ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Distributed Computing

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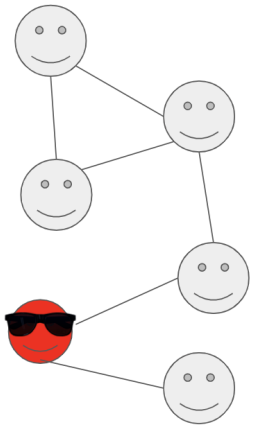
Graph Algorithms in Harsh Conditions

Consider a network of nodes where each node is aware of its neighbours but doesn't know the topology of the whole network. Suppose each node wants to output its distance to one special node. Taking into account Murphy's Law, it might be that some of the nodes are corrupted, and want to disrupt the communication in the network. Some nodes might crash, some might exhibit adversarial behaviour and lie about whether they are connected or not. Considering these harsh conditions, is it possible for the non-corrupted nodes to perform some algorithm that will produce reasonable outputs? What algorithm will give the best guarantee on how good the outputs are?

In this project, we will consider a graph problem, and you will study the impact of assuming adversarial behaviour in various settings. These are some of the questions that we want to address:



- How do existing algorithms perform in this setting?
- What is the best guarantee we can give about the outputs?
- Which assumptions are reasonable and necessary?
- How many corrupted nodes can we tolerate?
- What do optimal algorithms look like?

Requirements: Motivation and interest in theory are required. Knowledge in Graph Theory and Byzantine agreement protocols are big pluses. Being able to work independently and coming up with your own ideas are highly appreciated.

Interested? Please contact us for more details!

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