Popular science summary of the PhD thesis

PhD student	Mohammadreza Barzegaran
Title of the PhD thesis	Configuration Optimization of Fog Computing Platforms for Control Applications
PhD school/Department	DTU Compute

Science summary

Industry has so far experienced three revolutions. The first industrial revolution began in the 1760s and was the transition from manual production methods to machines. It thus led to an increase in the rate of production. The second industrial revolution began in the 1860s and continued with the electrification of factories and production lines. This industrial revolution promoted economic growth in many countries and contributed to the development of world industrial powers. In the 20th century, the rise of electronics, communications, and computers brought about the third industrial revolution. The result was high-end automation via robots and Programmable Logic Controllers (PLCs).

We are at the beginning of the fourth industrial revolution, called Industry 4.0, which is all about customized production and productivity. To realize such visions, a system-level architecture has been introduced where resources are distributed everywhere on the continuum from the cloud to the things, i.e., the machines, called Fog Computing. A Fog Computing Platform (FCP) consists of interconnected Fog nodes that can perform computations.

With an FCP, which implements industrial applications, the industrial control is virtualized on Fog nodes. Therefore, the platform must provide the same level of performance as is found in legacy systems such as PLCs. This thesis aims to generate FCP configurations that guarantee the performance of control applications.

Please email the summary to the PhD secretary at the department