Rock Climbing Wall Route Identifier and Evaluator
Eric Wei
ewei2@stanford.edu

Goal

To take an image of the rock climbing wall and trace out the different possible routes then rank them based on difficulty

Background and Methods

Indoor rock climbing is becoming an increasingly popular activity, with much of its appeal derived from the challenge of overcoming a difficult route after many attempts. Separate routes on the wall are often graded by difficulty, but fluctuations in this delineation exist for different facilities. Furthermore, a lower difficulty wall can subsequently be made more challenging through alternative routing. The proposed project will map out the possible distinct routes and rank them from easiest to hardest in a hope to enhance and broaden the experience at the climbing wall.

Some challenges of this project include:

- Depth perception and angle correction from the captured image
- Separation of the background of the wall and route markers → gray level thresholding and region labelling
- Categorizing different protrusions as being more suitable as foot and hand holds → imageset training, histogram binning, and least square error estimation
- Using the marked holds, reproduce all the routes that are achievable
- Develop a metric to determine difficulty of each route, possibly based upon average distance of holds and type of hold placements
- Display the different routes in an output image in a succinct and visually appealing manner

This project will be done using the Android platform and tested at the Arrillaga Outdoor Education and Recreation Center climbing wall. To test the validity of the imaging algorithm, images of different grades of routes will be taken and compared with the given rating. Insight from experienced rock climbers will also be inputted into the training algorithm.

References