

Agile Trajectory Generation for Tensile Perching with Aerial Robots

Yanbin Liang, Yuxuan
Liu, and Shuang Tang

Department of Mechanical
Engineering, Tsinghua
University, Beijing 100084,
China

liangyb17@mails.tsinghua.edu.cn,
liuyx17@mails.tsinghua.edu.cn,
tangshuang@mails.tsinghua.edu.cn

Abstract—This paper presents a novel agile trajectory
generation method for tensile perching with aerial robots.
The method is based on the combination of the tensile
perching method and the agile trajectory generation method.

Index Terms—Agile trajectory generation, tensile
perching, aerial robots

perching, agile trajectory generation, tensile perching,
aerial robots

perching, agile trajectory generation, tensile perching,
aerial robots

perching, agile trajectory generation, tensile perching,
aerial robots

perching, agile trajectory generation, tensile perching,
aerial robots

perching, agile trajectory generation, tensile perching,
aerial robots

Progress Update

- Demonstrations
 - Meeting with Atar on Friday to discuss demonstrations

From Previously

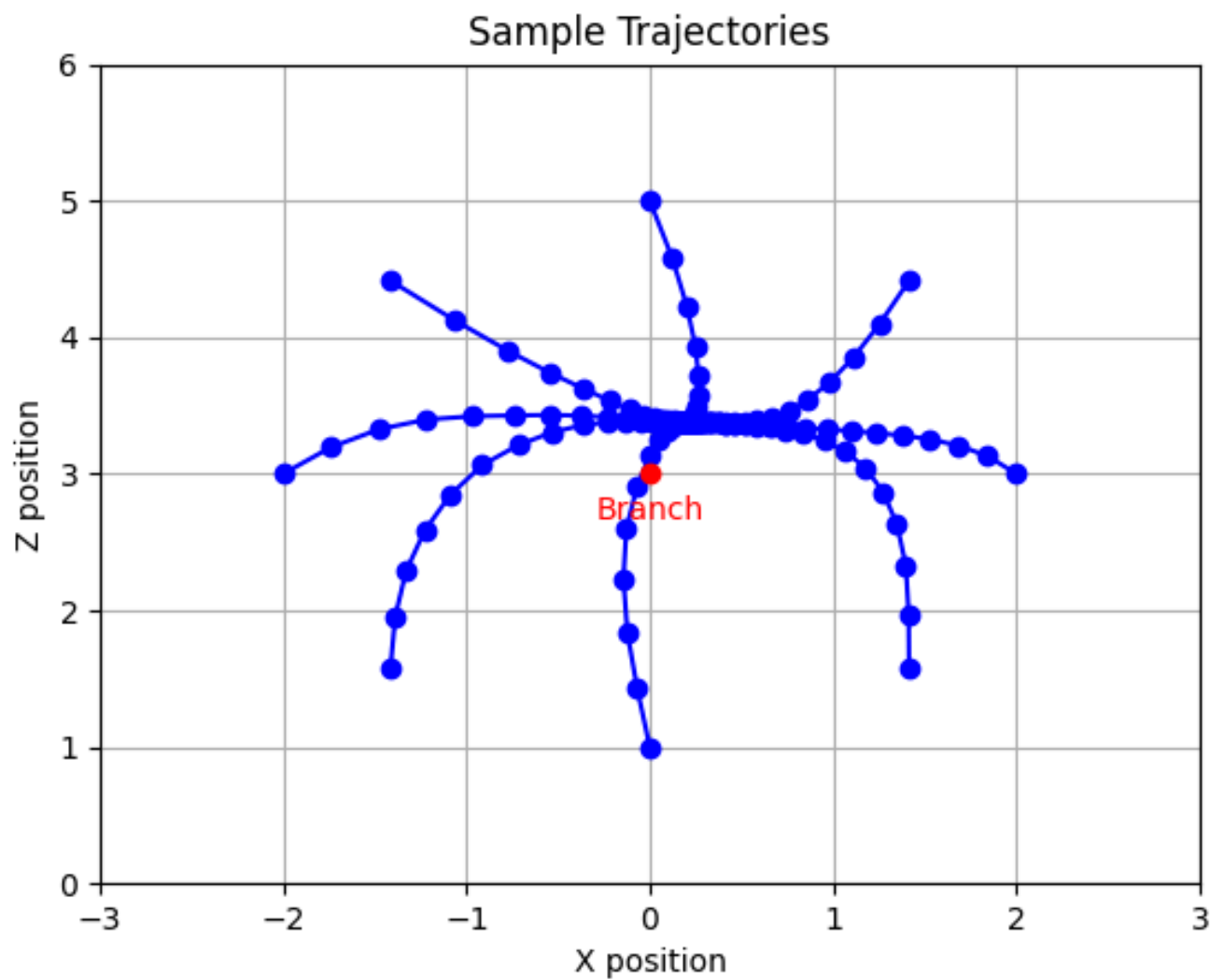
- Further Statistics on the training
 - Normalisation issue in the training data - where I hadn't applied the same normalisation to the demonstrations as I had in training.
- Reward Function
- Smoothness
 - Already a smoothness term which can be seen in easy tasks.
 - Introduce Prioritised Experience Replay to help combat the harder learning portions.
 - Sampling learnable parameter.
- Move onto next stage:
 - Wrapping

Reward

- Discussed last time about the level of tuning of reward function and whether that's what the right direction.
- Massively simplified the reward function
 - + Distance to branch
 - Hitting branch
 - + Wrapping
- Outcome
 - Without demonstrations - taking roughly 4-5x as long to reach a "good" point in training.
 - With demonstrations - 1.2-1.3x number of steps.

Wrapping Phase

- Currently achieving mixed results. From one direction, the wrapping seems to work. But from the other it struggles.
- Demo



Next Steps

- Augment State Space with "directional" knowledge
 - Starting position in state space
 - Previous n states
- Hanging Phase