

Master's Thesis

Haptic Coding for Robot Teleoperation

The Tactile Internet will enable fully immersive teleoperation experience to its users. By exploiting the full wireless connectivity of the new 5G infrastructure, users will be able to share sensations between distant places without the borders of wired connections.

To achieve that, however, new paradigms in the encoding of haptic information has to be discovered. In contrast to classical audio-visual data (like audio/video streaming), haptic information needs even higher refresh rates and very low latencies for real-time connectivity.

Goals

- In this master thesis, a haptic encoder for teleoperation of a robot arm or a Quadrocopter should be developed. The user should get tactile feedback (e.g. via vibration or force feedback) for his desired motion.
- The solution should perform in at least some point better than existing solutions like described in [1] or [2]. Possible enhancements include
 - network load reduction,
 - reliability or
 - decreased latency.
- The solution should be evaluated on a testbed with a real robot teleoperation system.



1 Prerequisites

- Experience in C programming
- Interest in system or embedded development
- Affinity to Unixoid operating systems

References

- [1] Steinbach, E., Hirche, S., Kammerl, J., Vittorias, I., and Chaudrahri, R.: Haptic Data Compression and Communication. IEEE Signal Processing Magazine, Vol. 28. Jan 2011.
- [2] Lee, J. and Payandeh S.: Haptic Teleoperation Systems - Signal Processing Perspective. Springer 2015.

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