Robot Learns Skills from Surgeon for Subretinal Injection

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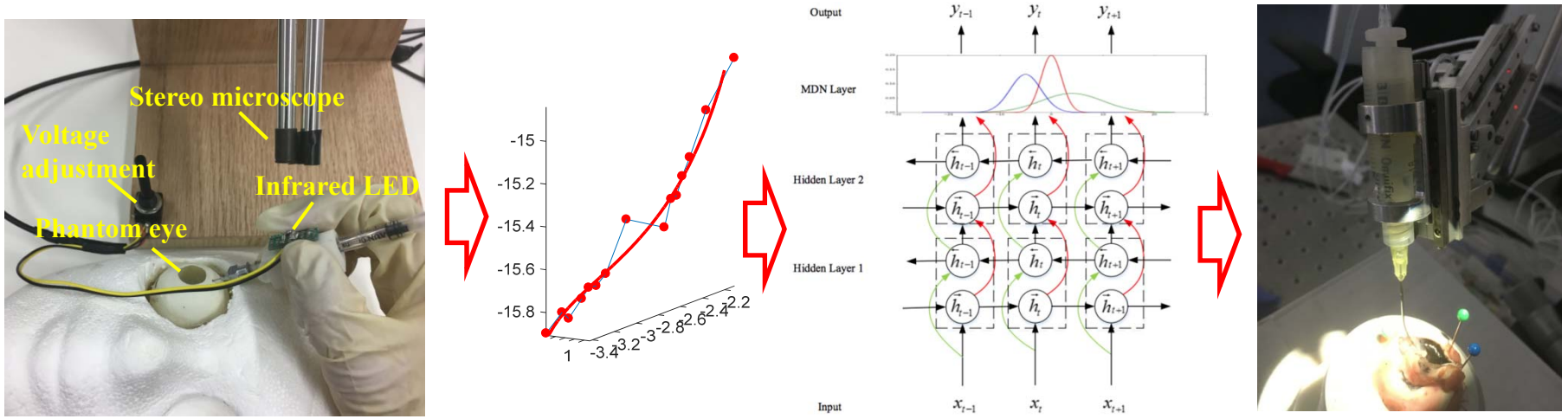
Abstract—Subretinal injection is known to be a challenging operation in the ophthalmic microsurgery domain. In this paper, we first propose the basic framework of tracking and learning, which allows the robot to learn subretinal injection surgical skills from the surgeon. These surgical skills can potentially give a certain degree of autonomy and reduce the robotic surgery training time for the surgeons. The framework contains a data collection hardware and a deep learning software. The data collection hardware is based on the stereo microscope vision tracking system, which tracks the movement of the instrument for subretinal injection. Given this data, a recurrent neural network is trained and then used to generate injection trajectories. We prove and demonstrate the feasibility of our framework on the phantom eye experiments.



(a) (b) (c) (d)