





Knowledge Graph Enhanced Community Consensus: a Scenario-based Knowledge Construction on Buddha Images

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CCS CONCEPTS:

- Information systems → Resource Description Framework (RDF);
- Computing methodologies → Ontology engineering.

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CD-OAM Link:

https://kgnlp.language-semantic.org/cdoam



Outline

Acquiring Knowledge

Knowledge Co-creation Framework

Collaborative Use Case Scenarios

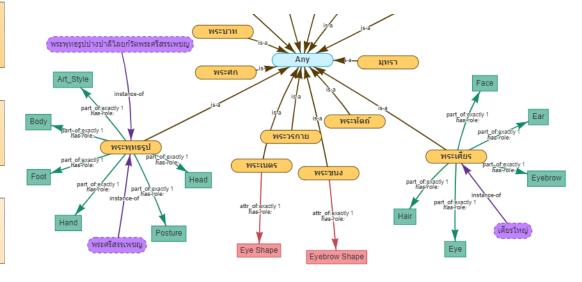
Community Consensus

Conclusion



Gather A online meeting.
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Background and Rationale to the Study:

A Scenario-based Knowledge Construction on Buddha Images

• There was a famous debate on a mystery of one of the most important buddha image in Thailand, Phra Si Sanphet of Ayutthaya (Sian Yai, เศียรใหญ่).





(a) Supportive evidence based on the Thai art historian 1 explanation.



(b) Supportive evidence based on the Thai art historian 2 explanation.



ACQUIRING KNOWLEDGE

- **Knowledge Acquisitions** process is an approach to identify concepts and relationships in discussions of any particular domain [Uschold, 1996] including 3 steps:
 - (1) Identifying the key concepts and relationships in any particular domain,
 - (2) Producing precise unambiguous text definitions for concepts and relationships, and
 - (3) Identifying terms referring to concepts and relationships.
- Ontology encompasses terminologies to represent formal naming and definition of the categories, properties, and relations between the concepts in particular domains [Horrocks, 2008]. Domain ontologies perform a prominent role to accomplish interoperability across heterogeneous domains and systems [Stephan, 2007].
- To acquired domain knowledge, using a semantic-based forum requires stakeholders' involvement to clarify their understanding including ambiguous terms, bilingual posting and the subjective nature of various metadata to better evaluate the meaning [Hazalina Hashim and Mohd Noah, 2015].



Community-Driven Ontology-based Application Management

- Based on the Semantic Web technology, OAM Framework aims to simplify creation and adoption of ontology-based applications
 [Buranarach+, 2016]
 .
- * CD-OAM Framework aims to improve collaborative activities in a knowledge-graph construction [Takhom+, 2020].
 - 1. Mapping the sources of knowledge: Reference documents, discussion context, and existing ontologies
 - 2. Real-world concepts are described as entities and relationships in a knowledge graph.
 - 3. Facilitating domain experts/stakeholders to make a consensus with the corresponding concept of the domain ontologies.
- With different perspectives, they can point out epistemological discrepancies of the same concept definition.
- Community consensus is provided to understand their reasons and differentiate concept's properties by referencing evidence.

References:

- Buranarach et al. "OAM: an ontology application management framework for simplifying ontology-based semantic web application development." International Journal of Software Engineering and Knowledge Engineering 26.01 (2016).
- Takhom et al. "A Collaborative Framework Supporting Ontology Development Based on Agile and Scrum Model." *IEICE TRANSACTIONS on Information and Systems* 103.12 (2020).



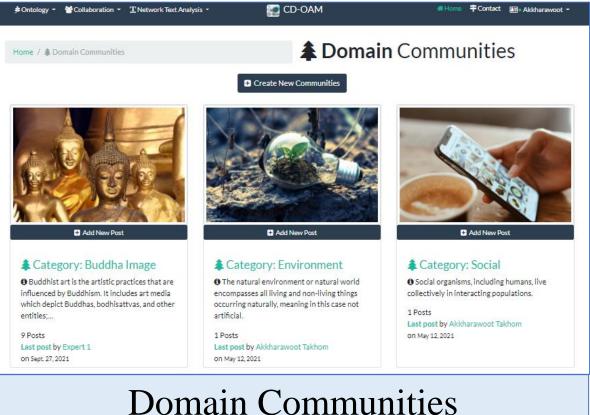




KNOWLEDGE CO-CREATION FRAMEWORK

CD-OAM: Community-Driven Ontology-based Application Management https://kgnlp.language-semantic.org/cdoam/

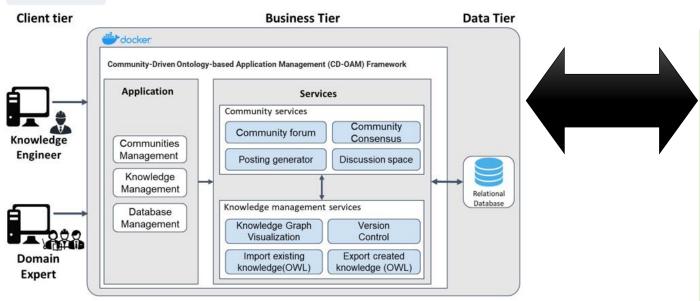




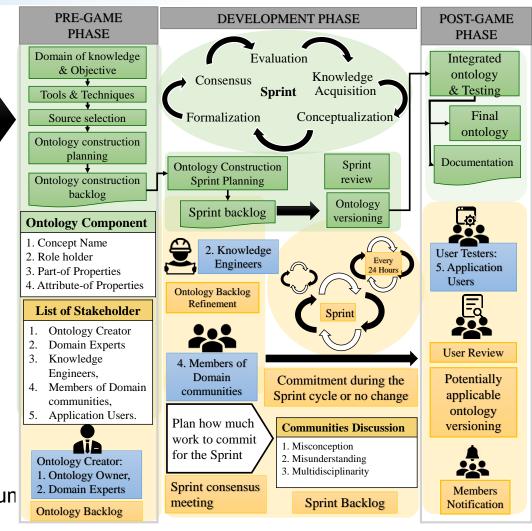




KNOWLEDGE CO-CREATION FRAMEWORK



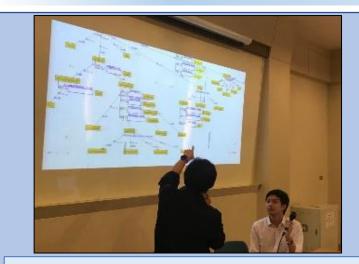
- A system architecture of CD-OAM framework [Takhom+, 2020]
- Three key components of the framework are:
 - (1) Ontology development processes based on Agile model
 - (2) Working stages of collaborative activities based on Scrum model,
 - (3) Five types of stakeholders exist in each working stage of the Scrun model.



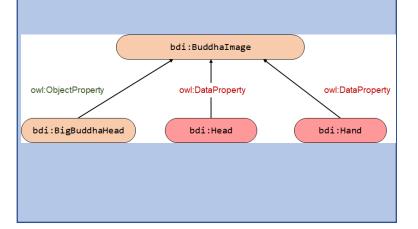
References: Takhom et al. "A Collaborative Framework Supporting Ontology Development Based on Agile and Scrum Model." *IEICE TRANSACTIONS on Information and Systems* 103.12 (2020).

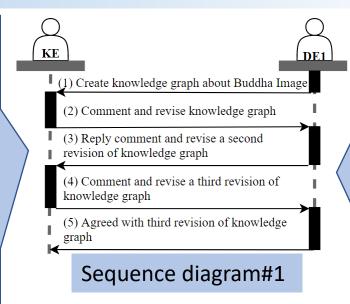


COLLABORATIVE USE CASE SCENARIO#1



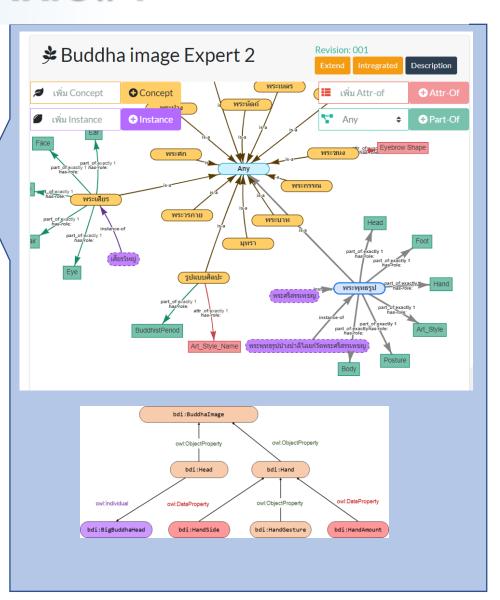
The workshop of Semantic Web technology on February 2, 2019.







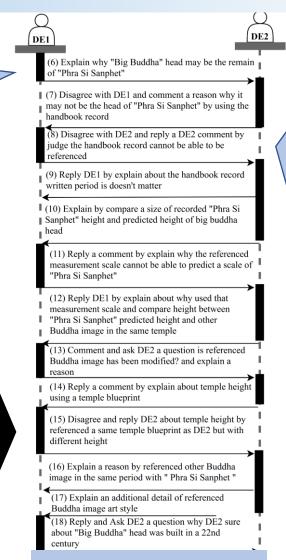
Gather A online meeting.
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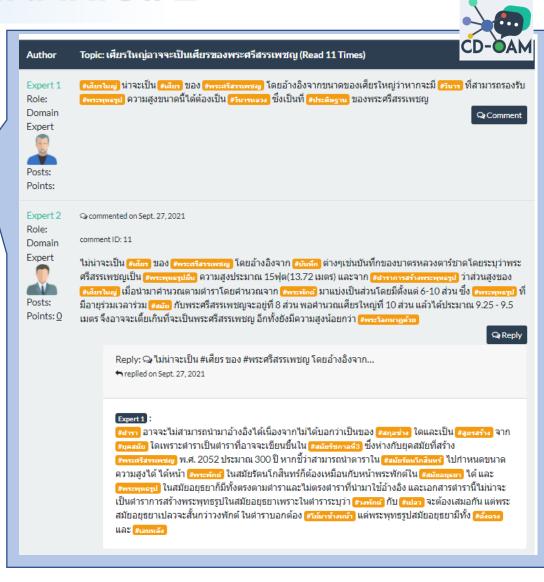


COLLABORATIVE USE CASE SCENARIO#2





Sequence diagram#2

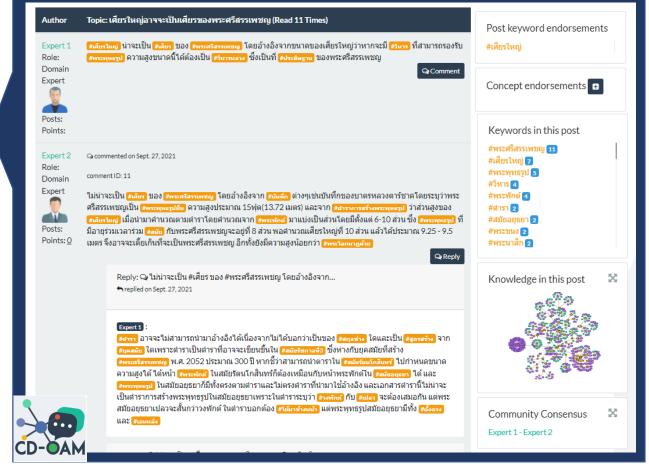


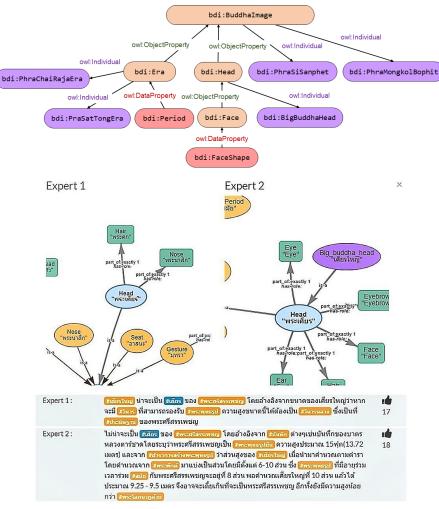


COMMUNITY CONSENSUS

• Community Consensus is collaborative activities in which all group members develop and agree to support a decision in the best interest of the shared concept and knowledge graph.









CONCLUSION

- 1. This paper presents an elaborated **KG construction** and **collaboration** between stakeholders to reach a community consensus on a specific domain.
- 2. Through the semantic-based forum with knowledge acquisition, two Thai art historians with distinct approaches on the Sian Yai concept.
 - They could define their key concepts which related to the Buddha Image Ontology, and could realize in which their concepts were located on KG.
- 3. To reach a consensus in the domain community, stakeholders can use the CD-OAM framework to discuss, to visualize, and to compare different knowledge perspectives either a new agreement or modified knowledge graph.



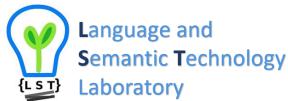
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