Assignment #6

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The survey paper titled "Energy and time efficient task offloading and resource allocation on the generic IoT-fog-cloud architecture" by Huaiying Sun, Huiqun Yu, Guisheng Fan and Liqiong Chen explores the problem of offloading all the data to the cloud and its communication overhead. The authors make a point that the exponential increase in the number of IoT devices and the amount of emitted data from these devices, it is expensive and inefficient to offload all tasks to the remote data centre.

The paper begins by elaborating the problem of offloading all tasks, whether required or not, to the cloud. The researchers claim that, currently, a huge amount of data emitted by distributed IoT devices are transferred to the centralized cloud for processing before the results are returned from the cloud to data consumers, which are always located adjacent to the original data sources. It is not efficient for some applications with rigid service delivery deadlines such as virtual reality, augmented reality and so on to be executed on remote cloud only.

The paper then moves to the Fog approach in Section two, also detailing other related works that were surveyed for the research paper. This paper proposes a general IoT-fog-cloud architecture that fully exploits the advantages of fog and cloud. Then, the energy and time efficient computation offloading and resource allocation. The researchers then introduce their own approach to solve the problem of offloading, keeping the process as energy efficient as possible.

Moving to the next section, we see system architecture and computing Models that are generic to IoT-fog-cloud architectures. The architecture basically has three layers. The first layer is the infrastructure layer. The second layer is the fog layer, including some fog servers and controllers. The third layer is the cloud layer comprising cloud servers. In the device, an energy module determines whether the device can serve offloaded tasks of other devices according to the energy and time constraints. The basic module of controller is responsible for information communication.

In the section four of this survey paper, the course is realigned with the objective of this paper which given as problem formulation. Apparently, these are two things: Offloading strategy and transmission power strategy.

In section 5, the authors describe the ETCORA algorithm, that is their proposed solution to the problem set described above. The ECTORA algorithm solves energy efficiency by choosing the least energy consuming device for offloading tasks and, and an intelligent routing approach to save on transmission power. In the successive section, its performance is evaluated assisted by simulation.

ECTORA makes decisions to offload the task or make local resource uses based on various factors. The computation offloading selection is mainly to determine which task of the request

needs to be offloaded to the fog or cloud, satisfying the task dependence and the number of tasks executed on fog layer as more as possible, making the energy and time cost of each application request as less as possible.

The algorithm makes sure that, if the local execution is larger, the task will be offloaded to the fog layer. otherwise, further considering whether it is possible to be offloaded to the cloud layer. If the execution overhead of the task on the cloud layer is smaller, it will be eventually offloaded to the cloud, otherwise it will stay on the local device.

The researchers mention that due to novelty and lack of the realistic testbed, they have evaluated the effectiveness of the proposed method by iFogSim to simulate an IoT-fog-cloud environment, which has been widely used to simulate different computing modes.

Section seven, concludes the research with the researchers summarizing the ETCORA algorithm and discussing its effectiveness backed by performance measures from simulation results. They claim that ECTORA indeed outperforms the other methods in reducing energy consumption and completion time of requests Authors then talk about future research prospects on the broader scale which includes, security factors and reliability of services, because they would also have direct impact on the performance of the IoT applications.

The researchers hope that IoT-fog-cloud environment realization will benefit many aspects of our daily life such as the transportation, medical, industrial automation, smart home and emergency response. Therefore, with an optimistic note the survey concludes. It provides relevant information that can be utilized by researchers interested in IoT.

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