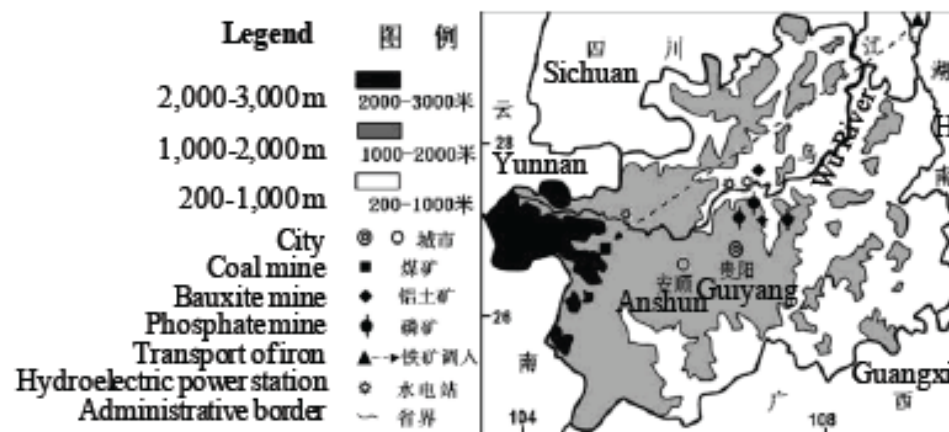


Towards Answering High School Geography Questions: A New AI Challenge and a Knowledge-driven Approach

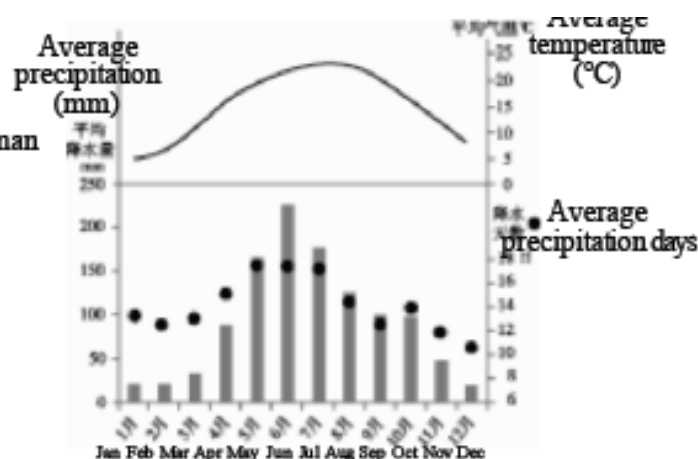
Zhiwei Zhang



Geography Questions



贵州地形与主要矿产资源分布示意图
Terrain and major mineral resources in Guizhou



贵阳气候基本数据统计图
Basic climate data for Guiyang

Questions:

(1) 描述贵州省的地理位置特点。

Describe the features of the location of Guizhou Province.

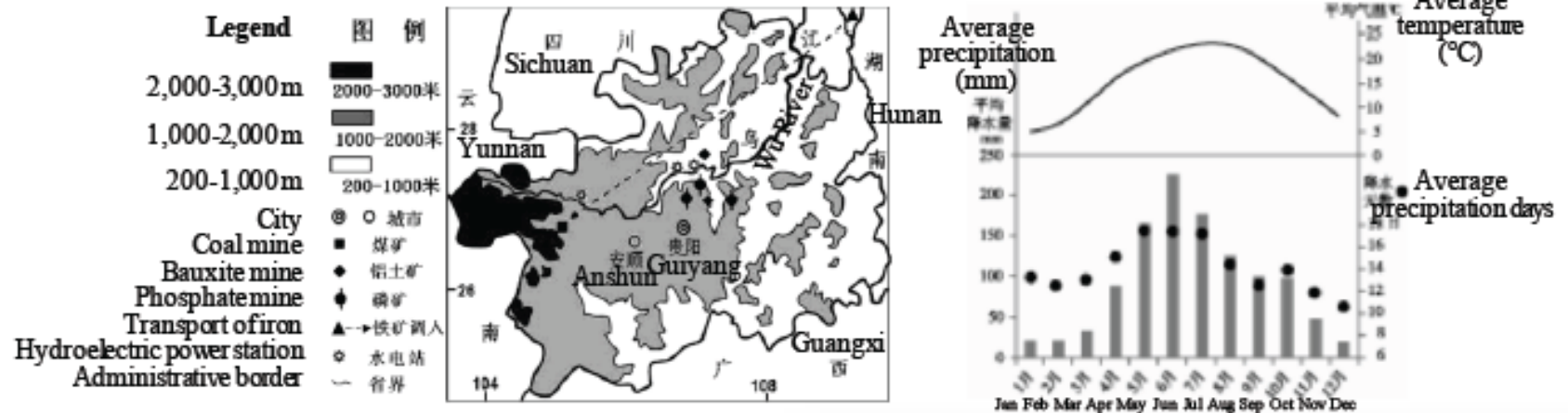
(2) 从地形、气候角度说明自然条件对贵州经济发展的不利影响。

In terms of terrain and climate, explain the negative effects of natural circumstances on the economic development of Guizhou.

(3) 2014年1月，国家级开发区——贵安新区在贵阳和安顺之间正式成立。我国三大电信运营商在此设立云计算中心，中关村科技园、搜狐、百度、京东等企业落户此地，贵安大数据产业基地初具雏形。根据该材料概括贵安大数据产业基地赢得的有利发展条件，结合所学指出该产业基地为吸引企业入驻应进一步采取的措施。

In January 2014, the Gui-An state-level new area was established, located between Guiyang and Anshun. Over there, the three state-run telecom companies opened their cloud computing centers, and companies including Centek, Sohu, Baidu, and JD set up new branches, showing the initiation of the Gui-An base for the big data industry. With respect to this information, summarize the positive circumstances for developing the Gui-An base for the big data industry, and identify some measures for this industrial base to attract more companies.

Human's methods



贵州地形与主要矿产资源分布示意图
Terrain and major mineral resources in Guizhou

Questions:

(1) 描述贵州省的地理位置特点。

Describe the features of the location of Guizhou Province.

(2) 从地形、气候角度说明自然条件对贵州经济发展的不利影响。

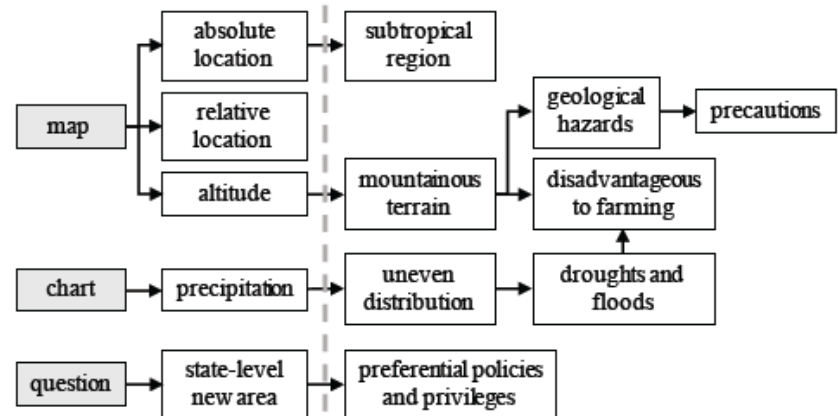
In terms of terrain and climate, explain the negative effects of natural conditions on the economic development of Guizhou Province.

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In January 2014, the Gui-An state-level new area was established, located between Guiyang and Anshun. Baidu, JD.com and other companies opened their cloud computing centers, and companies including Alibaba, Tencent, etc. have also entered the Gui-An base for the big data industry. With respect to this information, identify some measures for this industrial base.

Information Acquisition

Reasoning

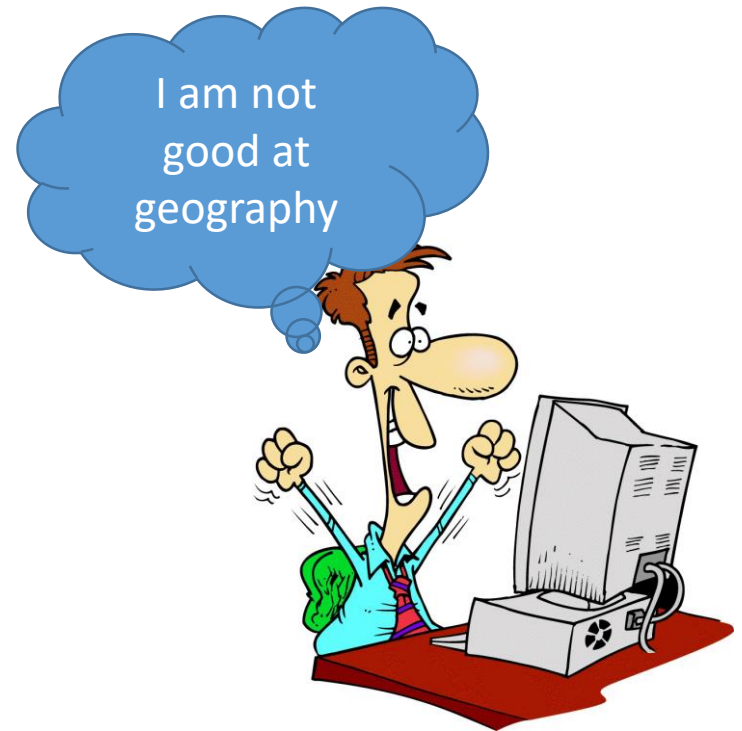
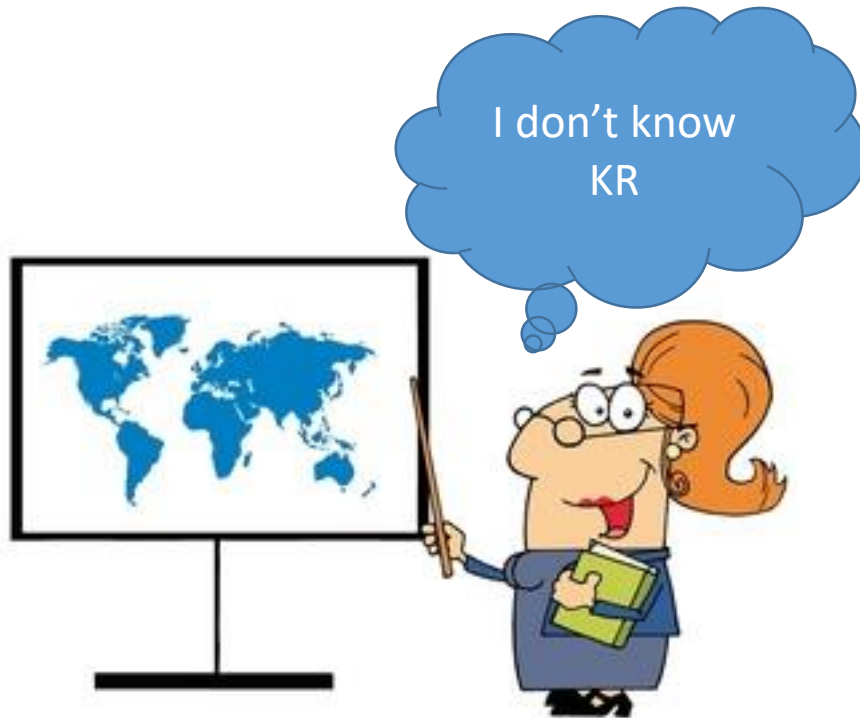


Challenges of Knowledge Engineering

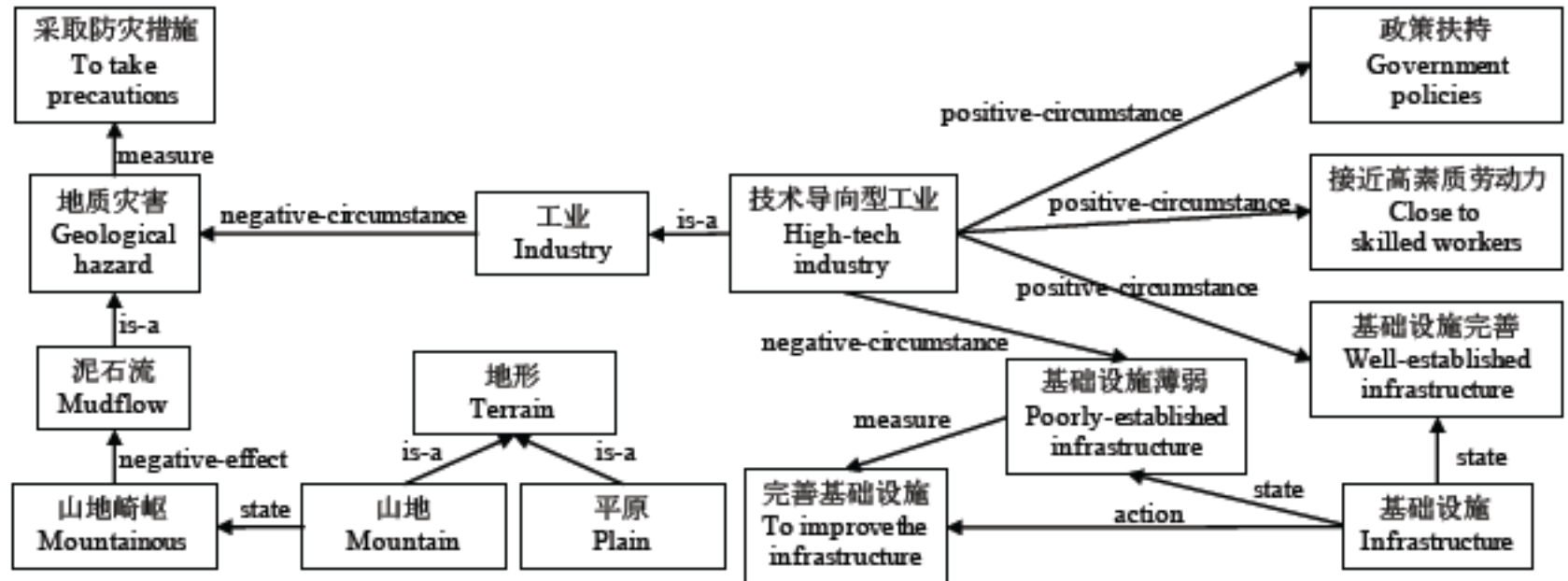
- Ontology
 - plateau is-a terrain
 - precipitation is-part-of climate
 - temperature is-part-of climate
- Casual link
 - Low precipitation -> drought
- Basic mathematics computation
 - maximum
- Numerous relationships, rules and processes related to time, space and uncertainty
- Widespread Common sense



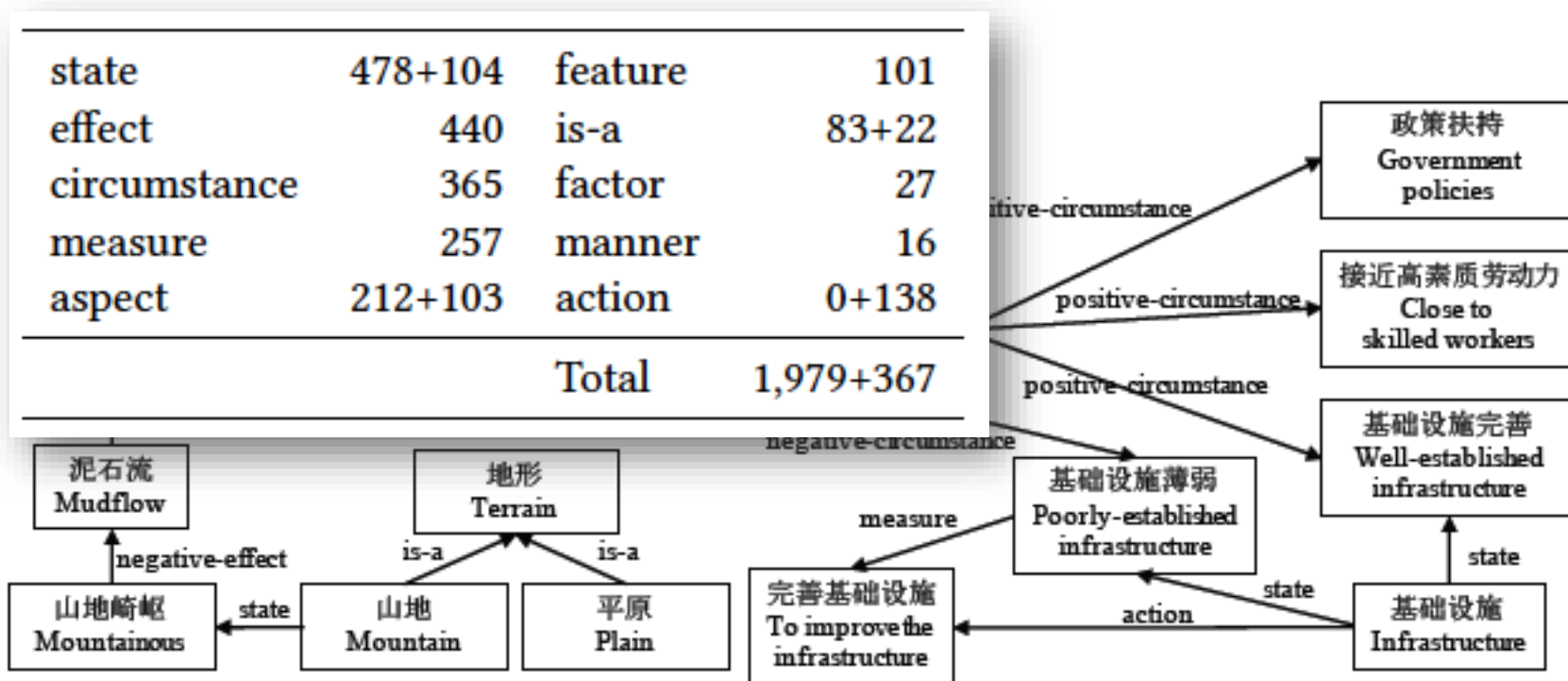
Domain expert vs. Knowledge engineer



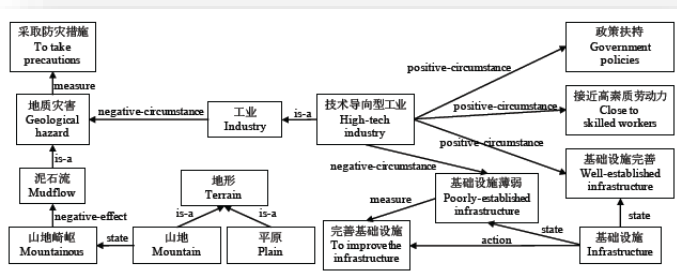
Knowledge Graph



Scale of Graph (Manually+Automatically)



Solving methods

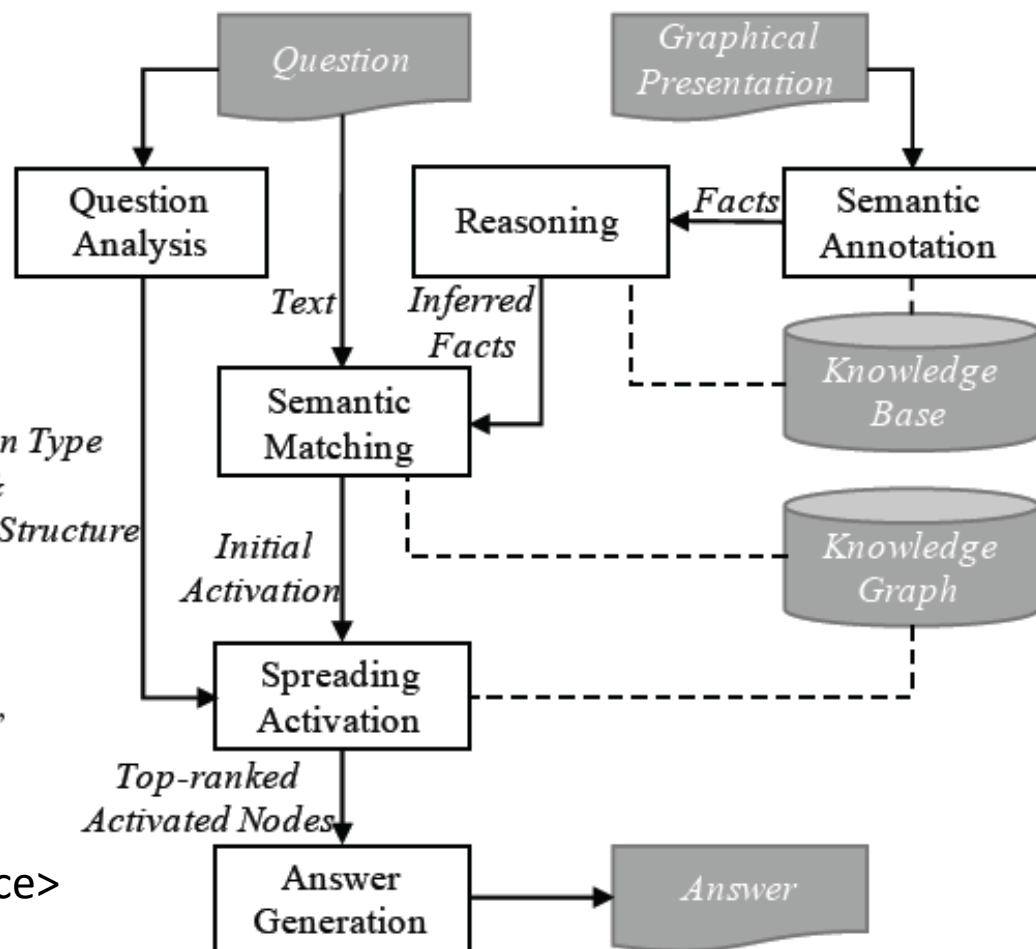


*Question Type
&
Question Structure*

Circumstances (subject, aspect, polarity)

Circumstances (Gui-an base for the big data industry, development, positive) .

[subject] <is-a>* <positive-circumstance>



Distribution of question types

Causes	27.67%	Troubles	4.06%
Circumstances	9.48%	Distribution	4.02%
Effects	8.63%	Changes	3.65%
Features	7.89%	Opinions	1.77%
Comparison	7.71%	Redirection	0.48%
Measures	7.16%	Transport	0.33%
Significance	5.20%	Misc.	11.95%

Current Result

