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Towards a Systematic Review and Classification of Collective Intelligence Systems

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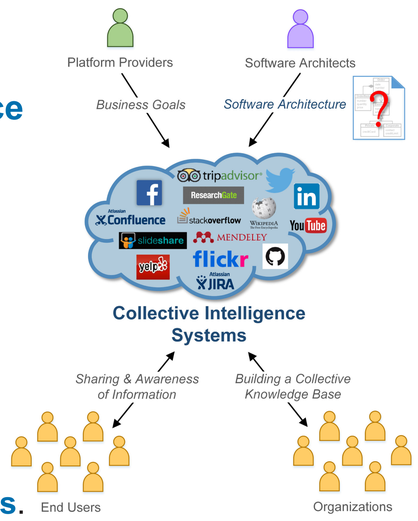
Context & Motivation

- Focus is on **self-organizational crowd-driven systems** (e.g. Wikipedia, LinkedIn, Stack Overflow) - we call them **Collective Intelligence Systems (CIS)**.
- Wide spectrum of CIS w.r.t. **system designs, application domain, community scope**.

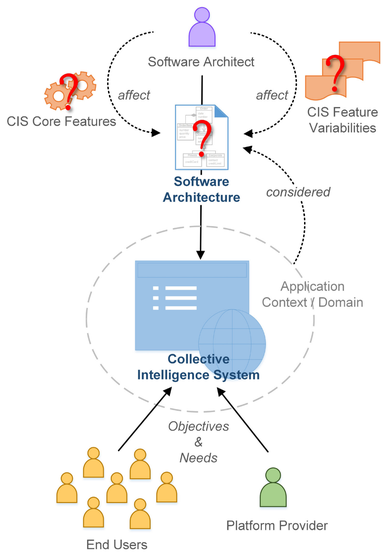
Motivation

- Increased **understanding** of CIS feature **commonalities** and **variants**.
- Critical for **design decisions** on system's **capabilities & behavior**.
- Foundation for **advanced architectural approaches**.



Research Problem

- **Observations existing variabilities in CIS**: Different systems have common features that are altered to some extent.
- **Variant choices** have strong impact on system design and behavior.
- But existing lack of knowledge about architecture-relevant **commonalities** and **architecture-significant variabilities** among key system features of CIS.



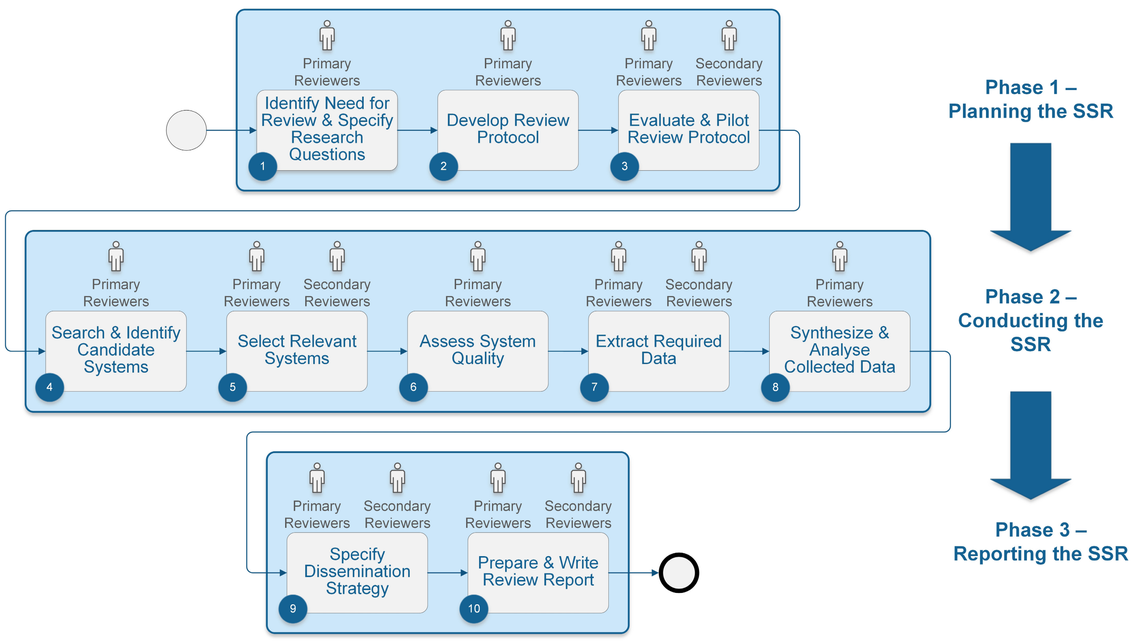
Systematic System Review

Goal of the Study: Empirically-grounded investigation to provide a complete understanding about (1) the **common set** of CIS features and (2) existing **variants** of functions and features between **system families**.

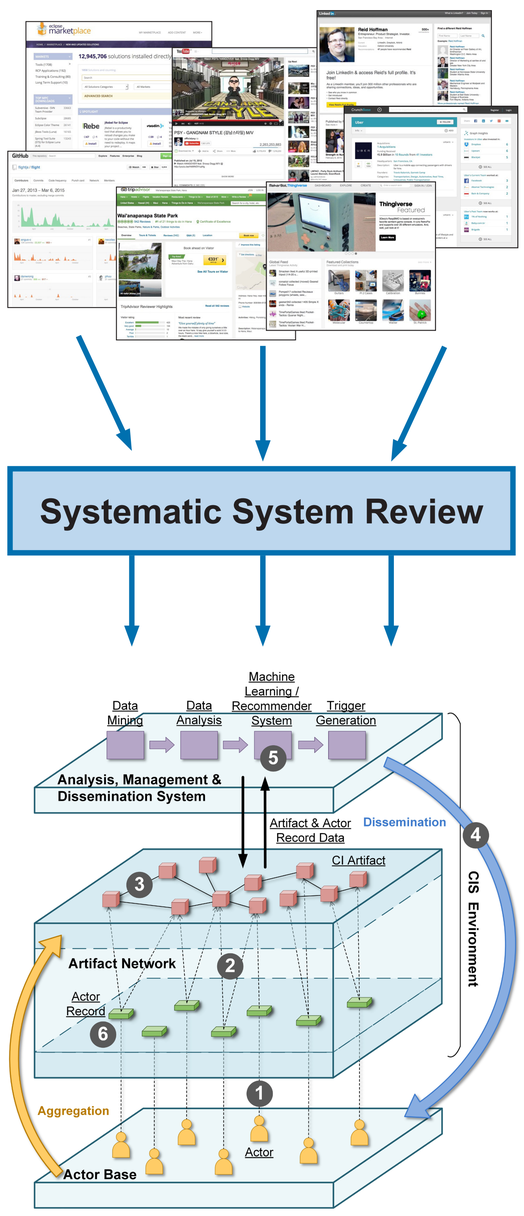
RQ 1. CIS Variabilities: What are architecture-significant variants among key system functions and features in CIS?

RQ 2. CIS Classification: How can CIS be classified based on identified commonalities and variabilities?

Methodological Approach: **Systematic System Review (SSR)** based on the well-defined and proven SLR approach to investigate 100+ CIS in a systematic way.



Preliminary Results



Initial pilot study with a small set of CIS in various application contexts and domains.

Quantitative review & analysis of architecture-significant system functions, features, capabilities, data structures, workflows, organizational structures.

Identification of **6 key features**:

(1) Any actor can add new domain items

(2) Actor contributes new content to domain items of an other actor

(3) Actor creates links to connect domain items

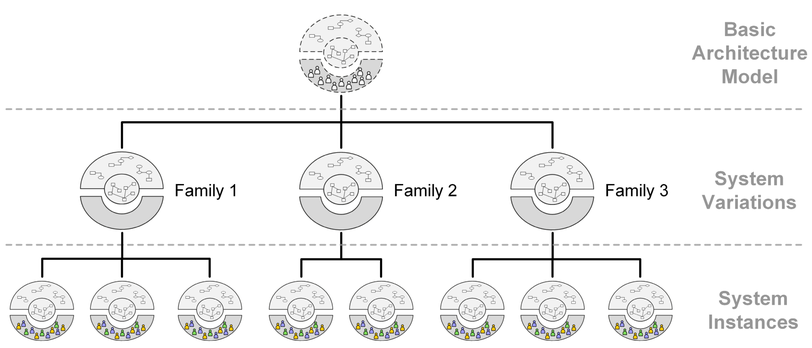
(4) Dissemination of changes of selected domain items and ongoing activities to actor base

(5) User-driven recommender system

(6) Tracking of actor behavior and item manipulation activities

Implications

- Based on SSR results: exploration of different **CIS families** with altered feature sets.
- Development of a **systematic CIS classification model (Taxonomy)**

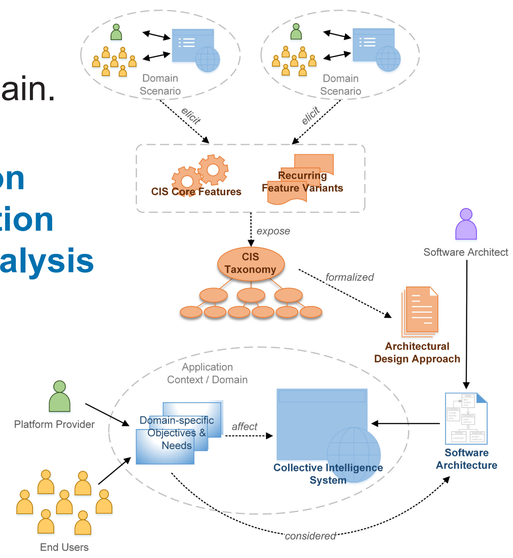


Conclusion & Future Work

- Promising to introduce architects to key principles and system variants of CIS domain.
- Need to further investigate relevance of features: **domain item linkability**, **creation of new items by actors**, **ownership relation** between actor and item, **monitoring & analysis**

Future Work

- Conduct **CIS Survey** with large sample.
- Based on **CIS variability model**: improvement of **systematic architectural design guidelines and support**



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More Infos ➡ http://qse.ifs.tuwien.ac.at/ci