Mobility-Aware Joint Task Scheduling and Resource Allocation for Cooperative Mobile Edge Computing

In this paper, they proposed device-to-device (D2D) cooperation based MEC to expedite the task execution of mobile user by leveraging proximity-aware task offloading.
They jointly formulate task allocation and power allocation to minimize the total task execution delay by considering user mobility, distributed resources, task characteristics, and user device energy constraints. They first proposed an evolutionary scheme based on genetic algorithm (GA) to solve the mixed integer nonlinear programming (MINLP) problem. Then they proposed a heuristic scheduling called Mobility Aware Task Scheduling (MATS) to obtain efficient task with low complexity.
They consider a D2D-enabled cooperative MEC network, where the idle and resource rich devices such as phone, tablet, laptop and desktop computer can serve as fog/edge nodes to facilitate computation offloading by establishing direct D2D links with a resource limited task device (TD) indexed by 0. Assume that TD is carried by a walking user moving along a trajectory. Meanwhile, TD has K independent computation intensive tasks to execute denoted by the set $K = \{1, 2, \ldots, K\}$. Along the path of TD, M resource devices (RDs) including cellphones, smart wearable devices, tablets, and laptops are distributed. The set of RDs is denoted as $M = \{1, 2, \ldots, M\}$. They consider a network assisted architecture, where the base station (BS) has global network information including details about user's mobility, computational resources, and tasks. And they assume that BS can discover the updated network topology and location of users by using bootstrapping program similar to.
For task offloading, TD can connect to any of the RDs by establishing a direct D2D link (using technologies such as WiFi-Direct or Bluetooth) with the assistance of BS. BS anticipates TD's mobility in order to schedule its tasks to RDs such that the computation offloading latency is minimized. Figure below illustrates the considered scenario where the tasks of mobile user are scheduled on RDs along user's trajectory.

- We want to use whale optimization algorithm to solve this scenario.

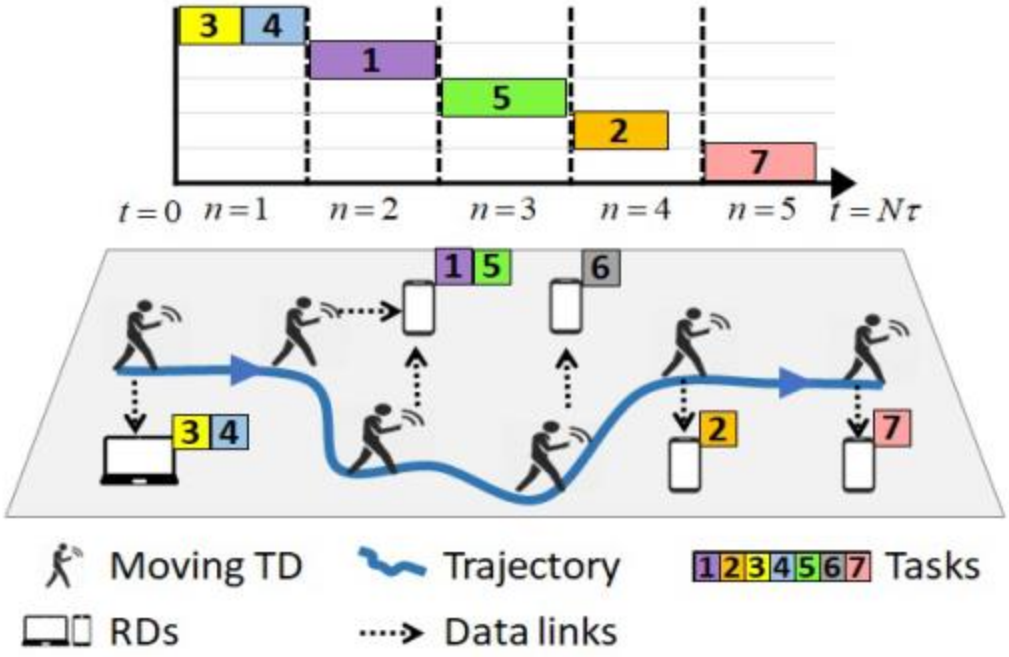

Fig. 1. Mobility-aware task offloading in D2D-enabled cooperative MEC network.