A semiotic-based framework to assess mental models of XAI systems

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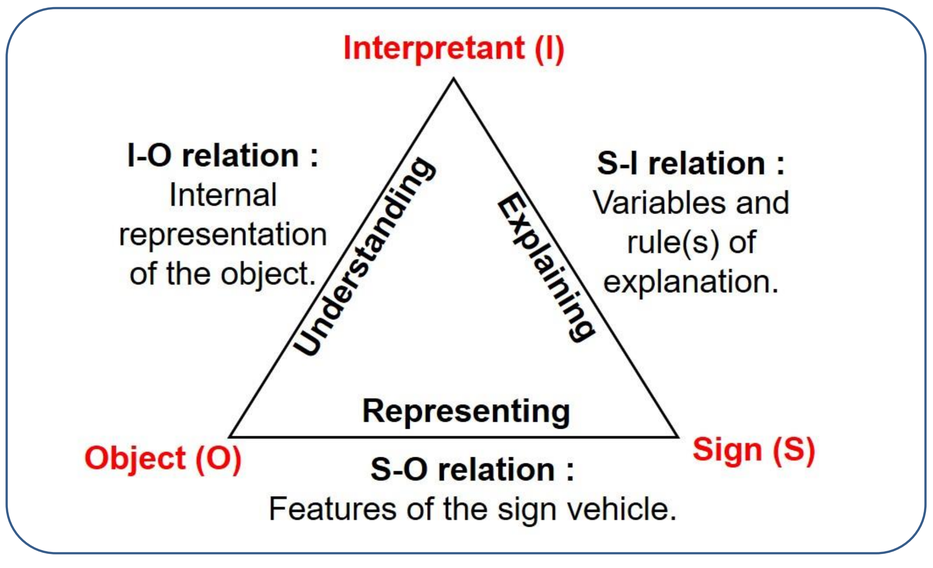
1. Introduction

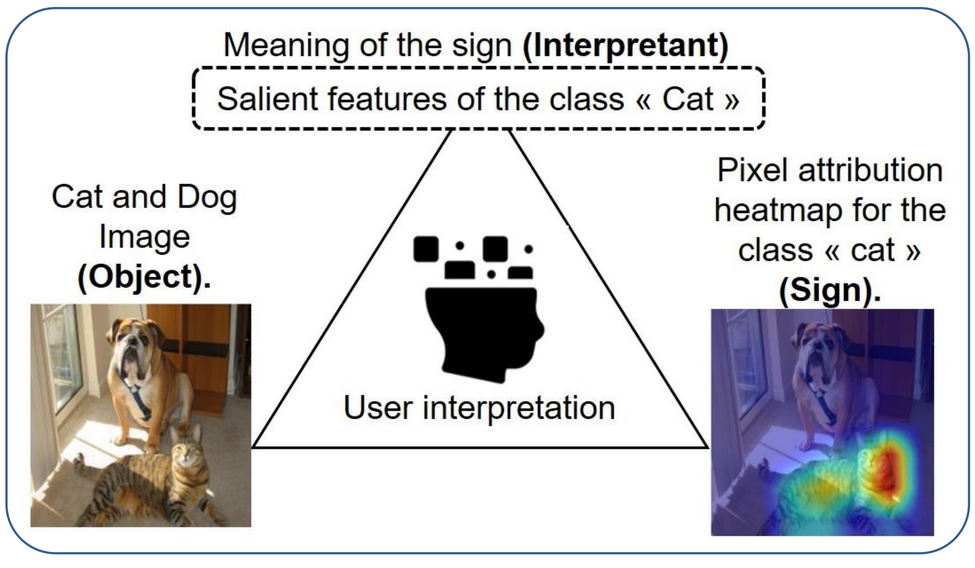
- Most of current XAI systems are algorithm-centric and hardly fit the way of thinking of their end-users.
- How can we describe the way human stakeholders picture such systems ? How to characterize their mental models ?
- Semiotic concepts [1], [2] can be used to describe mental models and connect interdisciplinary elements for XAI.

2. What are mental models used for ?

- **Representing** the system in its environment.
- **Understanding** the system's functioning.
- **Explaining** the system's behavior [3], [4].

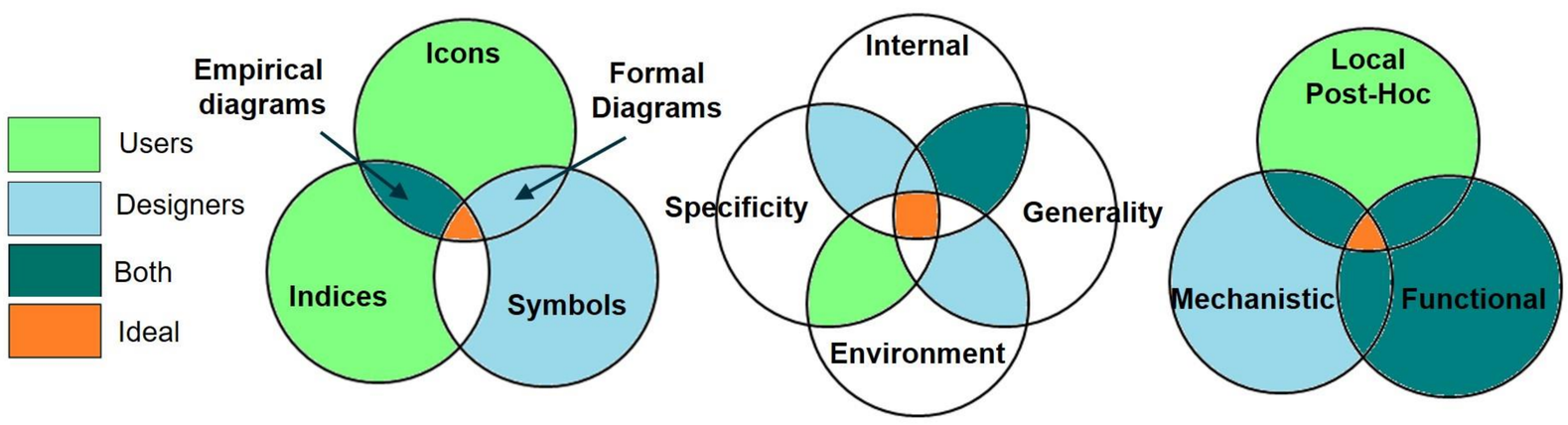


3. Can we use a semiotic approach to describe mental models ?



4. How to assess mental models using semiotics ?

- *Goal:* characterize stakeholders mental models components and assess their (mis-)alignment.
- *Approach:* connection of interdisciplinary concepts [5], [6], [7] to embody formal aspects of the semiotic theory.
- *Use case:* computer-vision anomaly detection system to monitor the quality of control points in assembly production line.
- *Method:* group interviews with **Users** and **Designers** of the system.
- *Results overview:*
  - **Users:** mostly use empirical diagrams, mechanism-agnostic context-centric explanations, post-hoc understanding.
  - **Designers:** mostly use formal diagrams context-agnostic mechanism-centric explanations, mechanistic understanding.



a) S-O axis : Representing — b) S-I axis : Explaining — a) I-O axis : Understanding

5. Conclusion

- Semiotic-based, user-centered framework to assess (mis-)aligned mental models components.
- Ability to delineate consistent stakeholder profile tendencies based on semiotic categories.
- Highlight the potential of existing work in semiotics to connect interdisciplinary concepts in XAI.

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