Critical Reading

6 items of critical reading.

1. What is the problem?
2. Why is it important?
3. Why is it challenging?
4. What are the limitations of the related work? What is the novelty
5. What are the contributions?
6. What is the validation methodology?

If you were to rewrite this paper today, what would you preserve and what would be revise? Briefly justify.

1. What is the problem?

- What is the problem addressed in the paper?
- Is it clearly stated?
- Are there assumptions, and are they clearly stated?
- Does the author make the important issues clear?

One sentence in the abstract.

One paragraph in the introduction.

Basic (or key) concepts of the papers

May be a separate section called problem definition.

2. Why is it important?

- Is the problem significant/relevant?
- Is there any reason to care about the problem (practical applications/real world applications) and paper's results?
- Is the problem new?

One sentence in the abstract.

Motivation or application domain sections of the paper.

3. Why is it challenging?

- What is the difficulty of solving the problem?
- Computationally complex? (NP completeness?)
- Large search space?
- Hard to solve?

One sentence in the abstract.

One paragraph in the introduction.

4. What are the limitations of the related work? What is the novelty

- Has the problem been solved before?
- Is this a trivial variation on or extension of previous results?
- Is the author aware of related and previous work, both recent and old?
- What are the assumptions and limitations of related work?
- Which limitation is solved in the paper?
- Critique an assumption that you believe is unreasonable.
- What is the impact of removing this unreasonable assumption on the solution proposed by the authors?

One sentence in the abstract.

Literature review or related work sections of the papers.

5. *What are the contributions?*

- Is the problem extension of the related work. Which part is extended?
- Is the problem new?
- What are the proposed approaches, algorithms, ideas.
- Is there any experimental and analytical evaluation.
- Which do you think is most significant and why?

One sentence in the abstract.

Can be a separate section on contributions?

Proposed models, problem definition etc.

Analytical evaluation and/or experimental evaluation of the sections.

6. What is the validation methodology?

- Is there any case study.
- Statistical hypothesis testing?
- Analytical evaluation?
    - Computational complexity
    - Theorem and lemmas, proofs.
- Experimental evaluation.
- Describe the strengths and weaknesses of the methodology.
- Why did authors choose this/these methodology?

One sentence in the abstract

Analytical and experimental section of the papers.

1. Given a collection of Boolean spatial features, the colocation pattern discovery process finds the subsets of features frequently located together.
2. For example, the analysis of an ecology data set may reveal symbiotic species.
3. The spatial colocation rule problem is different from the association rule problem since there is no natural notion of transactions in spatial data sets which are embedded in continuous geographic space.
4. In this paper, we provide a transaction-free approach to mine colocation patterns by using the concept of proximity neighborhood.
5. A new interest measure, a participation index, is also proposed for spatial colocation patterns.
6. The participation index is used as the measure of prevalence of a colocation for two reasons.
7. First, this measure is closely related to the cross-K function, which is often used as a statistical measure of interaction among pairs of spatial features.
8. Second, it also possesses an antimonotone property which can be exploited for computational efficiency.
9. Furthermore, we design an algorithm to discover colocation patterns.
10. This algorithm includes a novel multiresolution pruning technique.
11. Finally, experimental results are provided to show the strength of the algorithm and design decisions related to performance tuning.

* Yan Huang, Shashi Shekhar, Hui Xiong: Discovering Colocation Patterns from Spatial Data Sets: A General