# CE699 Presentation

## Comparison between SL and 3A classes based on season and train

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## Content

- Literature Review

- Clustering
- Seasonal Variation
- Train wise comparison
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## Literature Review

1. **Heterogeneity in Perceptions of Service Quality among Groups of Railway Passengers**
   > Study is done in Milan, Italy to analyze the different perception among groups regarding transit service quality. Proposed methodology is CART to identify the most influencial service quality.

2. **Evaluating the Impact of Rail-Trails: A Methodology for Assessing Travel Demand and Economic Impacts**
   > This study explores methods to measure the travel demand and economic impact of developing a rail trail. A methodology is proposed to identify the demand and need for rail-trails and their economic impacts and benefits in Buffalo Valley Rail Trail, Pennsylvania.

## Literature Review

3. **An integrated Bayesian approach for passenger flow assignment in metro networks**
   > This papere proposed a Bayesian Statistical Inference method to characerize passenger flow assignment model in complex metro networks. They used likelihood of observing passenger travel times provided by smart card data and their prior knowledge about the studied metro network.

4. **Analysis of the Mobility of Railway Passenger Transport in Small Urban Areas**
   > Main purpose behind the railway network is to provide better mobility to passengers. This paper analyses the mobility of passengers by railway in the area of the small town of Varazdin (Croatia).

## Clustering

- task of grouping a set of objects in such a way that objects in the same group are more similar to each other than to those in other groups.
- Hierarchical clustering seeks to build a hierarchy of clusters based on Agglomerative approach.

- Euclidean distance is used for matrix formation
- Ward's minimum variance criterion minimizes the total within-cluster vairance. Include pair of clusters that leads to minimum increase in total within-cluster variance after merging.

# Seasonal Variation

**Data recorded for JAN-15 01-10**

```
## Loading required package: bitops
## Loading required package: gdata
## gdata: read.xls support for 'XLS' (Excel 97-2004) files ENABLED.
##
## gdata: read.xls support for 'XLSX' (Excel 2007+) files ENABLED.
##
## Attaching package: 'gdata'
##
## The following object is masked from 'package:stats':
##
##     nobs
##
## The following object is masked from 'package:utils':
##
##     object.size
##
##
## Attaching package: 'dplyr'
##
## The following objects are masked from 'package:gdata':
##
##     combine, first, last
##
## The following object is masked from 'package:stats':
##
##     filter
##
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
##    CLASS OccCurrY OccLastY
## 1    1A    86.56    91.68
## 2    2A   109.43   114.57
## 3    2S    92.28    86.37
## 4    3A   111.57   113.72
## 5    CC    80.89    80.92
## 6    EC    53.02    60.05
```
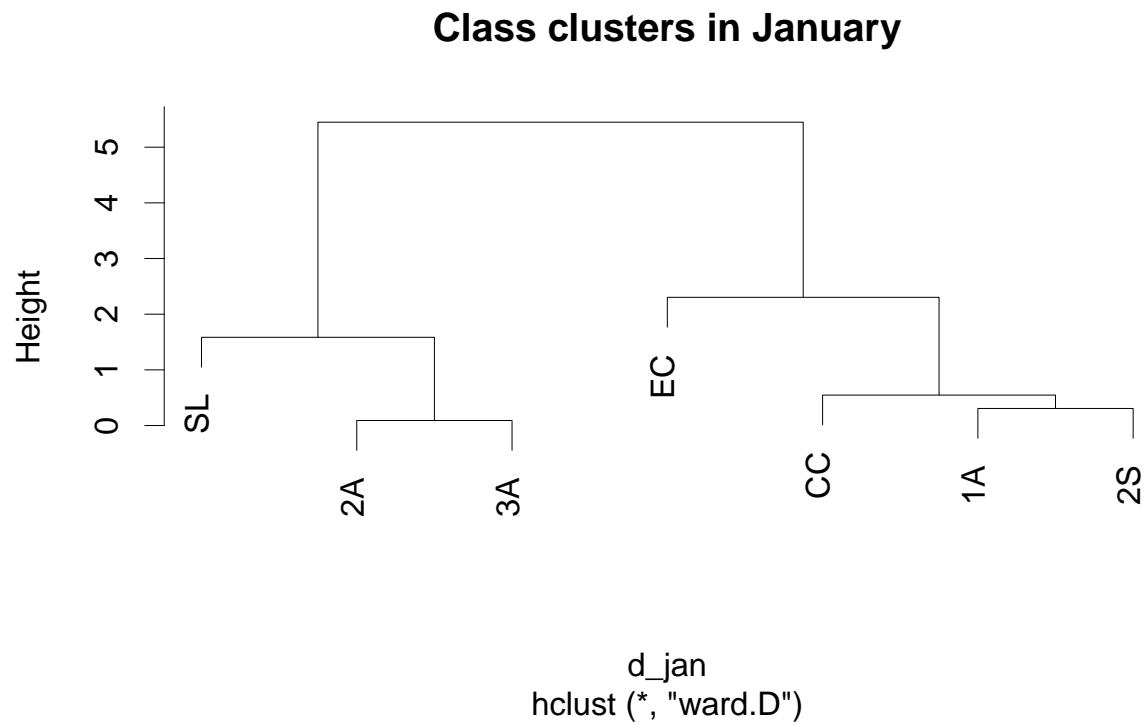
# Seasonal Variation

**Class Clusters based on occupational status**

```
##   CLASS OccCurrY OccLastY
## 1    1A    86.56    91.68
## 3    2S    92.28    86.37
##   CLASS OccCurrY OccLastY
## 2    2A   109.43   114.57
## 4    3A   111.57   113.72
##   CLASS OccCurrY OccLastY
## 5    CC    80.89    80.92
##   CLASS OccCurrY OccLastY
## 6    EC    53.02    60.05
##   CLASS OccCurrY OccLastY
## 8    SL   132.12   136.12
```

# Seasonal Variation

## Class clusters in January



d_jan
hclust (*, "ward.D")

**Cluster Visualization**

# Seasonal Variation

**Data recorded for MAY-15 01-10**

```
##   CLASS OccCurrY OccLastY
## 1    1A   106.90   106.61
## 2    2A   130.00   131.89
## 3    2S   117.12   112.44
## 4    3A   131.65   134.52
## 5    CC   105.74   105.40
## 6    EC   103.96   110.38
```

# Seasonal Variation

**Class Clusters based on occupational status**

```
##    CLASS OccCurrY OccLastY
## 1    1A   106.90   106.61
## 5    CC   105.74   105.40
##    CLASS OccCurrY OccLastY
## 2    2A   130.00   131.89
## 4    3A   131.65   134.52
##    CLASS OccCurrY OccLastY
## 3    2S   117.12   112.44
##    CLASS OccCurrY OccLastY
## 6    EC   103.96   110.38
##    CLASS OccCurrY OccLastY
## 7    SL    159.1    173.3
```

# Seasonal Variation

**Cluster Visualization**



**Class clusters in May**

d
hclust (*, "ward.D")
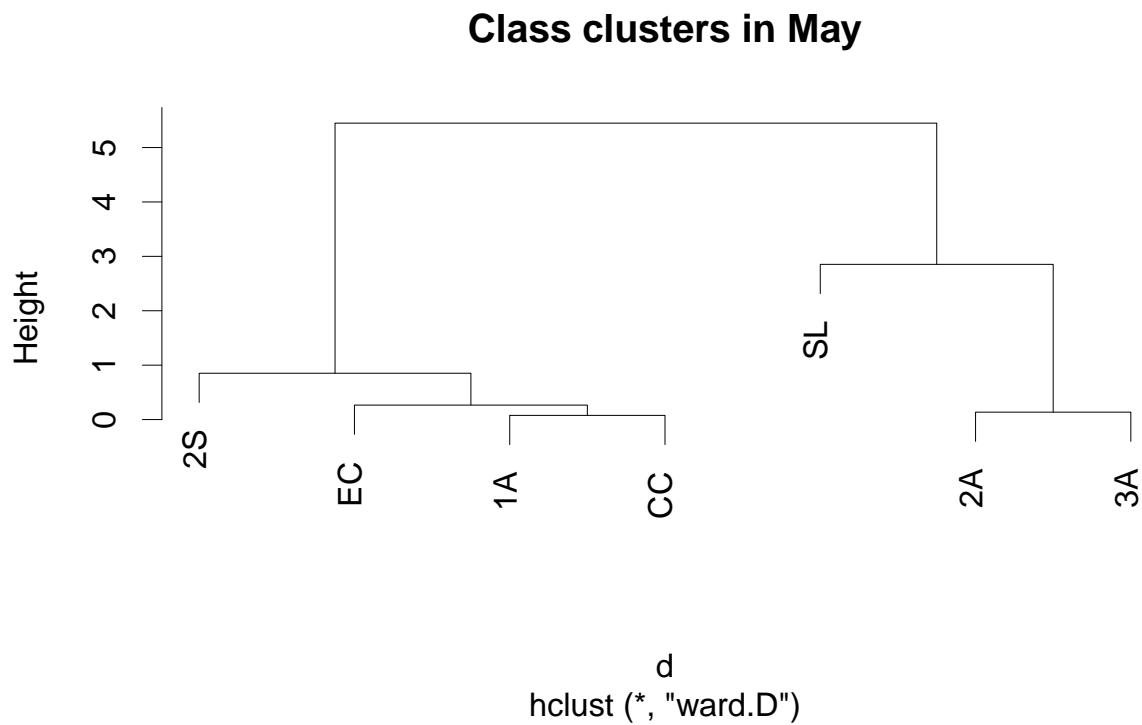
# Train wise comparison

**Comparison of 3A and SL classes of 4 selected trains of Central Railway**

- Coimbatore Exp (Mumbai to Bangalore)

- Kushinagar Exp (Mumbai to Gorakhpur)
- Jhelum Express (Jammu to Pune)
- Kolkata Mail (Mumbai to Howrah)

# Train wise comparison

**Class clustering**

```
##     passengers utilization          tclass
## 1          143        43.46 COIMBATORE EXP 2A
## 2          681        45.27 COIMBATORE EXP 3A
##     passengers utilization          tclass
## 3         2071        55.07 COIMBATORE EXP SL
## 13         529        58.77 JHELUM EXPRESS 2A
## 41         299        58.51    KOLKATA MAIL 2A
## 42        1027        63.94    KOLKATA MAIL 3A
##     passengers utilization          tclass
## 5          350        77.77 KUSHINAGAR EXP 2A
## 6         1194        82.91 KUSHINAGAR EXP 3A
## 14        2465        68.47 JHELUM EXPRESS 3A
## 43        5111        69.32    KOLKATA MAIL SL
##     passengers utilization          tclass
## 7        10648        79.40 KUSHINAGAR EXP SL
## 15        7421        87.71 JHELUM EXPRESS SL
```

# Train wise comparison

**Class Clusters for 4 trains**



d_cr
hclust (*, "ward.D")
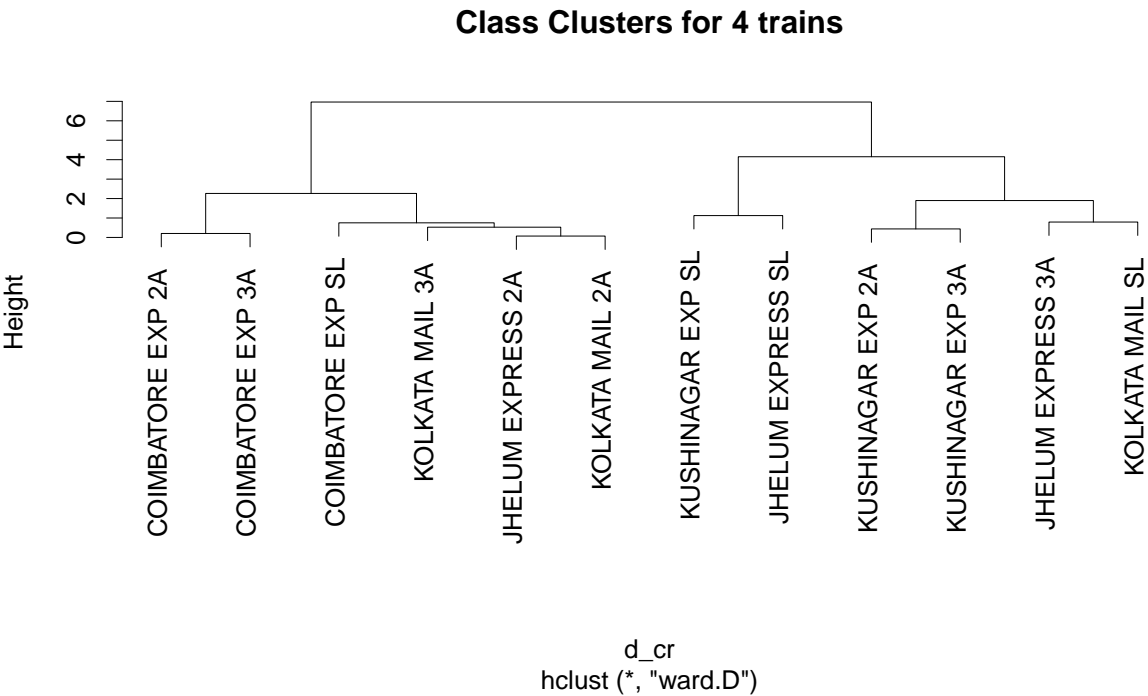
**Cluster Visualization**

# References

- 'International Journal of Sustainable Transportation Volume 9, Issue 7,2015'
- 'International Journal of Sustainable Transportation Volume 9, Issue 8, 2015'
- 'An integrated Bayesian approach for passenger flow assignment in metro networks'
- 'Analysis Of The Mobility Of Railway Passenger Transport In Small Urban Areas'
- 'R eserved passenger data warehouse of Indian Railway'