

RobotChain: Optimization of a Robot-Oriented Blockchain

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1 Abstract

RobotChain is a consortium blockchain for use in factories that allows the registration of robotic events and the construction of artificial intelligence logic that leverages the recorded events [1–4]. See the following URL for more information: <http://www.di.ubi.pt/~lfbaa/robotchain>.

2 Goals

The main goal of this thesis is to improve the registration rate of events on RobotChain. Robots generate many events per second and the current processing rate of RobotChain is not yet as high as desirable. So this thesis will mainly focus on improvements on the blockchain algorithms to allow for a large number of robots to interact with RobotChain simultaneously. This might involve changing the consensus algorithm, the peer-to-peer backbone or other implementation modules.

A real world evaluation is also a goal, since we have been making evaluations of the network with virtual robots. For this, the setup of a robot network at the lab will also be required.

3 Tasks

T1: Review of the documentation of RobotChain;

T2: Modify the current RobotChain code to allow for a higher event recording rate;

T3: Setup a real robot network in the lab to allow for a realistic evaluation of the detailed capabilities before and after the development;

T4: Write the master’s dissertation, technical documentation and a conference paper.

4 Schedule

Task	Start date	Duration
T1	2019-10-01	1 months
T2	2019-11-01	2 months
T3	2020-01-01	3 month
T4	2020-04-01	2 months

References

- [1] Miguel Fernandes and Luís A. Alexandre. A time-segmented consortium blockchain for robotic event registration. *CoRR*, abs/1904.04306, 2019.
- [2] Vasco Lopes and Luís A. Alexandre. Detecting robotic anomalies using RobotChain. In *19th IEEE International Conference on Autonomous Robot Systems and Competitions*, Porto, Portugal, April 2019.
- [3] Vasco Lopes, Luís A. Alexandre, and Nuno Pereira. Controlling robots using artificial intelligence and a consortium blockchain. *CoRR*, abs/1903.00660, 2019.
- [4] Vasco Lopes, Nuno Pereira, and Luís A. Alexandre. Robot workspace monitoring using a blockchain-based 3D vision approach. In *CVPR Workshop: Blockchain Meets Computer Vision & AI*, Long Beach, CA, June 2019. IEEE.