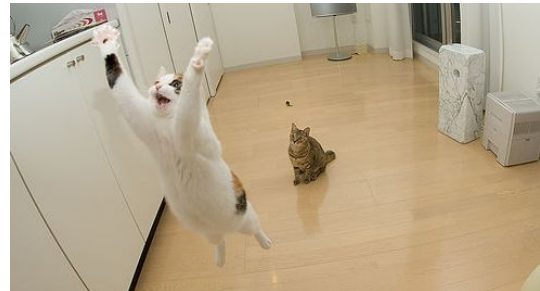




Stabilizing Flight

Recently, cameras have been utilized with accelerometers to take aerial pictures by throwing them into the air. One of the issues with the aerial photos is blur, which is caused by the rotation of the camera. Additionally, everyone knows that it is a non-trivial task to throw anything into the air without making it rotate. How cool would it be if you could throw your camera into the air and make the rotation stop automatically?



If you paid attention in your physics classes, you know that to stop rotation you have to conquer momentum. The goal of this thesis is to do exactly that. More precisely, the goal is to implement a device that measures rotations and design a way to slow down rotations along different axes. The measurement part can be handled for example with gyroscope of a modern smart phone, which can also be used to control the device that changes the orientations through servos.

Naturally, it makes sense to ask what this is good for. From a more serious perspective, one could imagine such a system to stabilize the flight or jump of a drone. Controlling the orientation during flight or on the landing would allow for more resilient exploration and reduce the chance of breaking expensive equipment. From a more fun perspective, this would make awesome toys. Imagine, for example, a plush cat that makes a frontal flip on every throw or stops at the highest point and gives you a high five.

Requirements: This thesis will require creativity and knowledge of hardware design. Experience and interest in “building stuff” is required. Interest in physics is advantageous. The student(s) should be able to work independently on this topic.

Contact

- Jara Uitto: juitto@tik.ee.ethz.ch, ETZ G61.2
- Pascal Bissig: bissig@tik.ee.ethz.ch, ETZ G61.3