CS445 Final Project Proposal

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I propose to build an automatic scoring for the board game Kingdomino | Board Game. The game itself is similar to dominos, in that each player takes turns drafting “tiles” that they then place in the kingdom. Each domino has different features that are important to scoring and placement. Enforcement of the rules (e.g. is this a legal board) of the game as well as final scoring will be provided.

Though the game itself could be considered as purely a 2D construct, I am hoping to learn a lot from the challenge of using real-life photographs of the board game from multiple perspectives to ensure a robust scoring algorithm. In particular, deriving the camera parameters based on known quantities of the board and tile size, object detection (both known and spurious) to aid in the identification of tiles.

Milestones:

1) Preliminary Data Capture - Identify corpus of board states from various angles, surfaces and lighting conditions.
2) Identify each tile type in isolation from 2d orthographic view
3) Recovery of a perspective to orthographic mapping
4) Board identification + (2) and (3) on full photograph.
5) Game rule enforcement and score calculation
6) Stretch goal of deploying as a web page and asking random internet strangers to break it.
7) Final report and polish

Week 1	Week 2	Week 3	Week 4	Week 5
(1) and (2)	(1) and (3)	(4)	(5)	(6, 7)

I will evaluate the final product on the corpus collected by milestone #1. Success will be matching manual scores 100%, or if that is not possible due to photo quality or incorrect human scoring, make note.

To complete the project, I will collect my own data using a variety of cameras and cell phones. I will use github.com to be the project repository and store the data there as well. All computing will be done on my local machine as a python notebook for development. If milestone #6 is reached, I will replatform the code into a python/flask application and utilize Illinois’ shared hosting environment.