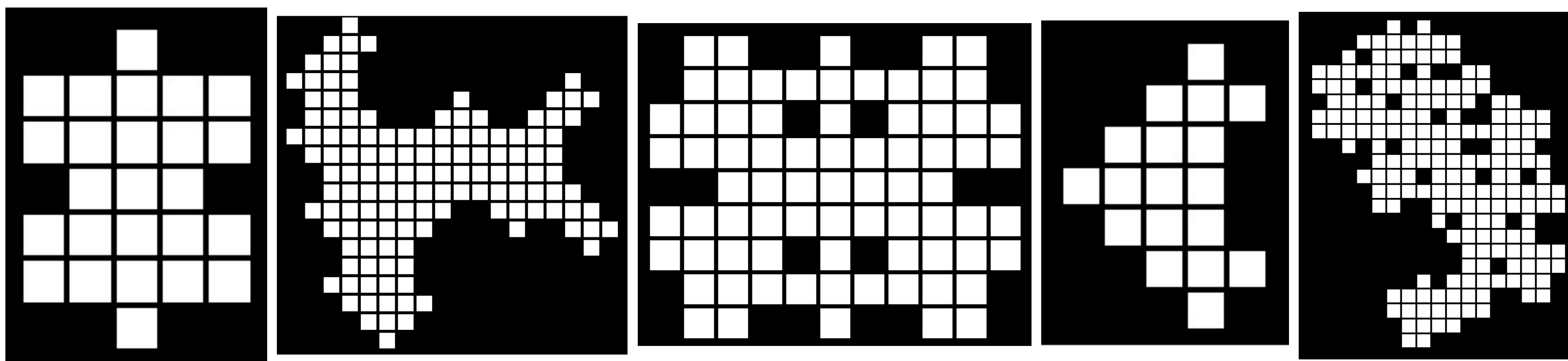# Efficient Discovery of Halting Paths in Aggregation System Multiway Graphs

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GOAL

Explore totalistic aggregation systems through simulations and visualization with multiway graph analysis. Classify aggregation systems rules and uncover insights on criteria for rules and minimal initial conditions for halting.

SUMMARY OF RESULTS

Development of a diverse collection of visual computations for these systems, offering valuable tools for further exploration and optimization; External simulation software to perform manual/random walks in these systems; Proposal of relevant classification of rules, focusing on a subset of 96 rules and demonstrating that 32 of them never halt, further narrowing down the "gray area for conclusions" to a group of 64 rules, and revealing limited halting properties on 40 of them.

FUTURE WORK

The 16 3-Bit rules that resisted halting have a shared property that suggests they may be impossible to halt. Constructing a definitive proof for this observation would be a significant step forward. Further in-depth exploration of 2-Bit and 3-Bit rules, specially 3-Bit sensitivity to some initial configurations. Explore alternative halt-finding method, involving pruning subgraphs of the multiway graph. Develop cell selection policies to target halting paths in the simulation software.