Learning visual stabilization reflexes in robots with moving eyes

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This work addresses the problem of learning stabilization reflexes in robots with moving eyes. Most essential in achieving efficient visual stabilization is the exploitation/integration of different motion related sensory information. In our robot, self-motion is measured inertially with an artificial *vestibular* system (gyroscopes) and visually by estimating the *optic flow*.

The first sensory system provides short latency measurements of rotations and translations of the robot's head in space, the second, a delayed estimate of the motion across the image plane. A self-tuning neural network learns to combine these two measurements and generates oculo-motor compensatory behaviors that stabilize the visual scene.

We describe the network architecture, the learning mechanism, and the stabilization performance evaluated using direct measurements on the image plane. We further speculate on the similarities between the robot implementation and biological stabilization reflexes.