InterPARES Trust AI

AD06: Automatic Construction and Open Source Use of Trustworthy Knowledge Graph of Ancient Chinese and Italian Medical Texts

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Outline

01 Background

02 Analytical techniques versus ancient medical texts

03 Research goals

04 Expected products

Background

Ancient **Chinese** medical texts: Copied or printed on paper before 1911.

There are as many as 8,663 kinds of ancient Chinese medical texts dated before 1912 survived, accounting for 6% of all ancient Chinese books in China.

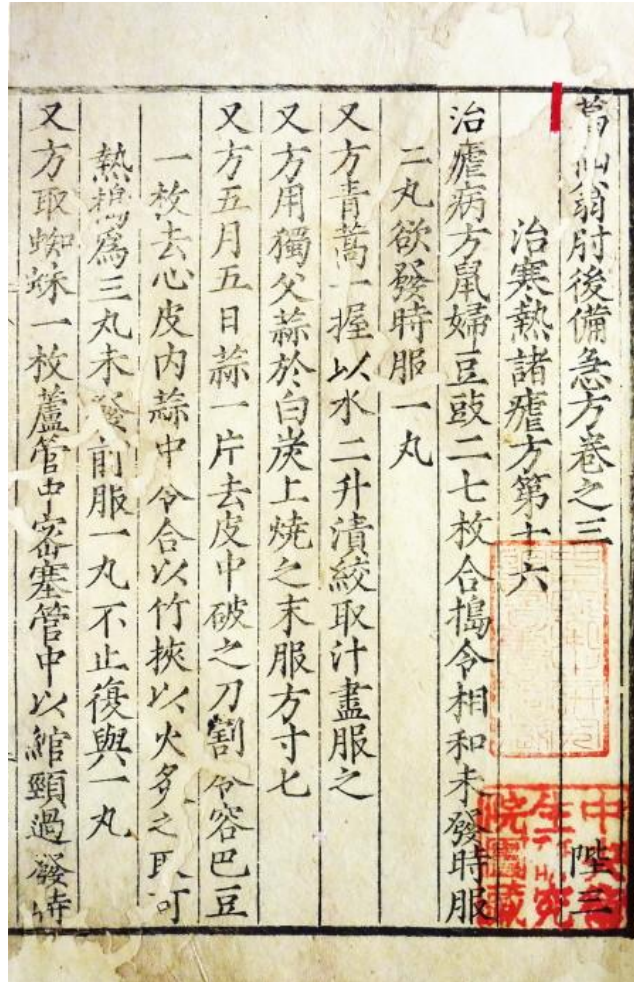————Xue Qinglu,《General Catalog of Chinese Ancient Medicine Books》

TU YOUYOU

Chinese Medicine will help us conquer life-threatening disease worldwide, and that people across the globe will enjoy its benefits for health promotion.

Tu Yuyou

Ge Hong's 'A handbook of prescriptions for emergencies' (East Jin Dynasty, around 317—420 A.D.). Tu Youyou searched ancient compendia of traditional Chinese medicine to find a cure for malaria. © Nobel Prize Museum
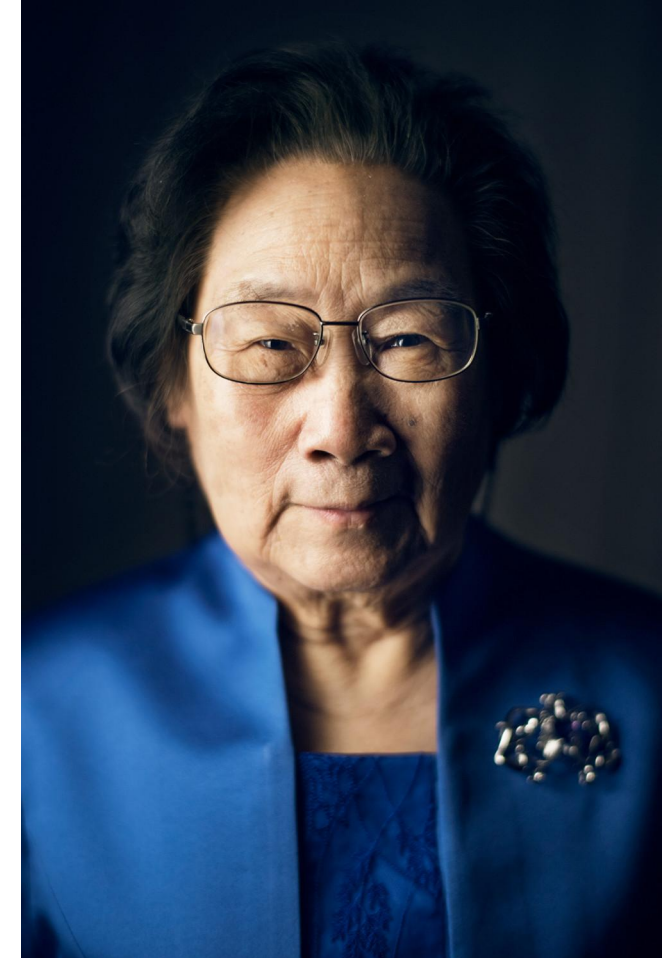
TU YOUYOU

If Tu Youyou had the assistance of AI tool, would she find the cure sooner or later?

Opinions on Promoting the Work of Ancient Texts in New Era

"...... greater efforts on the work of ancient texts, to properly protect, develop and utilize these precious treasures of our motherland."

"...... actively carry out research and practice on text structuring, knowledge systemization, and intelligent use of ancient texts"

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中共中央办公厅 国务院办公厅印发《关于推进新时代古籍工作的意见》

2022-04-11 18:56　来源：新华社

【字体：大中小】　🖶 打印

新华社北京4月11日电 近日，中共中央办公厅、国务院办公厅印发了《关于推进新时代古籍工作的意见》，并发出通知，要求各地区各部门结合实际认真贯彻落实。

《关于推进新时代古籍工作的意见》全文如下。

做好古籍工作，把祖国宝贵的文化遗产保护好、传承好、发展好，对赓续中华文脉、弘扬民族精神、增强国家文化软实力、建设社会主义文化强国具有重要意义。党的十八大以来，以习近平同志为核心的党中央站在实现中华民族伟大复兴的战略高度，对传承和弘扬中华优秀传统文化作出一系列重大决策部署，古籍事业迎来新的发展机遇。为深入推进新时代古籍工作，现提出如下意见。

Challenges when utilizing ancient medical texts

- Unstructured text, complex characters, and classical Chinese

- Use of different expressions

- Fuzzy words

- Information fragmentation

- Tacit knowledge

Techniques have been used to analyze data in the ancient medical texts

- ## Database construction

- ## Cognitive linguistic analysis

- ## Fuzzy logic

- ## Data mining

The Library of the China Academy of Chinese Medical Sciences

Digitized Ancient Medical texts database Library of Shandong University of Traditional Chinese Medicine
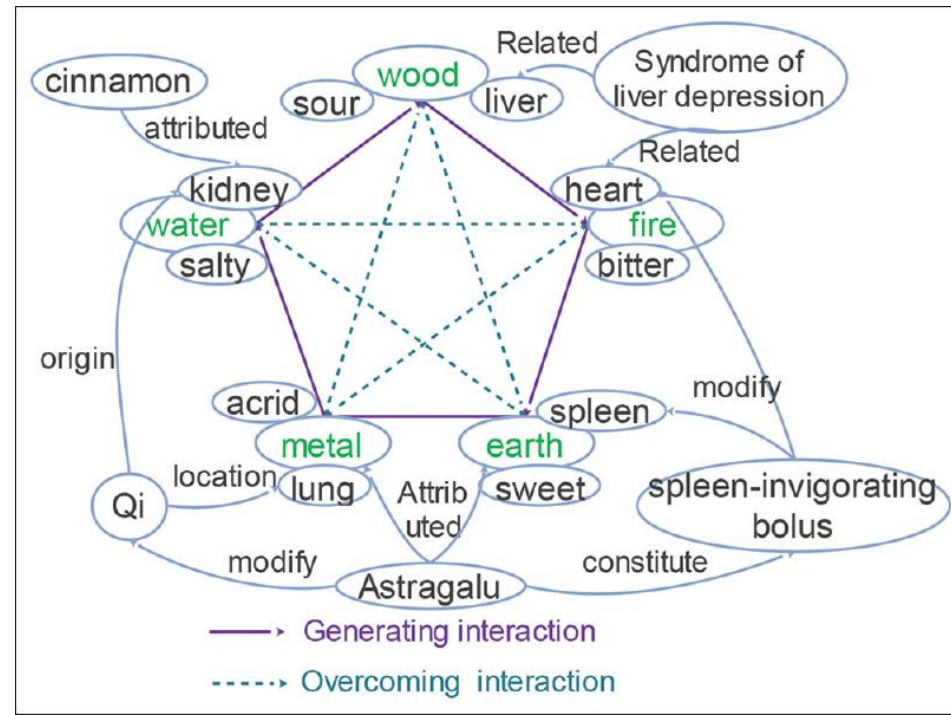
Artificial Intelligence technology

- Machine learning algorithm

- Deep learning algorithm

- Knowledge graph

Knowledge Graph

Semantic network that describes objective entities, concepts, and the relationships between them in the real world.

(Nickel et al., 2016)

- Map-based method of knowledge representation and organization

(Gao et al, 2020)

Opinions on Accelerating Scenario Innovation and High-level Application of AI to Promote High Quality Economy Development

"......insufficient design of major scenario system, insufficient openness of scenario opportunities, ecology for scenario innovation not well developed, and others......"

Italy's concept and theory of cultural heritage protection and knowledge graph technology are among the top in the world.

- Venice Time Machine

- BabelNet
- ArCo: the Italian Cultural Heritage Knowledge Graph
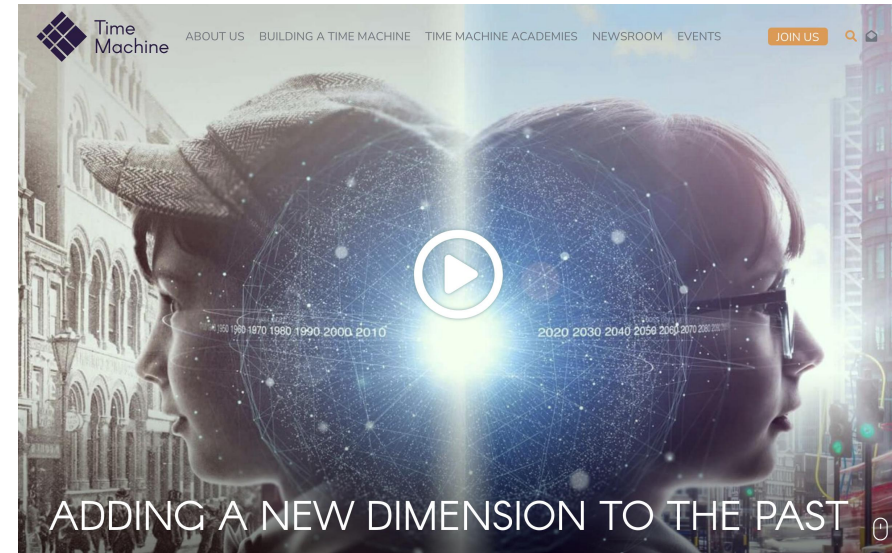

ADDING A NEW DIMENSION TO THE PAST

Overall goal

This project aims to focus on terminology and study the underlying mechanism of trustworthy knowledge graph by examining the generation mechanism of trustworthy, explainable, and computable knowledge graphs, integrating lexical chain model and deep learning technology to develop usable,trustworhty domain knowledge graphs techniques for ancient medical texts, and using pandemic prevention and regimen as examples to develop demo applications.

Objectives

Trustworthy knowledge graph theories to improve the explainability and computability of knowlege graph

AI technologies for mining knowledge within traditional Chinese and Italian medical texts
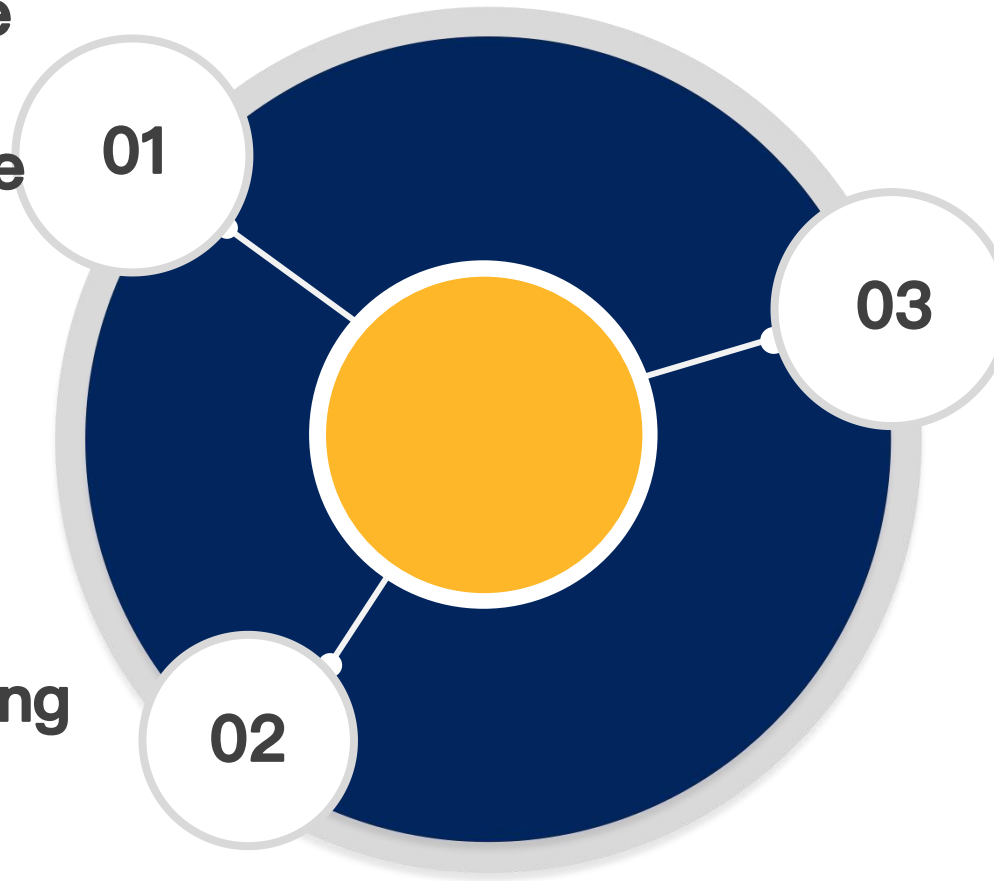
01

03

02

Scenario–based open source demo applications

Interdisciplinary research that integrates knowledge from the fields of language, cognitive science, and computing science will be conducted to understand the mechanism of trust and provide bases for the development of trustworthy knowledge graph.

- Trustworthy knowledge graph is essentially a sense-making process.

- "Attention"research in cognitive science.

  - Attenuation theory (Anne Treisman)

    "the attenuation of unattended stimuli would make it difficult, but not impossible to extract meaningful content from irrelevant inputs, so long as stimuli still possessed sufficient "strength" after attenuation to make it through a hierarchical analysis process."

01 "Trustworthy" knowledge graph(Cont.)

- The process of knowledge graph generation is actually the process of human beings filtering information.

- Words and sentences have different cognitive loads on people.

- Graph generation often uses multiple tasks to execute in parallel,

(1) Restoring ancient texts using deep neural network technology

(2) Developing technology for the construction of knowledge graph based on lexical chain

(3) Methods for enhancing trustworthy knowledge graph based on entity linking and link prediction.

03 Scenario–based open source demo applications

(1) Cross-language terminology service of Chinese and Italian traditional medical science.

(2) Designing "Digital Ricci" using metahuman technology.

Cross-language terminology service of Chinese and Italian traditional medical science.

- • Map terminologies in Chinese and Italian ancient medical texts and through which to aggregate medical knowledge in China and Italian ancient medical text.

Pandemic prevention (public health) and regimen (personal health care)

Matteo Ricci(Li Madou) (1552-1660, born in Macerata)

- An Italian Jesuit priest and one of the founding figures of the Jesuit China missions, also one of the first Western scholars to master Chinese script and Classical Chinese.
- Pioneer of Chinese-Western dialogue and cultural exchanges

"Digital Ricci" : Automatic questioning and answering service to the general public on Chinese and Italian medical information.

MATTHEVS RICCIVS MACERATENSIS QVI PRIMVS E SOCIETAE ESV EVANGELIVM IN SINAS INVEXIT OBIIT ANNO SALVTIS 1610 ÆTATIS 60.

Thanks!

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