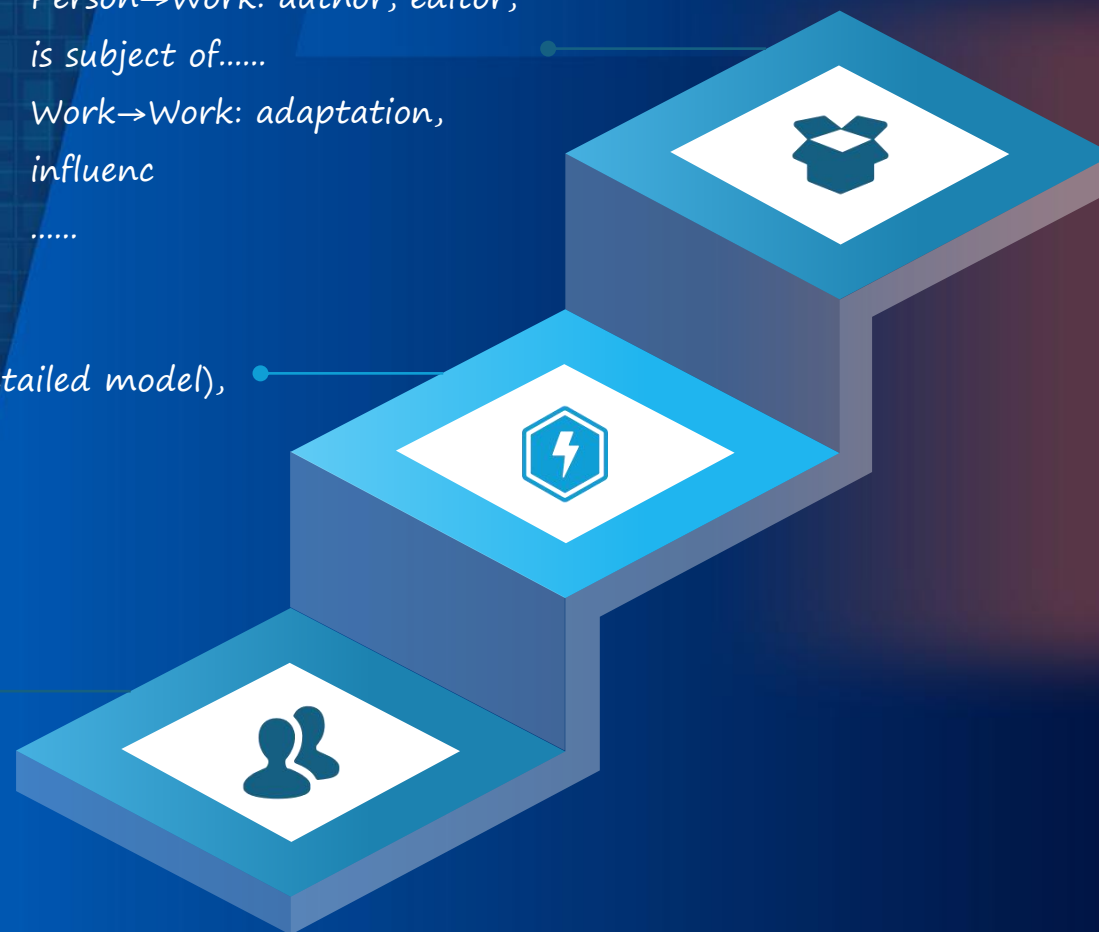
.....

Entity Extraction, Mapping & Disambiguation

Person entity:
person name(detailed model),
authority file

Granular data model

Person name: 100a(marc21)
701a(cnmarc), creator(dc).....



4 Applications

4 应用



4.1 Donor's profile about Wang Anyi

授权的标题
Wang, Anyi, 1954-

Wang, Anyi, 1954-....

王安憶

Wang, An yi 1954-....

数据来源: 国图个人名称规范数据(复旦匹配库)

来源唯一标识: UCS10000121111

姓名: 王安忆

异名: Wang Anyi/王安憶

性别: 女

生卒年: 1954-

出生地: 江苏南京

隶属机构: 复旦大学

活动领域: 中国文学

检索范围: **全部数据库** 姓名/异名/国图标识号/规范库ID: **王安忆**

共发现 **1** 条数据

序号	规范库唯一标识	姓名	籍贯
1	907406803	王安忆	
		王安忆	福建

关键字 高级检索

精确搜索结果 结果: 1-97/97 显示: 100 相关性

格式 位置 3 出版商 语言 检索词 中文 英语 主题 体裁/形式 检索词 Fiction Short stories Biographies Criticism, int 共发现55条数据

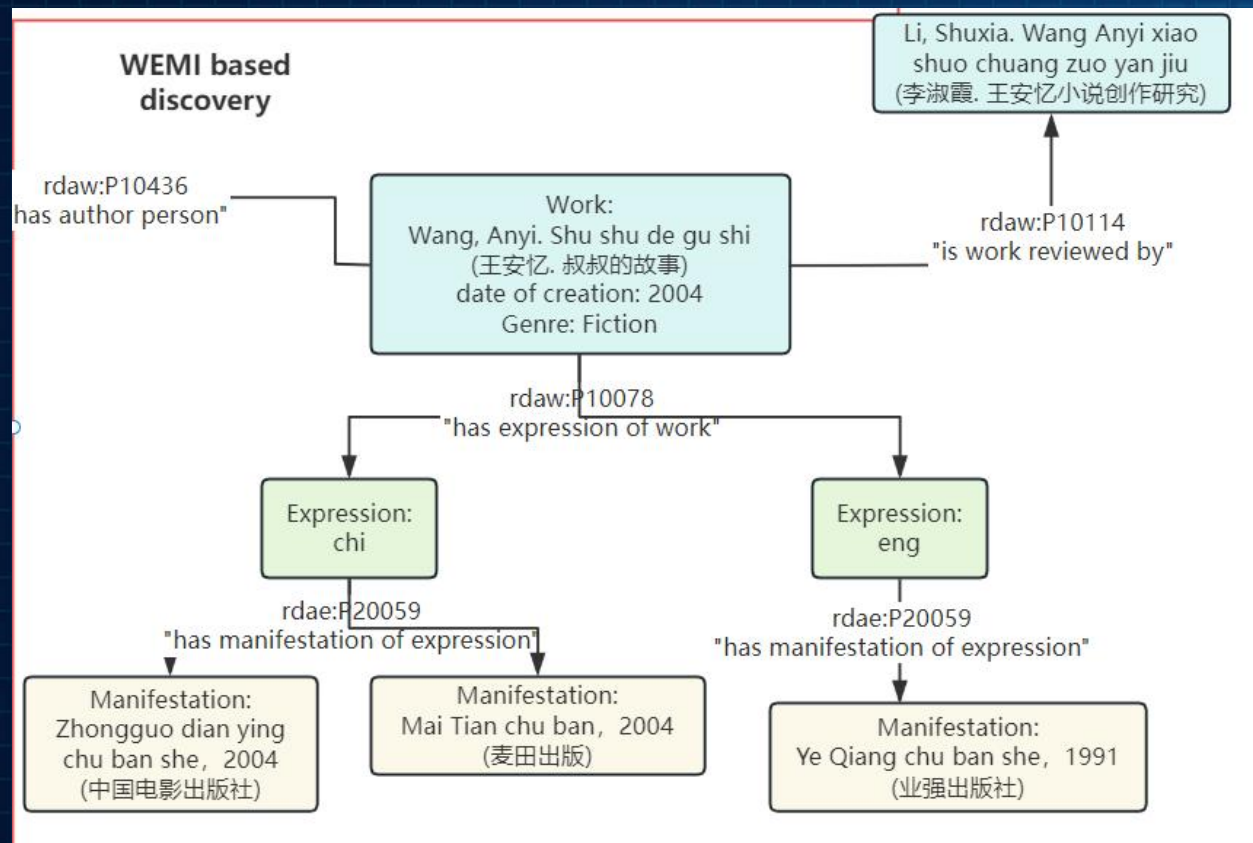
Book
Wang Anyi zhong pian xiao shuo xuan / Wang Anyi zhu.

Book
Liu shi : Wang Anyi dai biao zuo / Wang Anyi zhu.

Book
Fuping / Wang Anyi.
富萍 / 王安憶.
作者: [Wang, Anyi, 1954-](#)
投稿人: [王安憶, 1954-](#)
已出版: Mai tian chu ban, Taipei Shi, 2022
版本: Er ban., 二版.
体裁: [Fiction, History](#)
主题: [1900-1999, Women internal migrants--China--Fiction, Women--Conduct of life--Fiction](#) +8 更多

可用: 剩 1 本, 共 1 本 副本
复旦大学学者

4.2 Donors' Knowledge Graph --WEMI based discovery



- **Work--Work**

Wang, Anyi. Shu shu de gu shi--is work reviewed by--Li, Shuxia, Wang anyi xiao shuo chuang zuoyanjiu

- **Work--Expression**

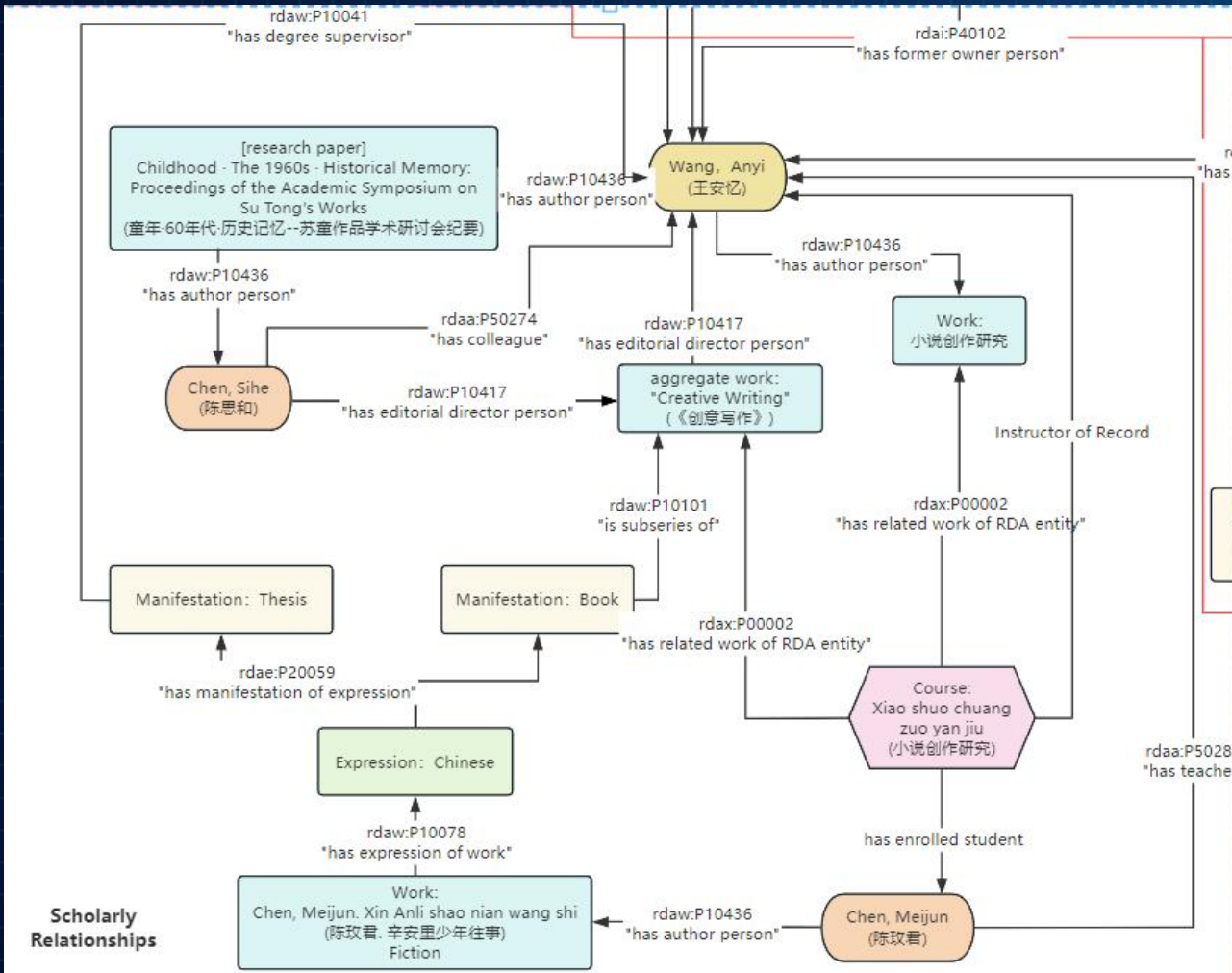
This work has Chinese and English expressions.

- **Expression--Manifestation**

Chinese expression has two manifestations.

Users can view different manifestations and expressions of the same work

4.3 Donors' Knowledge Graph



--Author networks

Showing collaboration and academic connections among scholars

- **Person--Person**

Wang, Anyi--has colleague--Chen, Sihe

Chen, Meijun--has teacher--Wang, Anyi

- **Work--Course**

[Course]Xiao shuo chuang zuo yan jiu--has related work to RDA entity--[Work]Xiao shuo chuang zuo yan jiu

Scholarly Relationships

4.5 AI-Assisted Relationship Discovery

自助服务列表

主题数据

个人实体数据 媒体表现层数据 单元层数据 业务操作行为为实体数据 图书馆用户行为为实体数据

匹配

属性分类	属性名称	匹配条件
RE030101媒体表现层基本	责任者	固定值 (单值) 包含 王安忆
RE0401单元通用属性	单元相关责任者	固定值 (单值) 包含 王安忆

Retrieve data from the data mart



950 itmes:
 244 Work entites
 246 Expression entities
 343 Manifestations entities
 93 Person entities
 108 Corporate body

Automatic extraction of WEIWI, person, and Corporate Body entities



LRM关系统计

关系类型	数量	说明
hasSubject	4,381	主题关联
hasSeries	546	系列作品
creates	366	创作关系
publishes	352	出版关系
embodies	343	体现关系
realizes	246	实现关系
edits	37	主编关系

Relationship discovery and identification



Person (人物)	96	
关系类型统计		
关系类型	数量	Neo4j关系名
合作关系	146条	HAS_COLLABORATOR
师生关系	28条	HAS_STUDENT
同行关系	9条	HAS_COLLEAGUE
同事关系	2条	HAS_COLLEAGUE
翻译关系	2条	TRANSLATES
母女关系	1条	HAS_PARENT
朋友关系	1条	HAS_FRIEND
总计	189条	

Revealing relationships among personal entities



分析结果

研究作品分析:

- 《王安忆小说创作研究》: 研究了228个王安忆作品
- 《王安忆作品中的上海书写研究》: 研究了228个王安忆作品

被研究作品:

- 所有王安忆的作品都被研究, 包括《22岁, 莲花盛开》、《王安忆短篇小说编年》、《上种红菱下种藕》等

研究关系网络:

- 以研究作品为中心, 辐射到大量王安忆的作品
- 单向研究关系, 从研究作品指向被研究作品
- 网络高度集中, 围绕王安忆的创作展开

Description of inter-work relationships



我已经完成了作品间研究与评论关系的分析, 专注于识别哪些作品研究王安忆作品以及其他研究关系。

分析结果

统计项	数值
研究/评论类作品	3个
识别的关系	456条
关系类型	研究关系

输出文件

研究与评论关系表已保存至: research_comments_relations.csv

Identification of commentary and research relationships between works

4.6 Conclusions



WEMI knowledge graph can serve as an important basis for evaluating books, even be used to create guided reading maps.



Academic relationship network provides a comprehensive visualization of social and scholarly connections among researchers.



Provenance information offers valuable evidence for bibliographic research and study.



It highlights individual donations, guiding libraries in actively attracting high-quality special collections in the future.

Thank you!

Qing Miao

email: qmiao@fudan.edu.cn

