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CONSTRAINT-BASED PATTERN MINING

An Overview of Techniques and Applications of Mining Space
Pruning with Succinctness Constraints

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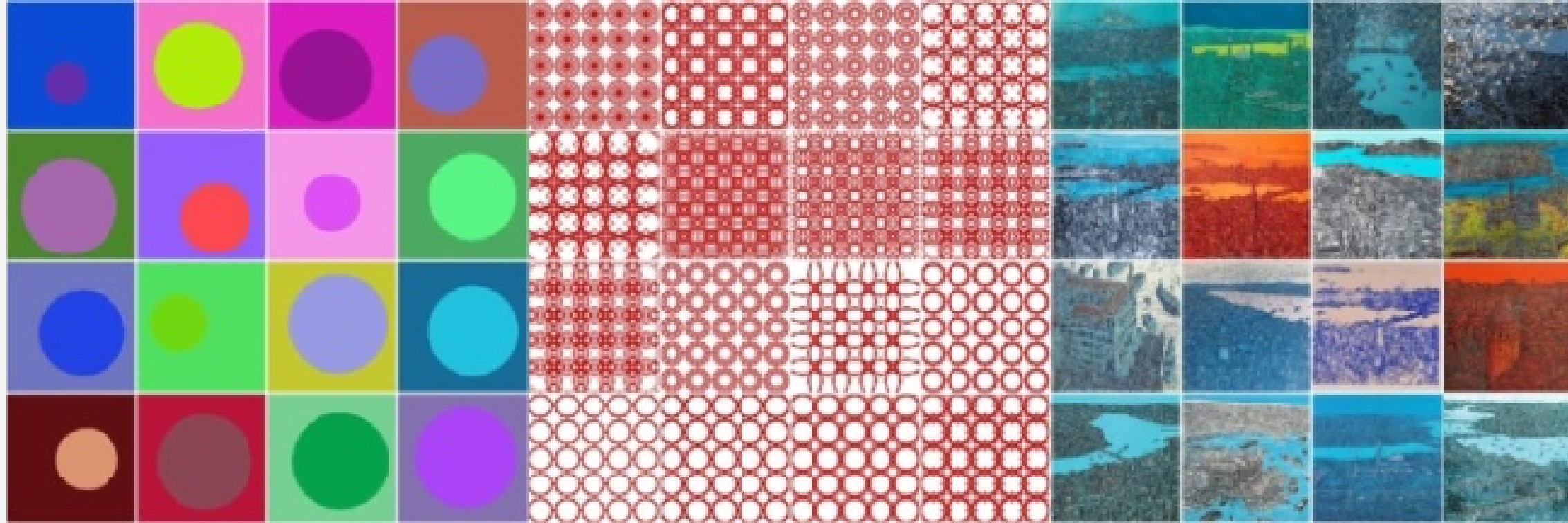
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Q & A

WHAT IS PATTERN MINING?

Pattern mining is the process of discovering interesting patterns in large datasets.

Common applications include market basket analysis, bioinformatics, and social network analysis.



Patterns in GAN system

Types of Constraints in Pattern Mining

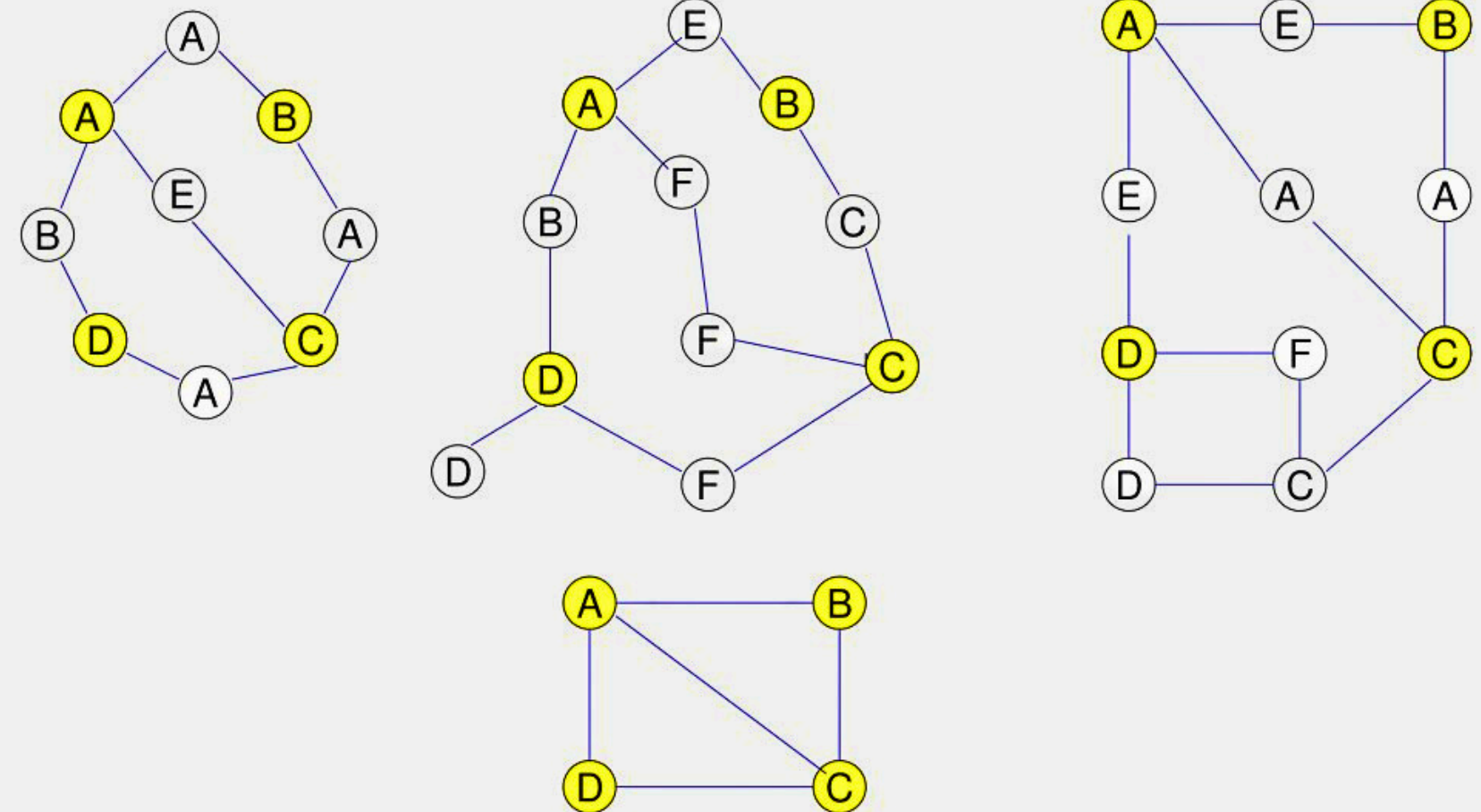
Frequency Constraints

Length Constraints

Succinctness Constraints

Other Constraints

Frequent Pattern Mining

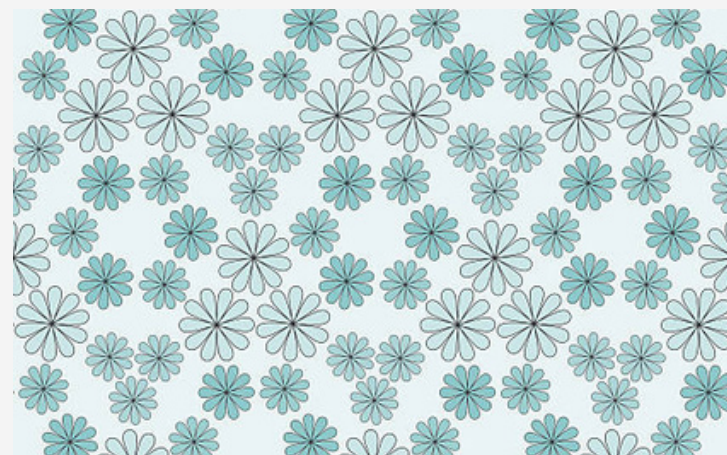


The Importance of Succinctness Constraints

- ◆ Ensure patterns are not overly complex.
- ◆ Balance between informativeness and simplicity.

Easier interpretation and application of patterns.

Reduces the search space, enhancing computational efficiency.



MINING SPACE PRUNING

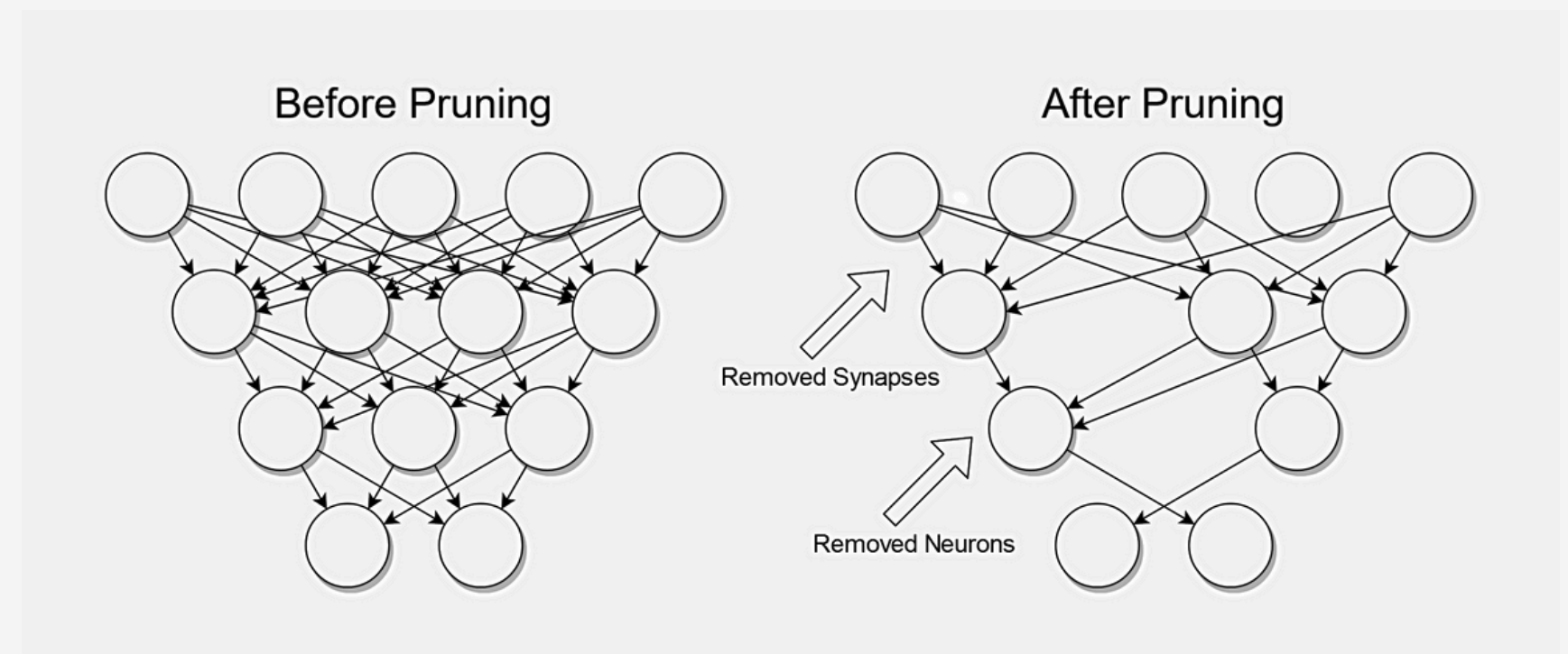
The process of reducing the number of candidate patterns to be evaluated.

Techniques:

- Pruning based on constraints.
- Efficient search algorithms like Apriori and FP-Growth.

Impact on Performance:

- Significantly decreases computational overhead.
- Improves the scalability of pattern mining methods.



Methods for Pruning with Succinctness Constraints

Apriori Algorithm

- Uses a level-wise search for frequent itemsets.
- Prunes candidates that do not meet frequency and succinctness constraints.

FP-Growth Algorithm

- Constructs a compact data structure called an FP-tree.
- Mines frequent patterns without candidate generation.

Other Advanced Techniques

- Constraint-based pattern growth methods.
- Hybrid approaches combining multiple algorithms.

CHALLENGES & FUTURE DIRECTIONS



- Challenges
 - Balancing succinctness with informativeness.
 - Handling large and complex datasets efficiently.
- Future Directions
 - Development of more sophisticated pruning techniques.
 - Integration with machine learning and AI for enhanced pattern discovery.
 - Real-time pattern mining in streaming data.

CONCLUSION

- Summary
 - Constraint-based pattern mining, especially with succinctness constraints, is vital for discovering meaningful patterns efficiently.
 - Pruning the mining space is essential for handling large datasets.
- Final Thoughts
 - Continued advancements in this field promise to unlock further insights across various domains.



Q&A

Thank You!

