



Running Genetic Algorithms in the Edge: A First Analysis*

*Note: The full contents of this paper have been published in the volume *Lecture Notes in Artificial Intelligence 11160* (LNAI 11160)

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Abstract—Nowadays, the volume of data produced by different kinds of devices is continuously growing, making even more difficult to solve the many optimization problems that impact directly on our living quality. For instance, Cisco projected that by 2019 the volume of data will reach 507.5 zettabytes per year, and the cloud traffic will quadruple. This is not sustainable in the long term, so it is a need to move part of the intelligence from the cloud to a highly decentralized computing model. Considering this, we propose a ubiquitous intelligent system which is composed by different kinds of endpoint devices such as smartphones, tablets, routers, wearables, and any other CPU powered device. We want to use this to solve tasks useful for smart cities. In this paper, we analyze if these devices are suitable for this purpose and how we have to adapt the optimization algorithms to be efficient using heterogeneous hardware. To do this, we perform a set of experiments in which we measure the speed, memory usage, and battery consumption of these devices for a set of binary and combinatorial problems. Our conclusions reveal the strong and weak features of each device to run future algorithms in the border of the cyber-physical system.

Index Terms—Edge Computing, Fog Computing, Evolutionary Algorithms, Genetic Algorithms, Metaheuristics, Smartphone, Tablet, Ubiquitous AI