Visual Navigation for Flying Robots

Autonomous Landing on a Moving Platform

Final Project
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Overview

- Goal: an Ardrone will be able to track an irregularly moving platform with a marker on it and by command initiate an autonomous landing procedure. It will detect whether this landing is successful or in the negative case cancel and restart the operation.
Challenges

There are three main parts this project consists of:

- Finding and tracking the platform with marker
- Landing on the platform
- Detecting a successful landing
Finding and Tracking the Platform

• The robot is flying controlled manually. The user will steer it in the general landing zone

• Once the platform is localized, control will be taken off of the user. The platform will now be tracked and followed by the robot

• Platform and robot movement will be tracked independently in world coordinates. This is done by estimating position based on environmental landmarks.
Landing

- The descent on the platform will be done smoothly, not too fast. Sensor latency is to be taken into account.
- Regularity observed in the movement of the platform will be taken into account to more accurately plan further navigational commands by predicting future movement whenever possible.
Detecting a Successful Landing

- Failure detection routines will be implemented
  - IMU based: e.g. landing in a non-level pose implies a failed landing
  - Vision based: the marker leaving the FOV, together with our robot and platform estimate could imply a failed landing

- Upon failure eject and reinitiate platform seeking using platform movement prediction

- Upon success turn off the robot