

1.Cluster the subject areas of faculty using the Louvain algorithm (k=5)

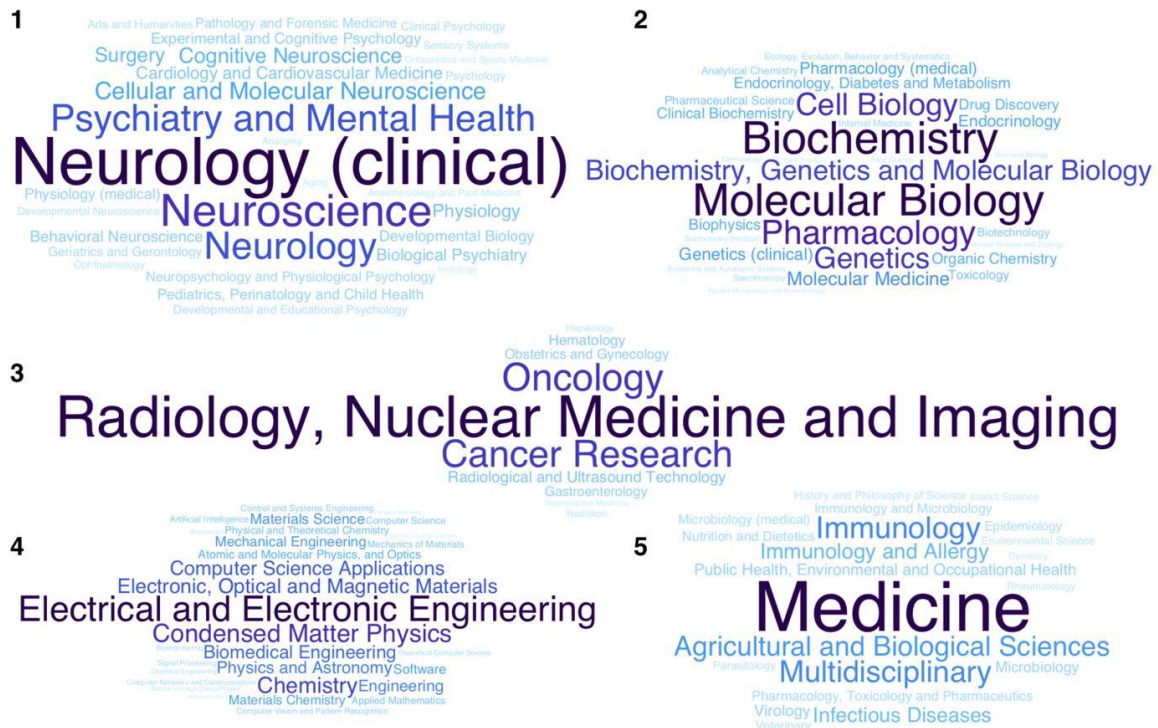
Explanation:

### Louvain Clustering Algorithm

- ❖ It is a method to extract communities from a large networks
  - ❖ One of the fastest modularity-based algorithm
  - ❖ Works well with large graphs
- 
- ❖ Step 1: Construct network using publication subject areas
  - ❖ Step 2(i) : Read the network data from csv file
  - ❖ Step 2(ii): Convert the dataframe into a graph dataframe
  - ❖ Step 3: Use cluster\_louvain() function for Louvain Clustering
- ```
clusters = cluster_louvain(graph_df)
```
- ❖ Step 4: Save the clusters object into a csv file
  - ❖ Step 5: Use wordcloud () function to represent the clusters

### Sample output

1: Neurology    2: Cell & Molecular Biochemistry    3: Radiology & Oncology    4: Engineering    5: Medicine



2. Generate a bar plot for

- number of publications per **subject area** per **continent pre-2014**,
- number of publications per **subject area** per **continent post-2014**,
- The **difference** of above graphs

3. Generate a bar plot for

- number of publications **per CIP** category **per continent pre-2014**,
- number of publications **per CIP** category **per continent post-2014**,
- the **difference** of above graphs