Drill Creator

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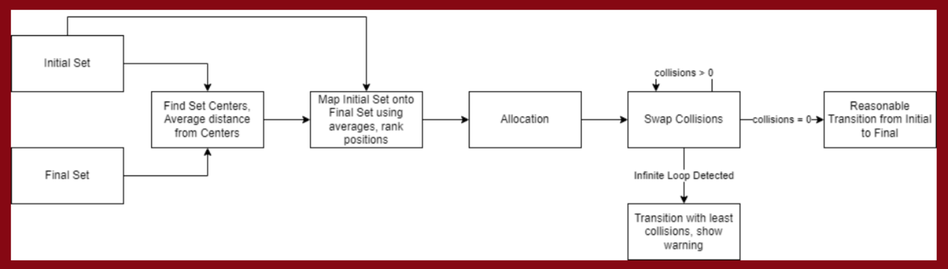
Problem: Creating Marching Band Shows is difficult and unintuitive. Industry-standard tools such as Pyware are used to design and create drills, the visual portion of marching band. These programs provide a variety of tools, but the software could stand to be smarter. We want to create a set of drill creation tools that automate creation using image recognition and provide intelligent feedback.

Solution: We focused on creating three components to solve the problem, an image interpreter, transition solver, & drill editing GUI. The image interpreter takes an image and creates a Set for the Marching Drill. The transition solver determines how band members will move between two sets. It does so by solving a complex allocation problem with several constraints. Alternative solutions such as sequence prediction and clustering were also explored. The Drill Editing GUI allows further editing within each Set created.

Challenges: Algorithm optimization for the transition solver was one of the big challenges that we faced. We brainstormed different approaches for this algorithm including trying every combination, pruning then testing a subset of combinations, as well as estimation and allocation.

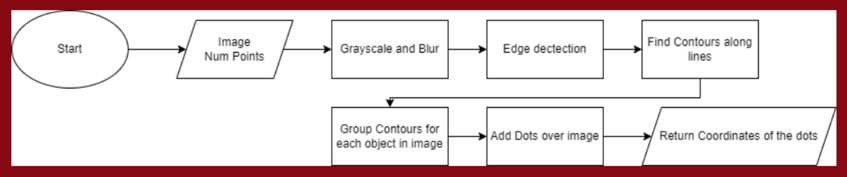
GUI Development also provided a variety of challenges. The biggest being designing an interface that was intuitive for users of any skill level.

Technical Diagrams:

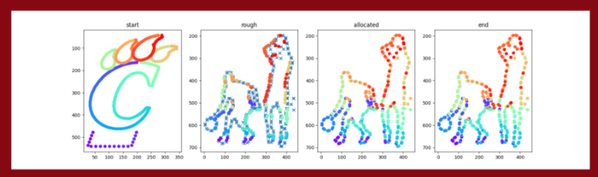


Drill Solver Diagram

Image Interpreter Diagram



Results:



Visualization of algorithm: transition from C-paw (left) to basketball players (right)

Interactive GUI allowing access to our tools, loading/saving/viewing shows

Future Improvements: Since we have only included basic drill moves for our transition solver, looking into adding more drill move types is one option for additional features. Another option would be to add features that explore more detailed editing tools.

Powered by:

Python
PyQt
Matplotlib

Teams Meeting: