

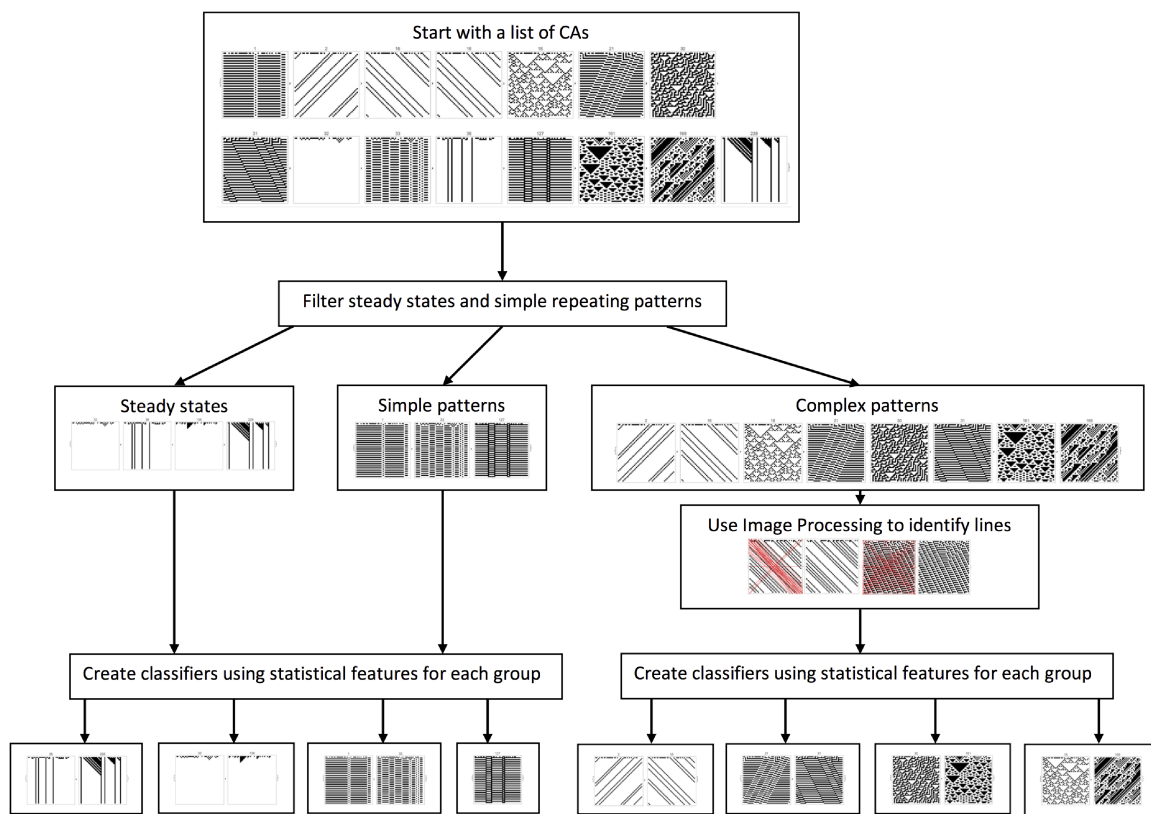
Classifying cellular automata using machine learning

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Project description

While Cellular Automata can be classified manually for small spaces (such as 256 elementary CA), we need more efficient and automatic methods to classify them over bigger spaces. I used unsupervised classifying methods to do so. To make it more effective, I came up with preprocessing functions and feature sets for the classifiers. The flowchart below shows how the algorithm works:



Summary of results and conclusions

While experimenting with different features, I found that a set of kurtosis, density and entropy measures can be used to create efficient classifying functions. To classify complex CAs, I used the statistical distribution of lines in the plots as a feature to make additional classifiers.

Classification was much more effective after preprocessing the data, i.e filtering simple CAs out.

Future directions

I am interested in seeing how this algorithm classifies bigger and bigger spaces. I plan on running it on different CA spaces.