# Modularity-based Dynamic Clustering for Energy Efficient UAVs aided Communications

### ABSTRACT

In this letter, we propose a novel modularity-based dynamic clustering relying on modified Louvain method for UAVs aided mobile communications. Our aim is to save the transmit power of the mobile devices, by locating the UAVs vertically projected on the centroids of the user clusters. We further propose two types of operation for the modularitybased dynamic clustering, namely the recurring operation and the differential operation. We show that the proposed method requires substantially lower transmit power of the mobile devises and lower energy consumption of the UAVs than that required by the K-means based solution. We also show that the differential operation is more suitable for networks with lower proportion of moving users, since it consumes significantly less energy than that required by the recurring operation at the cost of requiring slightly higher transmit power of mobile devices.

## **EXISITING SYSTEM**

- The approach is to locate the UAVs closer to the mobile devices for establishing shorter radio links.
- To elaborate, that the transmit power of mobile devices can be substantially reduced by adapting the UAVs positions based on the mobile devices' locations.
- In UAVs aided mobile communications, each UAV serves a cluster of mobile devices, where the clustering is typically based on the de facto K-means criteria.
- However, it is known from network science that modularity is the most used and best measure of the quality of clustering performance.

# **PROPOSED SYSTEM**

- We propose a novel modularity-based dynamic clustering for energy efficient UAVs aided mobile communications, relying on modified Louvain method in both recurring and differential operation to construct clusters.
- The proposed modularity-based clustering method also exhibits beneficial savings when compared to the K-means based clustering, although their difference tends to be smaller when the density of mobile devices becomes higher.
- Specifically, after forming dynamic clusters, the UAVs are relocated to the positions vertically projected on the centroids of clusters.

# SYSTEM REQUIREMENTS

#### HARDWARE REQUIREMENTS

- •Processor Intel core i3
- •RAM 2B
- •Hard Disk 20 GB

#### SOFTWARE REQUIREMENTS

- •Operating System : LINUX
- •Tool : Network Simulator-2
- •Front End : OTCL (Object Oriented Tool Command Language)

### REFERENCE

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