CSI2120 : Programming Paradigms

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**Assignment 1 Report : DBSCAN**

For my solution I chose to follow the pseudo code given in the assignment pdf.

For running the algorithm, please open a terminal and run the following command

>> java TaxiClusters filename eps minPts

Ex: java TaxiClusters yellow_tripdata_2009-01-15_1hour_clean 0.0001 5

**DBSCAN Algo:**

```
DBSCAN(DB, distFunc, eps, minPts) {
    C := 0                                              /* Cluster counter */
    for each point P in database DB {
        if label(P) ≠ undefined then continue           /* Previously processed in inner loop */
        Neighbors N := RangeQuery(DB, distFunc, P, eps) /* Find neighbors */
        if |N| < minPts then {                          /* Density check */
            label(P) := Noise                           /* Label as Noise */
            continue
        }
        C := C + 1                                      /* next cluster label */
        label(P) := C                                   /* Label initial point */
        SeedSet S := N \ {P}                            /* Neighbors to expand */
        for each point Q in S {                         /* Process every seed point Q */
            if label(Q) = Noise then label(Q) := C      /* Change Noise to border point */
```

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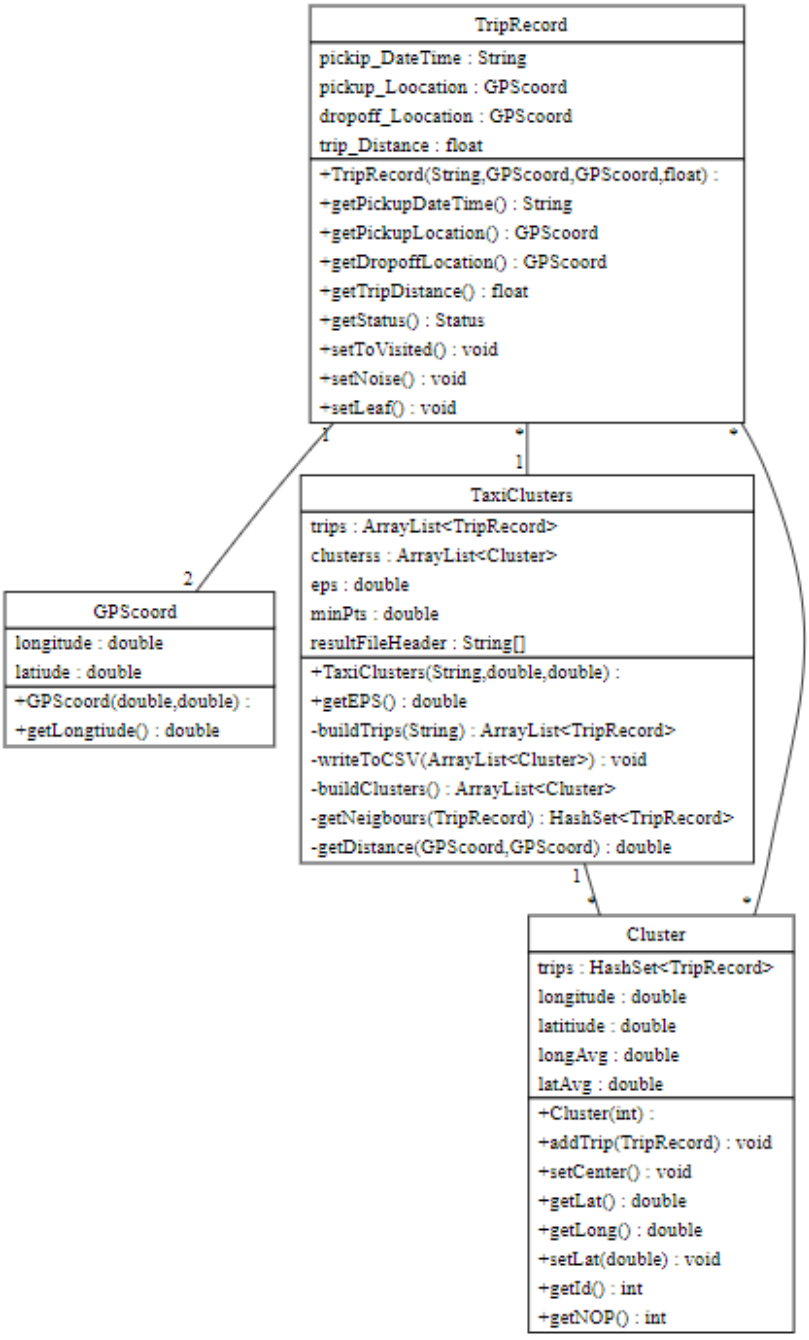
```
            if label(Q) ≠ undefined then continue       /* Previously processed */
            label(Q) := C                               /* Label neighbor */
            Neighbors N := RangeQuery(DB, distFunc, Q, eps) /* Find neighbors */
            if |N| ≥ minPts then {                      /* Density check (if Q is a core point) */
                S := S ∪ N                              /* Add new neighbors to seed set */
            }
        }
    }
}

RangeQuery(DB, distFunc, Q, eps) {
    Neighbors N := empty list
    for each point P in database DB {                   /* Scan all points in the database */
        if distFunc(Q, P) ≤ eps then {                  /* Compute distance and check epsilon */
            N := N ∪ {P}                                /* Add to result */
        }
    }
    return N
}
```

/* Reference: https://en.wikipedia.org/wiki/DBSCAN */

**UML Diagram**

For my uml Diagram I used a free source website called UMPLE




For a better view please visit
https://cruise.umple.org/umpleonline/umple.php?model=2202087twc8hoypzgt

and follow these instructions:

options → Diagram type (Graphvz Class)