Purpose Driven Biological Lawsuit Modeling and Analysis Based on DIKWP

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Abstract. Towards an innovative automatic resolution on disputations involving essentially inconsistent, incomplete, inaccurate, inexpressible resources in biological lawsuits, we propose to integrate the modeling and processing the semantics embodied in the inconsistent, incomplete, inaccurate and inexpressible Data, Information, Knowledge, Wisdom, Purpose (DIKWP) representing the stakeholders' cognitive understandings, uniformly as DIKWP (stakeholder), and the multiple modal documentary content, uniformly as DIKWP (content). We firstly map the content in the sample lawsuit input, transaction, communication and juridical output as DIKWP (content) Graphs including DIKWP Content Graph from the objective material literally. Thereafter we proposed a purpose driven or oriented traversing of the pursues along with reasoning and documenting the subjective DIKWP of the stakeholders as DIKWP (stakeholder) Graphs including DIKWP Cognition Graph. Traversing among DIKWP (content) and DIKWP (stakeholder) based on our proposed Essence Computation and Reasoning, Existence Computation and Reasoning, Purpose Computation and Reasoning allows the integration of the subjective and objective semantics to bridge the gaps leaved by previously processing inconsistent, incomplete, inaccurate, inexpressible resources besides great potential on crossing modals DIKWP validations. Computationally DIKWP promises enhanced understand ability and reduced complexity with shorten cognitive distances and reasoning distances.

Keywords: DIKWP · Purpose driven · Essence computation and reasoning · Existence computation and reasoning · Purpose computation and reasoning · Semantic computation · Biological lawsuit

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1 Introduction

Semantics [1] is the essential cognitive content for people to think and communicate using a language composed of conceptual symbols. The cognitive interpretation of finding concepts can be mapped to the existence confirmation, dependency relationship and pattern discovery from Concept Space to Semantic Space. A large number of DIKW resources are gathered in biological legal cases. During the construction and application of DIKW maps, Duan et al. [2] proposed to formalize DIKW elements, and classify content objects and relationships into typed DIKW content with a unified standard. Mapping semantic element entities or relationships in related resources to multimodal conceptual model levels such as DIKW through intent-oriented fusion, experience systemization, and ontology formalization [3].

Current AI solutions lack effective strategies, which can combine machine learning, subjective judgment information, expert knowledge, and smart strategies. Under the background of incomplete data, insufficient information, incomplete knowledge, and unbalanced wisdom strategies, the mixed subjective and objective [4–6] DIKW content faces great challenges in technologies such as interpretable and trusted semantic representation and responsible AI service system construction. Through the interaction and integration of DIKW services, the innovation of concepts, theories and model mechanisms in interdisciplinary fields can be realized. The theoretical basis is the integration, transformation and sharing of DIKW concepts and semantics.

The innovation of DIKW service integration and interaction based on subjective objectification [7,8] helps to solve this series of problems. The difference between relations and entities in the conceptualization process can be revealed through relations or semantics, and can also be used as a basis for distinguishing types of data resources and information resources in subsequent work. Using the Axiom of Consistency of Semantics (CS), Axiom of Conservation of Existence Set (CEX), Axiom of Consistency of Compounded Essential Set (CES), Axiom of Inheritance of Existence Semantics (IHES) and other axiom systems based on Existence Computation and Reasoning (EXCR) [9] and Existence Computation and Reasoning (ESCR) [10] to reveal the semantic space of the points, lines and surfaces of the Euclidean space, and then complete the stipulation proof of the Four Color Theorem [11], Semantic modeling and cognitive reduction analysis of Goldbach's Conjectur [12] and Collatz Conjecture [13]. For large-scale concept-semantic expression fuzzy and mixed semantic content fusion, especially the fusion scene where semantic content is time-sensitive and continuously evolving. Based on the fusion of EXCR exist semantics and cross-DIKW modalities, the Essential Semantic Relationship Defined Everything of Semantics (RDXS) [14,15] is constructed. By associating the EXCR existence semantics of content descriptive and executable contradictory goals with the ESCR essential semantics, DIKW Graphs supports more complete conceptual, semantic modeling and processing [16] of multimodal categories. Based on the EXCR and ESCR mechanisms, the meta-model [17] of DIKW Graphs is designed, which is also applied in intelligent form filling [18], emotional communication [19], Privacy Protection

[20], Internet of Things [21], Cloud Computing [22], Electronic Commerce [23] and so on.

2 Architecture Design

Starting from the natural language of incomplete, imprecise, inconsistent data, information, knowledge and wisdom concepts, semantics. The multi-dimensional, multi-modal, and multi-scale subjective and objective content service interaction expressed in machine language is used to identify the semantics of uncertain concepts, subjective and objective formal modeling, formal expression and value fusion processing, and construct purpose-driven fusion data and information., knowledge and wisdom case modeling and judgment.

There are a large number of relevant Biological Lawsuit Resource (BLRES) on the Internet, but the real and complete resources are always different from individual and local resources. Its specific manifestations are incomplete, inconsistent, inaccurate and inexpressible. We found two paragraphs of text in the network, the first paragraph of text, we deleted it, and got individual local resources. By comparing the two, it is easy to see that there is a huge difference in the meaning of the two sentences. The protagonist of the second paragraph of text has the same name, but does different things. It is not difficult to see that the attributes of the protagonist are different.

Example 1

Complete Resource: There is a group of white animals waiting quietly on the ice surface. Suddenly the group of animals moved **quickly** and rushed towards a certain part of the ice. They move faster than humans and are **not afraid** of the cold. This animal can survive by **reducing** its caloric needs **when food is completely unavailable**. What is a target to identify?

Individual Resource: There is a group of white animals waiting quietly on the ice surface. Suddenly the group of animals moved **slowly** and rushed towards a certain part of the ice. They move faster than humans and are **afraid** of the cold. This animal can survive by **increasing** its caloric needs. What is a target to identify?

Example 2

Role	Text
A	Shylock is mysterious. Initially discovered in February 2011 by security firm, Shylock delivers web injects into victims' browsers and logs keystrokes. Shylock is so contagious that it can be infected by sending a mail. What is Shylock?
B	Shylock is mysterious. In September 2011, Shylock walked to the shop, bought a knife and killed a doctor. He eluded the police for three years by relying on his keen insight. What is Shylock?

The inconsistency, incompleteness, inaccuracy, and inexpressivenes to express the essential data, information, and knowledge between individual resources and complete resources make AI unable to make accurate decisions, and even lead to wrong judgments. Confusion of subjective and objective semantic categories of the subject expression content, insufficient degree of objectification of subjective semantics, lack of semantic correlation, inaccurate semantics, inconsistency of semantics, drift of concept-semantic mapping, redundancy of semantic-concept mapping, etc. Realize the automation of inter-service services and improve the efficiency of intelligent interaction.

From the DIKWP (content) Graphs and the DIKWP (stakeholder) Graphs, the data, information, knowledge, wisdom and purpose mapping of the content involved in the text are carried out, and the recognition result is obtained by driving the Purpose. The Cognition Graph is mainly descriptive content, the Content Graph supports executable processing, and the two graphs can be represented in tabular form.

DIKWP (content) Graphs include Data Content Graph, Information Content Graph, Knowledge Content Graph, Wisdom Content Graph and Purpose Content Graph.

$$DIKWP_{CT} ::=< DG_{CT}, IG_{CT}, KG_{CT}, WG_{CT}, PG_{CT} > \tag{1}$$

DIKWP (stakeholder) Graphs include Data Cognition Graph, Information Cognition Graph, Knowledge Cognition Graph, Wisdom Cognition Graph and Purpose Cognition Graph.

$$DIKWP_{CG} ::=< DG_{CG}, IG_{CG}, KG_{CG}, WG_{CG}, PG_{CG} > \tag{2}$$

Define the text content of Example 1, Example 2A and Example 2B as content(C1), content(C2) and content(C3), respectively, and define user(A) and user(B) for multiple users. For content(C1), content(C2), user(A), user(B), corresponding expressions are:

$$\begin{aligned}
&DIKWP_{CT}(C1) ::=< DG_{CT}(C1), IG_{CT}(C1), KG_{CT}(C1), WG_{CT}(C1), PG_{CT}(C1) > \\
&DIKWP_{CT}(C2) ::=< DG_{CT}(C2), IG_{CT}(C2), KG_{CT}(C2), WG_{CT}(C2), PG_{CT}(C2) > \\
&DIKWP_{CG}(A) ::=< DG_{CG}(A), IG_{CG}(A), KG_{CG}(A), WG_{CG}(A), PG_{CG}(A) > \\
&DIKWP_{CG}(B) ::=< DG_{CG}(B), IG_{CG}(B), KG_{CG}(B), WG_{CG}(B), PG_{CG}(B) >
\end{aligned} \tag{3}$$

For the understanding of content(C1) by user(A), the cognitive DIKWP in user(A) is denoted as:

$$\begin{aligned}
&DIKWP_{CG}(A(C1)) ::= \\
&< DG_{CG}(A(C1)), IG_{CG}(A(C1)), KG_{CG}(A(C1)), WG_{CG}(A(C1)), PG_{CG}(A(C1)) >
\end{aligned} \tag{4}$$

For the understanding of content(C1) by user(B), the cognitive DIKWP in user(B) is denoted as:

$$DIKWP_{CG}(B(C1)) ::= \\ < DG_{CG}(B(C1)), IG_{CG}(B(C1)), KG_{CG}(B(C1)), WG_{CG}(B(C1)), PG_{CG}(B(C1)) > \quad (5)$$

The final combined DIKWP of semantics, denoted as DIKWP (semantic (stakeholder, content)), is the integration of objective DIKWP (content) and subjective cognitive DIKWP (stakeholder).

$$\begin{aligned} & DIKWP_S ::=< DG_S, KG_S, KG_S, WG_S, PG_S > \\ & DIKWPS \\ & ::= DIKWPCT + DIKWPCG \\ & ::=< DG_{CT}, IG_{CT}, KG_{CT}, WG_{CT}, PG_{CT} > + \\ & \quad < DG_{CG}, IG_{CG}, KG_{CG}, WG_{CG}, PG_{CG} > \\ & ::=< (DG_{CT} + DG_{CG}), (IG_{CT} + IG_{CG}), (KG_{CT} + KG_{CG}), \\ & \quad (WG_{CT} + WG_{CG}), (PG_{CT} + PG_{CG}) > \end{aligned} \quad (6)$$

For the understanding of content(C1) by user(A), the final combined semantic DIKWP is denoted as:

$$\begin{aligned} & DIKWP_S(A(C1)) \\ & ::= DIKWP_{CT}(C1) + DIKWP_{CG}(A(C1)) \\ & ::=< DG_S(A(C1)), IG_S(A(C1)), KG_S(A(C1)), WG_S(A(C1)), PG_S(A(C1)) > \\ & ::=< (DG_{CT}(A(C1)) + DG_{CG}(C1)), \\ & \quad (IG_{CT}(A(C1)) + IG_{CG}(C1)), (KG_{CT}(A(C1)) + KG_{CG}(C1), \\ & \quad (WG_{CT}(A(C1)) + WG_{CG}(C2)), (PG_{CT}(A(C1)) + PG_{CG}(C1)) > \end{aligned} \quad (7)$$

For the understanding of content(C1) by user(B), the final combined semantic DIKWP is denoted as:

$$\begin{aligned} & DIKWP_S(B(C1)) \\ & ::= DIKWP_{CT}(C1) + DIKWP_{CG}(B(C1)) \\ & ::=< DG_S(B(C1)), IG_S(B(C1)), KG_S(B(C1)), WG_S(B(C1)), PG_S(B(C1)) > \\ & ::=< (DG_{CT}(B(C1)) + DG_{CG}(C1)), \\ & \quad (IG_{CT}(B(C1)) + IG_{CG}(C1)), (KG_{CT}(B(C1)) + KG_{CG}(C1)), \\ & \quad (WG_{CT}(B(C1)) + WG_{CG}(C1)), (PG_{CT}(B(C1)) + PG_{CG}(C1)) > \end{aligned} \quad (8)$$

3 Resource Mapping

Taking the complete resource as an example, it is divided according to the part of speech, and the specific meaning is mapped to the data resource, such as noun, number, time, etc. Mappings that contain some kind of information into information resources, for example, verbs, adjectives, etc. Combined with context semantic structure, as well as data resources and information resources, knowledge resources are derived. According to the semantic structure expressed by the context in the paragraph, the observed relationship, and combined with the data, information, and knowledge resources, the purpose resources are obtained. Wisdom resources are stored in the form of a value system, and it is necessary to judge the feasibility of intentions through the value system.

Complete Resource

There is a group of white animals waiting quietly on the ice surface. Suddenly the
I D D I D D I I I D D I
group of animals moved quickly and rushed towards a certain part of the ice. They
D I D I I I I I I I D I D D
move faster than humans and are not afraid of the cold. This animal can survive by
I I I D I I I I I D I I I
reducing its caloric needs when food is completely unavailable.
I D I I D I I
What is a target to identify?
I D I I

Map resources to corresponding data, information, knowledge, wisdom, and purpose as shown in Table 1.

Table 1. Partial resource mapping

D	I	K	W	P
target a group white animals ice surface they humans caloric part	here of waiting quietly on suddenly moves quickly and rushed towards	$no(food) \rightarrow$ $reducing(caloric)$ $\rightarrow survive$	animal, survivable	$what(target)$ survive

3.1 Data Mapping

The nodes of the data graph are connected by time sequence, concept and semantic relationship to form a connected structure. Part of the data further forms a topological structure through the partial order relationship. Topological structure is represented by physical connections on the graph, and its specific meaning will change due to different partial order relationships, such as ring topology, tree topology and other structures. Using the joint structure and topological structure in the graph can well represent and calculate the relationship between the data, such as in-out degree, distance, frequency weight, etc.

Data Content Graph
The way the content data model is handled is defined based on dimensions and frequency. We map the text from Example 1 to the data resource to get the Data Content Graph, as shown in Fig. 1.

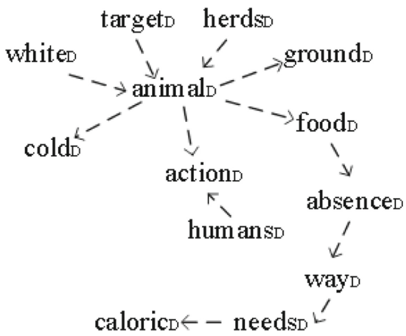


Fig. 1. Data content graph-Example 1

We map the A and B fragments of Example 2 to the data resources to obtain the Data Content Graph, as shown in Fig. 2.

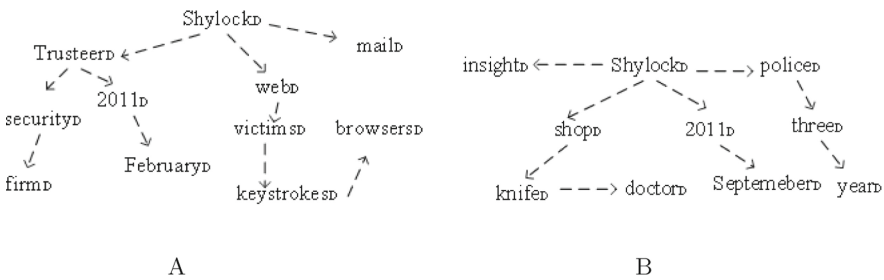


Fig. 2. Data content graph-Example 2

Data Cognition Graph

Data Cognition Graph is the cognition of concepts and the processing of probability. Different people in Example 1 have different Cognition Graph. Assuming three bodies user(A), user(B), and user(C), combined with the white, animal, and ground nodes of the Data Content Graph, user(A) will think that the white land animals may be white swans, white cows, white sheep, white horses, arctic wolves, and user(B) will think they may be white cows, white sheep, white horse, polar bear, and user(C) will think it is white cow, white sheep, white horse, arctic wolf, polar bear, then the corresponding Data Cognition Graph is shown in the Fig. 3.

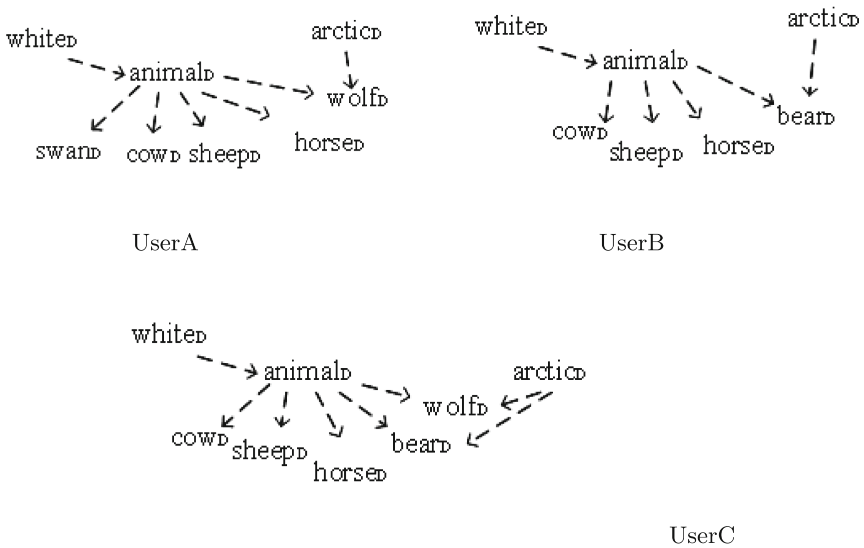


Fig. 3. Data cognition graph-Example 1

According to the Data Content Graph of the two fragments in Example 2, the Shylock node of the A text fragment is directly connected to the web node, and indirectly connected to the security and firm nodes, and the Shylock node of the B text fragment is directly or indirectly connected to the nodes such as police, shop, and insight. Suppose that if Shylock of Example 2 is a person, it is a character in Shakespeare, and it is the protagonist of the detective Sherlock. If it is an item, it can be something, and if it is a virtual item, it can be a virus. The Data Cognition Graph is shown in the Fig. 4.

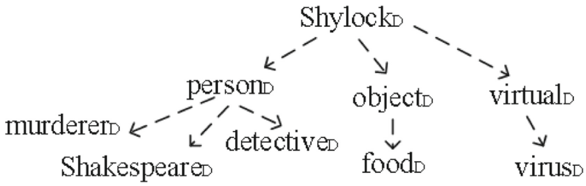


Fig. 4. Data cognition graph-Example 2

3.2 Information Mapping

In information resources, the relationship between information, in addition to the general connection method, some also need to be linked across data. The content information model exists in a partial order relationship.

Information Content Graph
In traditional text information extraction, it is often represented in the form of triples, and the relationship between entities is determined according to the text. This method can easily filter out some important data and information, resulting in incomplete and inaccurate resources, and even expressing wrong meanings. Our resource mapping starts from the essence of various types of resources, and does not easily filter out any type of resources. The five types of resources have a certain connection with each other, and this connection is not extracted from the text. The Information Content Graph of Example 1 is shown in the Fig. 5.

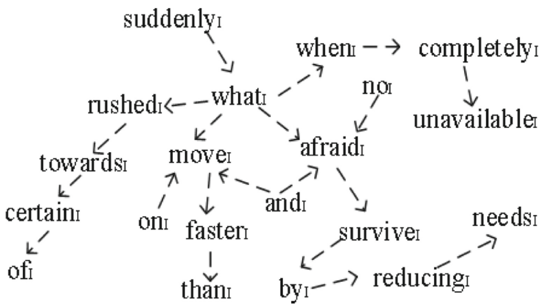
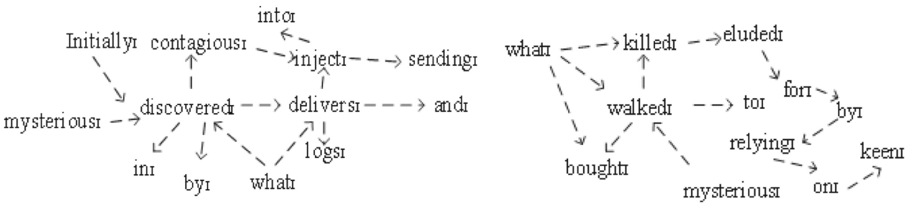


Fig. 5. Information content graph-Example 1

The Information Content Graph is obtained from the two paragraphs of text mapping information resources in Example 2 (Fig. 6).



A B

Fig. 6. Information content graph-Example 2

Information Cognition Graph

Example 1 according to human cognition, combined with text, determine the semantic map of information cognition. The animal node in the data cognition graph, combined with the action, cold nodes, and cognition in the content data graph, can obtain the Information Cognition Graph node fast and ice node, thereby obtaining nodes such as move, walk, run, and immediately.

$$IG_{CG}(A(C1)) ::= DIKWP_{CT}(C1) + DG_{CT}(A(C1))$$
$$IG_{CG}(A(C1)) ::=< move, run, walk, fast.. > \tag{9}$$

Information Cognition Graph of Example 1 is shown in the Fig. 7.

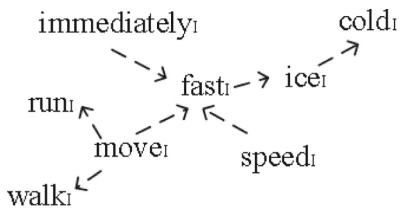


Fig. 7. Information cognition graph-Example 1

The protagonists of the two fragments in Example 2 have the same name, but they express different things. Combined with our cognition, they form different information cognitive semantic models.

According to the Shylock, security, web nodes in the content data graph of segment A, the virtual and virus nodes in the data cognitive semantic graph, and the contagious, inject, and into nodes in the content information graph, it can be seen that the Information Cognition Graph revolves around infection, fast, spread and other information.

The Shylock, shop, knife, doctor nodes in the Data Content Graph of segment B, the person node in the data cognitive semantic graph, and the walk, kill and other nodes in the Information Content Graph, it can be seen that the

Information Cognition Graph revolves around running, walking, eating, using, take the action information of others. The formalization process is as follows.

$$\begin{aligned} IG_{CG}(A(C2)) &::= DIKWP_{CT}(C2) + DG_{CG}(A(C2)) \\ IG_{CG}(A(C3)) &::= DIKWP_{CT}(C3) + DG_{CG}(A(C3)) \\ IG_{CG}(A(C2)) &::=< infect, fast, poisonous.. > \\ IG_{CG}(A(C3)) &::=< run, eat, take, kill... > \end{aligned} \tag{10}$$

Information Cognition Graph of Example 2 is shown in the Fig. 8.

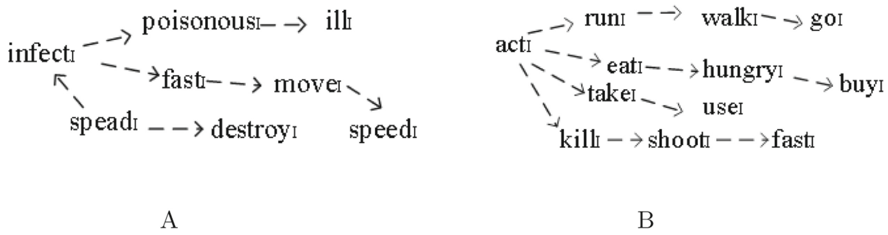


Fig. 8. Information cognition graph-Example 2

3.3 Knowledge Mapping

In knowledge resources, knowledge rules are used to represent, and there is a logical relationship before and after. Combining data, information resources and context, the deduced knowledge resources are not necessarily correct, and some of them are unproven. When the Knowledge Content Graph cannot handle it, it can be filled from the Knowledge Cognition Graph.

Knowledge Content Graph

According to the text content of Example 1, mapped to knowledge resources, the Knowledge Content that can be obtained is as follows, indicating that in the absence of food, it is possible to survive by reducing calories (Table 2).

Table 2. Knowledge content-Example 1

	Knowledge content
K	$no(food) \rightarrow reducing(caloric) \rightarrow survive$

The content of the two fragments of Shylock in Example 2 is mapped to its knowledge resources respectively, and the Knowledge Content table is obtained (Table 3).

Table 3. Knowledge content-Example 2

	A	B
K	$and(contagious(Shylock), sending(mail)) \rightarrow infect(Shylock)$	$and(killed(doctor), relying(keen(insight))) \rightarrow for(eluded(police), threeyears)$

Knowledge Cognition Graph

Combining Data, Information Cognition Graph, and related text, on the basis of personal cognition, the Knowledge Cognition Graph is obtained. In Example 1, user(A), user(B), user(C) three objects have different Knowledge Cognition Graph. For example, the white, animal, and ground nodes in the Data Content Graph of user(A), the arctic and wolf nodes in the Data Cognition Graph, the move, fast and other nodes in the Information Content Graph, and the move, run, and fast nodes in the Information Cognition Graph, combined with recognition, get K_1, and so on. The Knowledge Cognition table is shown in Table 4, and the analysis is as follows.

$$
\begin{aligned}
KG_{CG}(A(C1)) &::= DIKWP_{CT}(C1) + DG_{CG}(A(C1)) + IG_{CG}(A(C1)) \\
KG_{CG}(B(C1)) &::= DIKWP_{CT}(C1) + DG_{CG}(B(C1)) + IG_{CG}(B(C1)) \\
KG_{CG}(C(C1)) &::= DIKWP_{CT}(C1) + DG_{CG}(C(C1)) + IG_{CG}(C(C1))
\end{aligned}
\tag{11}
$$

Table 4. Knowledge cognition-Example 1

	Knowledge cognition	Meaning
K(user(A))	$speed(arctic\ wolf) \rightarrow up(65\,km/h)$	Arctic wolves can run as fast as 65 km/h.
	$sheep \rightarrow noafraid(cold)$	Sheep are not afraid of cold.
	$speed(Sam) \rightarrow run(15\,min, 5\,km)$	Sam ran the 5 km half marathon in 15 min
	$arctic\ wolf \rightarrow stored(food)$	Arctic wolves can store food
K(user(B))	$speed(arctic\ bear) \rightarrow up(60km/h)$	Arctic bears can run as fast as 60 km/h.
	$arctic\ bear \rightarrow stored(food)$	Arctic bears can store food.
	$arctic\ bear \rightarrow reducing(caloric) \rightarrow survive$	Arctic bears can survive by cutting calories minutes
	$speed(Bolt, Olympic) \rightarrow run(9.58\,s, 100\,m)$	Bolt, who ran the 100-meter dash with a world record of 9.58 s at the 2008 Beijing Summer Olympics
K(user(C))	$arctic\ bear \rightarrow noafraid(cold)$	Arctic bears are not afraid of cold
	$speed(arctic\ bear) \rightarrow up(60\,km/h)$	Arctic bears can run as fast as 60 km/h
	$arctic\ bear \rightarrow reducing(caloric) \rightarrow survive$	Arctic bears can survive by cutting calories minutes
	$arctic\ wolf \rightarrow stored(food)$	Arctic wolves can store food

In the cognitive, the Data Content Graph nodes security, firm, Trusteer, victims, browsers, keystrokes in the A segment of Example 2, and the Information Content Graph nodes contagious, inject, inject and other resources, we know that Shylock may be a virus. In segment B, the Data Content Graph nodes shop, knife, doctor and the Information Content Graph nodes walked, bought, kill and other resources indicate that Shylock may be a murderer. The Knowledge Cognition table is shown in Table 5.

Table 5. Knowledge cognition-Example 2

	A	B
K	$and(Shylock, infect(victims, browser))$ $\rightarrow is(Shylock, virus)$	$kill(Shylock, doctor))$ $\rightarrow is(Shylock, murderer)$

3.4 Purpose Mapping

In the purpose resource, purpose can be divided into main purpose and sub-purpose according to the fineness. Different purpose maps obtained by the same main purpose will have different effects on the establishment of the model due to the difference in content bias and dominant type.

Purpose Content Graph
According to the text content of Example 1 and Example 2, it is mapped to the purpose resource, and the Purpose Content that can be obtained is as follows (Table 6).

Table 6. Purpose content

	Example 1	Example 2
P_1	$what(target)$	$what(Shylock)$
P_2	$survive$	

Purpose Cognition Graph
In cognition, the purpose of animals is observed, and the purpose is not consistent in different fields. For example, in the classroom, Purpose Cognition is learning. In recessive activities, Purpose Cognition may be a game. From the perspective of teachers, individual Purpose Cognition may be education. The Purpose Cognition table for Example 1 is as follows (Table 7).

Table 7. Purpose cognition-Example 1

	Purpose cognition
P_1	$what(target)$
P_2	$study(knowledge)$
P_3	$play(game)$
P_4	$educate(student)$

In Example 2, the content intent in segment A is what Shylock is, combined with Data Content Graph nodes security, victims, etc., Information Content Graph nodes what, inject, etc. According to Knowledge Cognition Graph nodes, we know that Shylock is a virus. Integrating our cognition, the purpose can be to benefit from viruses, obtain personal information, and obtain bank card passwords. The partial order relationship between them is more beneficial than personal information is greater than passwords. The Purpose Content in segment B is what Shylock is, combined with Data Content Graph nodes shop, knife, doctor, etc., Information Content Graph nodes walk, kill, etc. According to Knowledge Cognition Graph node, we know that Shylock is a murderer. Combining our cognition, purpose can be manslaughter or intentional homicide. Combined with the content of the acquired resources, the partial order relationship between intentional homicide is greater than that of negligent homicide. The Purpose Cognition table for Example 2 is as follows (Table 8).

Table 8. Purpose cognition-Example 2

	A	B
P_1	$get(benefit)$	$intentional(homicide)$
P_2	$get(information)$	$negligent(homicide)$
P_3	$get(password)$	

3.5 Wisdom Mapping

Wisdom resources are mainly constructed according to the value model. After the system obtains the purpose, it needs to judge the feasibility of the purpose through the value model. The two-tuple (type, extreme value) corresponding to the boundary of a specific goal is set to represent the wisdom resource.

Wisdom Content Graph
Combined with the text of Example 1, animals can survive by reducing their own calories without food, indicating that the animal has a high survival rate. The Wisdom Content of Example 1 is as follows (Table 9).

Table 9. Wisdom content-Example 1

	Wisdom content
W	$animal, survivable$

Wisdom Cognition Graph

In cognition, for example, entrepreneurs value efficiency more and consider economic contribution more important, while philanthropists place more value on reputation and consider individual happiness more important than contribution. In Example 1, different people have different perceptions. For example, businessmen value economic value, but scientists think it has research value. The Wisdom Cognition Graph is shown in the figure below (Fig. 9).

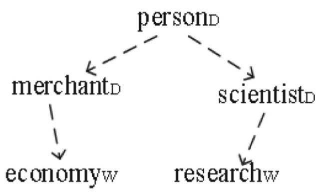


Fig. 9. Wisdom cognition graph-Example 1

In Example 2, text A is in cognition, combined with Knowledge Cognition Graph, Shylock is fast and has high commercial value, while text B is in cognition, Shylock is too cruel. The Wisdom Cognition in Example 2 is as follows (Table 10).

Table 10. Wisdom cognition-Example 2

	A	B
W_1	$Shylock, fast$	$business, high$
W_2	$business, high$	

3.6 Purpose Driven Processing

In Example 1, according to the purpose input (target), the output (animal) is obtained by combining Data Graph, Information Graph, Knowledge Graph or DIKW derivation. user(A), user(B) and user(C) draw different conclusions under different Cognition Graph. It is necessary to find the output results that satisfy the intention in the existing cognitive system. When data, information, knowledge, and wisdom are inconsistent, incomplete, inaccurate and inexpressible, the conclusions drawn directly affect judgment. For example, the individual resource in Example 1. The formal analysis process of user(A), user(B) and user(C) is as follows.

Example 1

$$\begin{aligned}
&user(A)\\
&INPUT: what(target), DIKWP_S(A(C1))\\
&OUTPUT: arctic\ wolf\\
\\
&user(B)\\
&INPUT: what(target), DIKWP_S(B(C1))\\
&OUTPUT: arctic\ bear\\
\\
&user(C)\\
&INPUT: what(target), DIKWP_S(C(C1))\\
&OUTPUT: arctic\ bear
\end{aligned} \tag{12}$$

In Example 2, although the protagonists of both A and B are Shylock, they are actually saying different things. This conclusion is also drawn through content data, information, knowledge, wisdom and its cognitive semantics. The specific formal analysis process is as follows.

Example 2

$$\begin{aligned}
&Fragment\ A\\
&INPUT: what(Shylock), DIKWP_S(A(C2))\\
&OUTPUT: is(Shylock, virus)\\
\\
&Fragment\ B\\
&INPUT: what(Shylock), DIKWP_S(A(C3))\\
&OUTPUT: is(Shylock, person)
\end{aligned} \tag{13}$$

Different people have different cognitions and different judgment results for the same affairs. The same person has different judgment results for different affairs. So in the context of incompleteness, inconsistency, inaccuracy, and inexpressibility, the results are also incomplete, inconsistent, imprecise, and inexpressible. The difference between the cognitive understandings of content(C1) by user(A) and user(B) is as follows.

$$\begin{aligned}
&DIFF(DIKWP_{CG}((user(A), user(B)), content(C1)))\\
&::= DIKWP_{CG}(A(C1)) - DIKWP_{CG}(B(C1))
\end{aligned} \tag{14}$$

The difference between the understood semantics of content(C1) by user(A) and user(B) is as follows.

$$\begin{aligned} &DIFF(DIKWP_S((user(A), user(B)), content(C1))) \\ &::= DIKWP_S(A(C1)) - DIKWP_S(B(C1)) \\ &::= (DIKWP_{CT}(C1) + DIKWP_{CG}(A(C1))) \\ &\quad - (DIKWP_{CT}(C1) + DIKWP_{CG}(B(C1))) \end{aligned} \tag{15}$$

4 Conclusion

We map the objective materials in biological legal cases to the Data Content graph, Information Content Graph, Knowledge Content Graph, Wisdom Content Graph and Purpose Content Graph. Combine the Cognition of stakeholders to form Data Cognition Graph, Information Cognition Graph, Knowledge Cognition Graph, Wisdom Cognition Graph and Purpose Cognition Graph. Traversing among DIKWP (content) and DIKWP (stakeholder) based on our proposed Essence Computation and Reasoning, Existence Computation and Reasoning and Purpose Computation and Reasoning allows the unprecedented integration of the subjective and objective semantics to bridge the gaps leaved by previously processing inconsistent, incomplete, inaccurate and inexpressible resources besides great potential on crossing modals DIKWP validations. The model uses DIKWP modal transformation for shortening the cognitive and computational reasoning distance between problem input and processed result, thus reducing the errors caused by incomplete, inconsistent, inaccurate and inexpressible resources input.

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