Field Mapping Task Splitting Algorithm
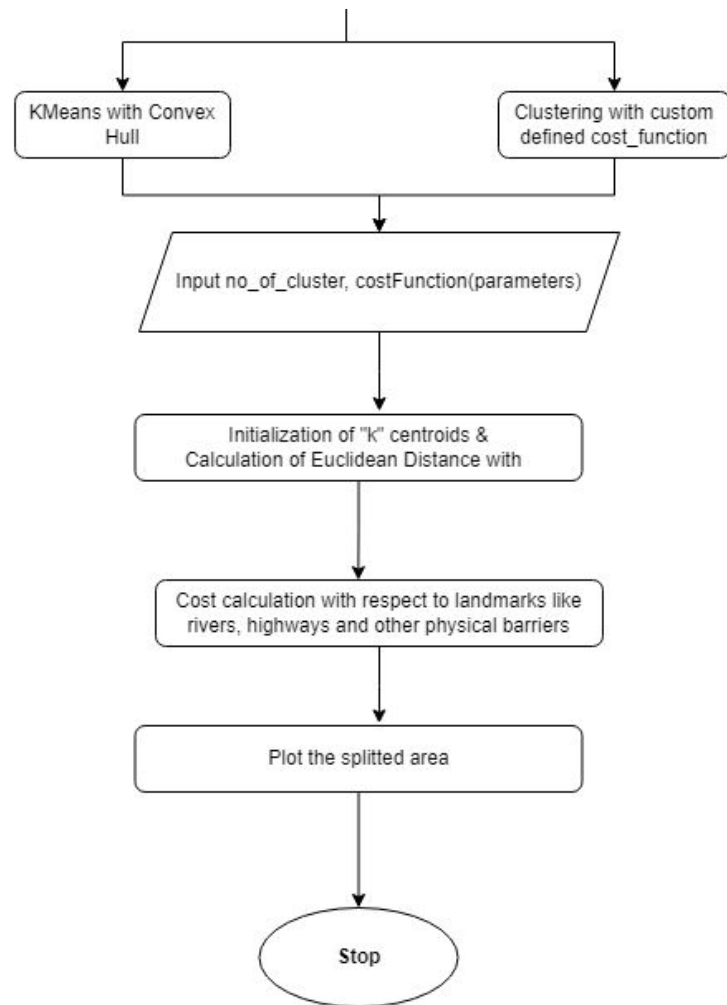
Team: MMV
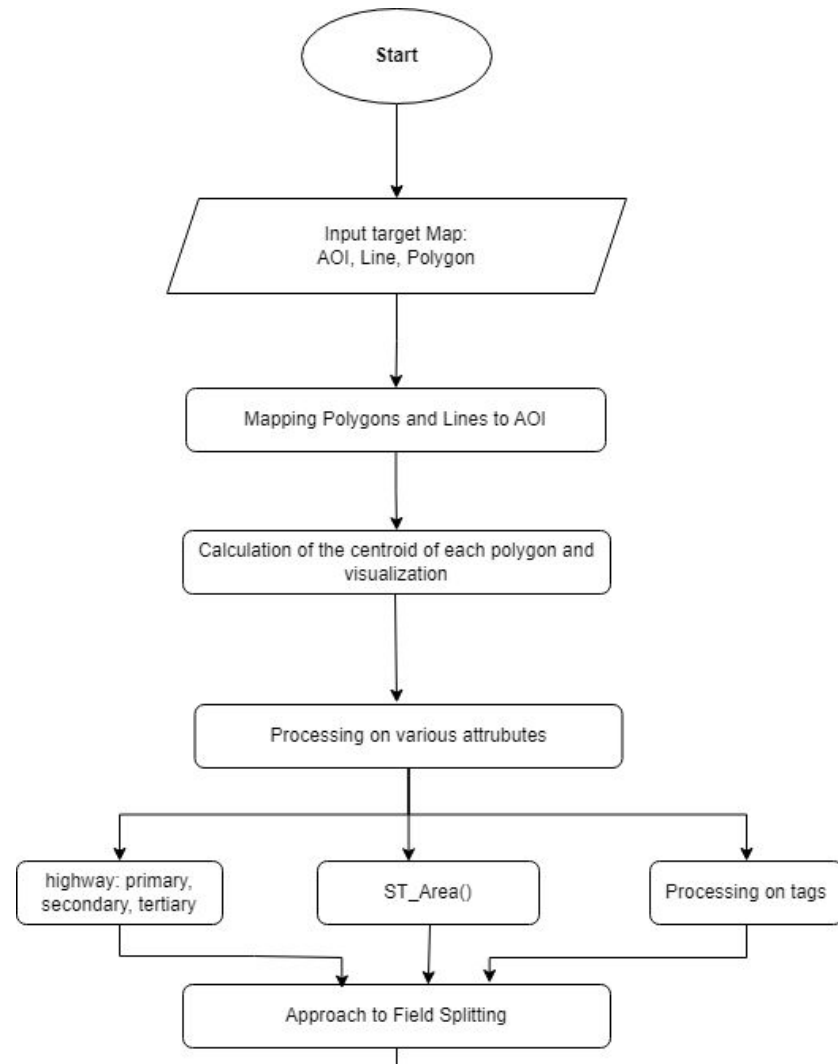
Members:
Om Prakash Sharma
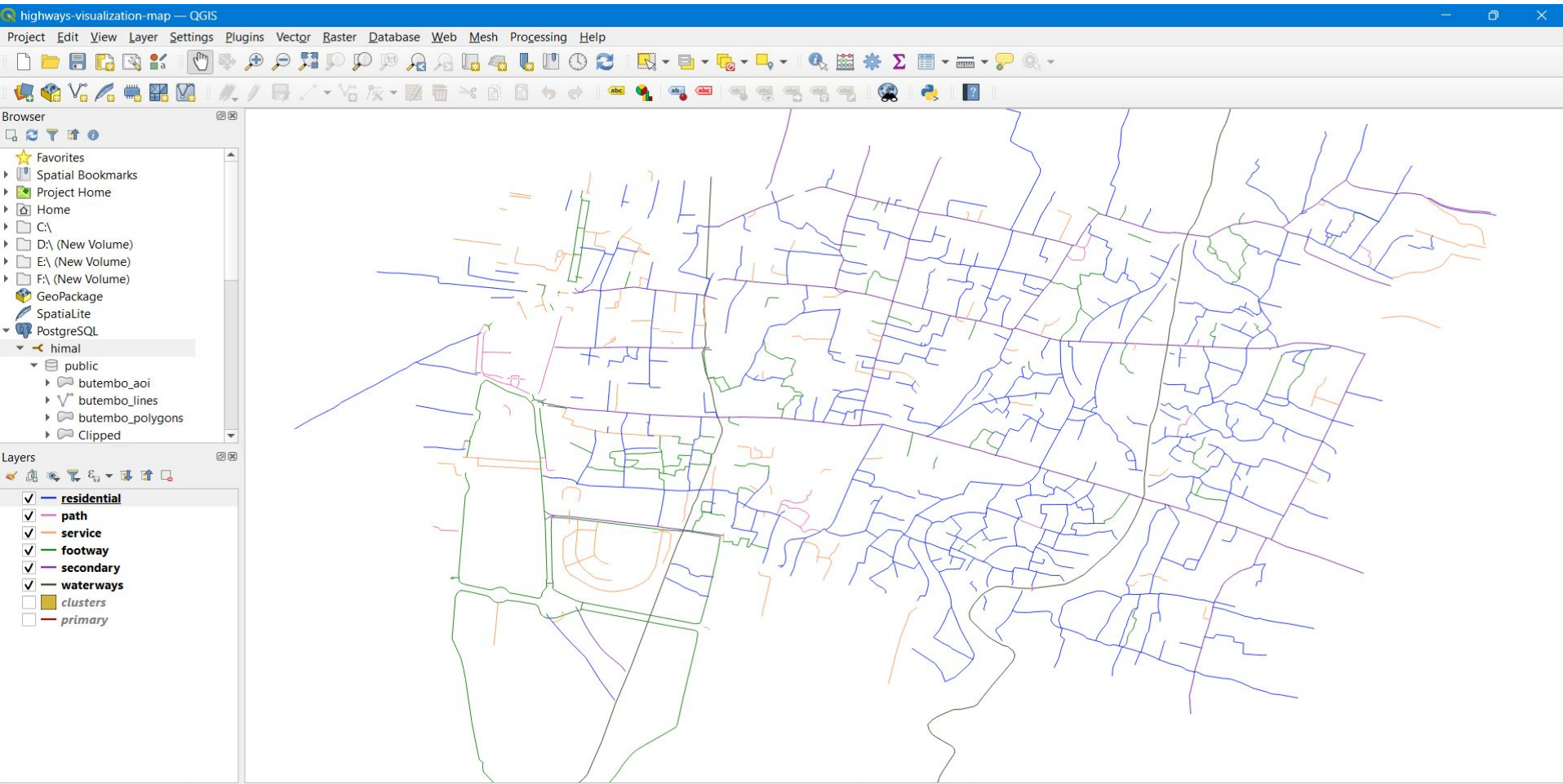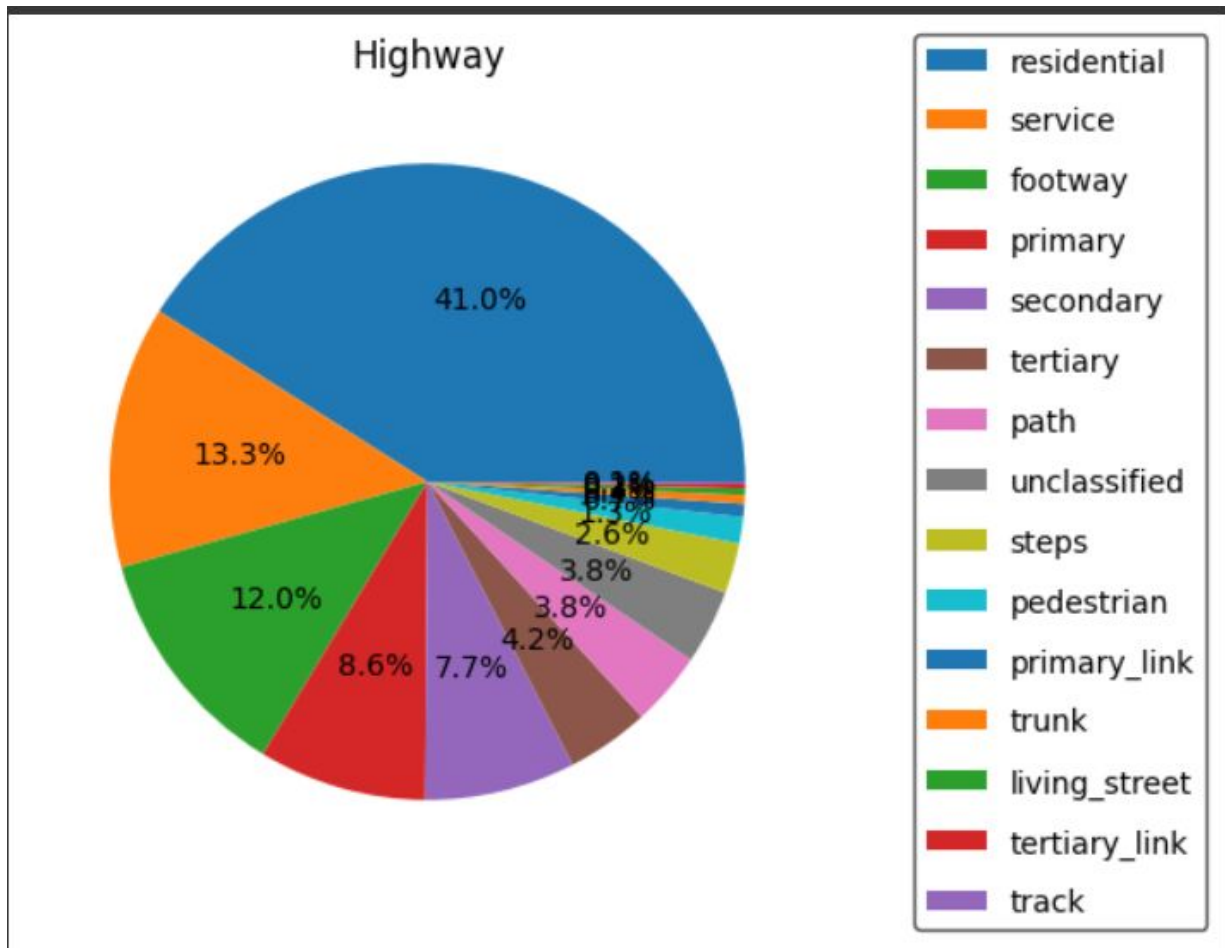Prabin Bohara
Raj Kumar Dhakal
Santosh Pandey

```
                    ┌─────────────┐
                    │    Start    │
                    └──────┬──────┘
                           │
              ┌────────────▼────────────┐
             /  Input target Map:        /
            /   AOI, Line, Polygon       /
           └────────────┬───────────────┘
                        │
          ┌─────────────▼──────────────┐
          │ Mapping Polygons and Lines │
          │ to AOI                     │
          └─────────────┬──────────────┘
                        │
          ┌─────────────▼──────────────────────┐
          │ Calculation of the centroid of each │
          │ polygon and visualization           │
          └─────────────┬──────────────────────┘
                        │
          ┌─────────────▼──────────────┐
          │ Processing on various       │
          │ attributes                  │
          └─────────────┬──────────────┘
```

Left flowchart nodes:

- Start
- Input target Map: AOI, Line, Polygon
- Mapping Polygons and Lines to AOI
- Calculation of the centroid of each polygon and visualization
- Processing on various attributes
  - highway: primary, secondary, tertiary
  - ST_Area()
  - Processing on tags
- Approach to Field Splitting

Right flowchart nodes:

- KMeans with Convex Hull
- Clustering with custom defined cost_function
- Input no_of_cluster, costFunction(parameters)
- Initialization of "k" centroids & Calculation of Euclidean Distance with
- Cost calculation with respect to landmarks like rivers, highways and other physical barriers
- Plot the splitted area
- Stop

Data Visualization

Data Visualization

Highway

- residential — 41.0%
- service — 13.3%
- footway — 12.0%
- primary — 8.6%
- secondary — 7.7%
- tertiary — 4.2%
- path — 3.8%
- unclassified — 3.8%
- steps — 2.6%
- pedestrian — 1.3%
- primary_link
- trunk
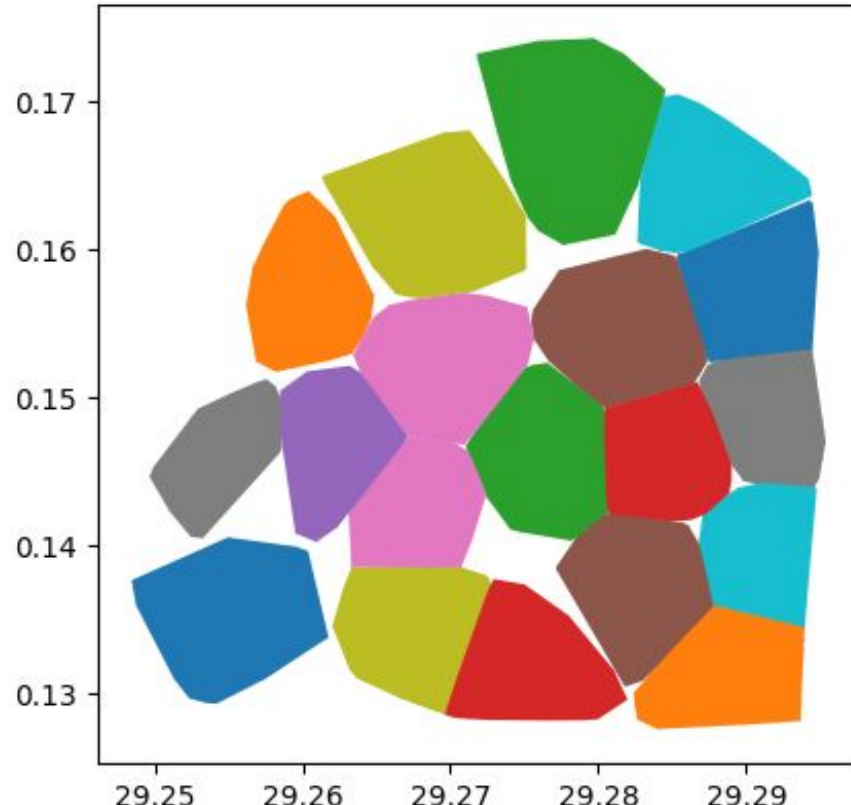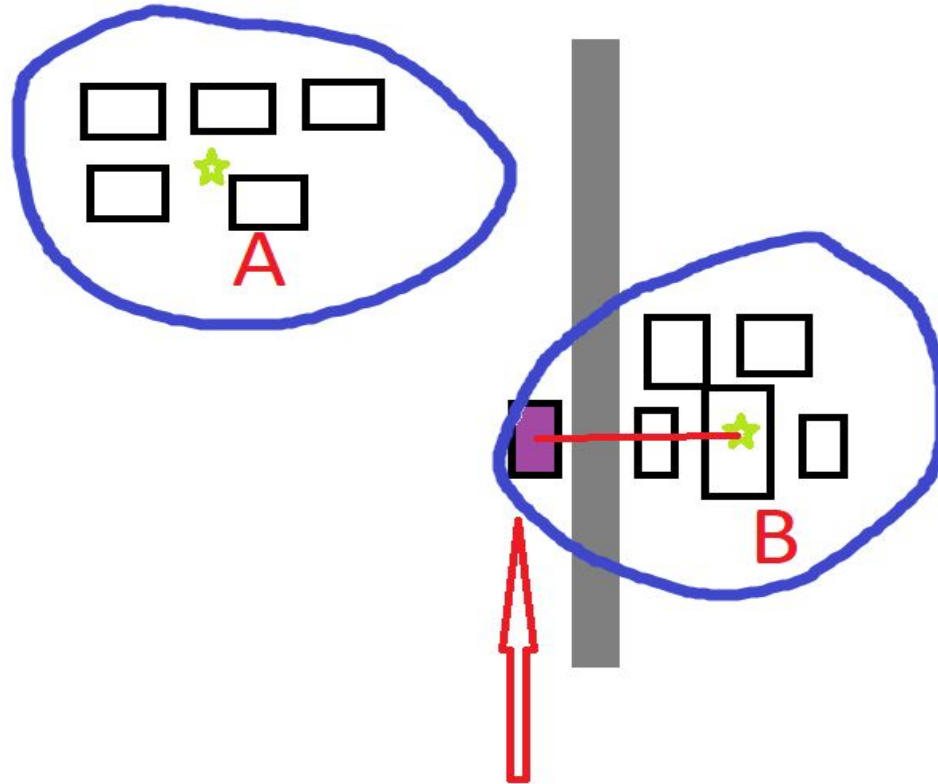- living_street
- tertiary_link
- track

Algorithm

K-nearest neighbour

Modified Cost based K-mean Algorithm
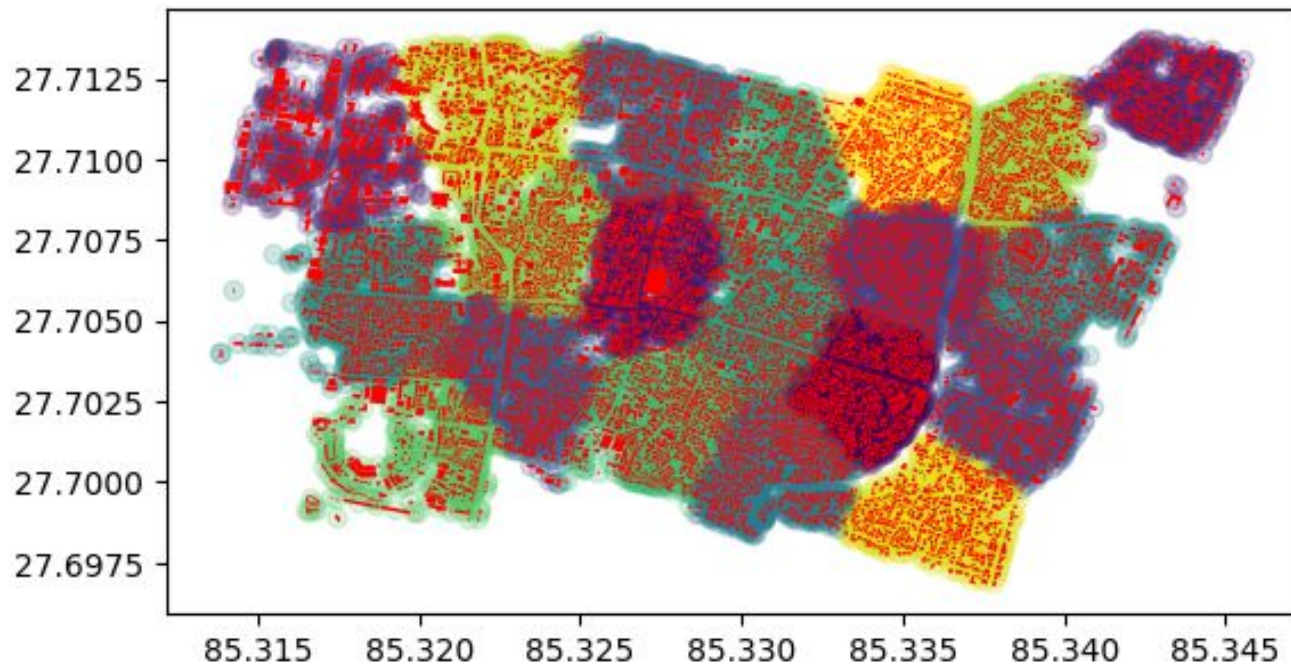
Splitting with K-nearest neighbour algorithm

Cost-based K-means clustering algorithm

Cost based K-mean point visualization
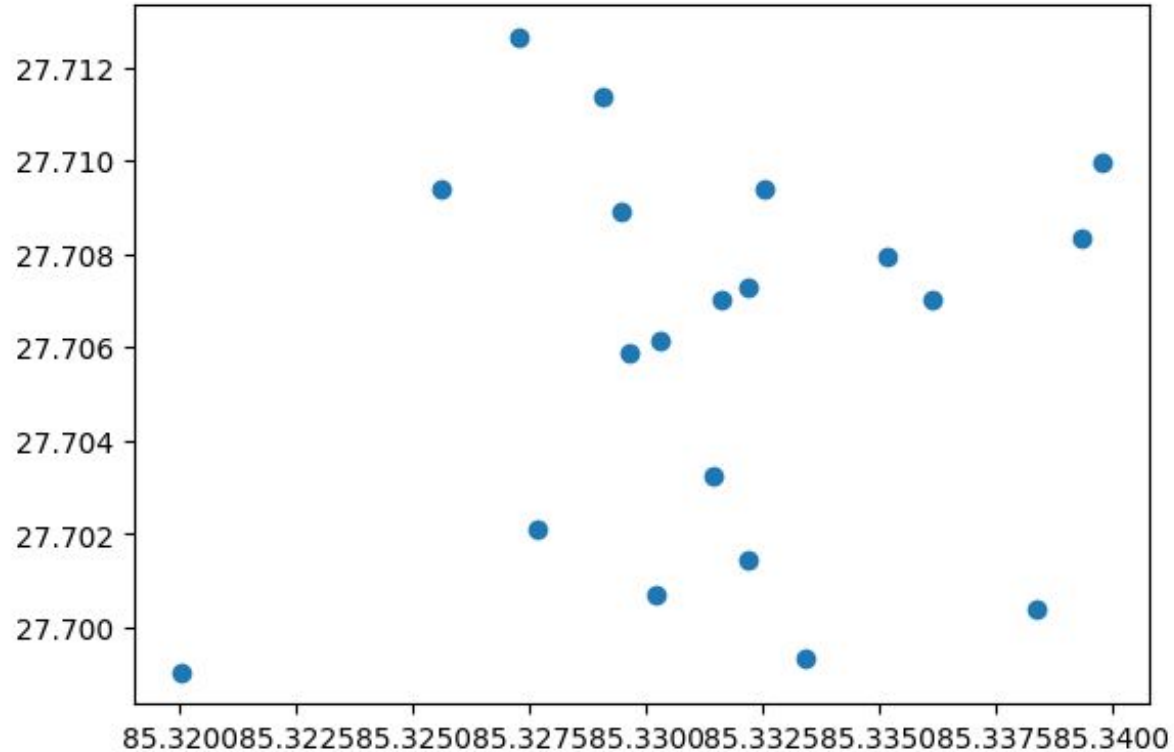
Visualization of splitted fields

Future Improvement

- Assigning the weights to different attributes such as building=commercial etc to give special emphasis to those clusters