Work done on NSE data for Clementi town secondary school

Temporal patterns : Sequential analysis of steps_change and press_change to classify between lifts and stairs [1]

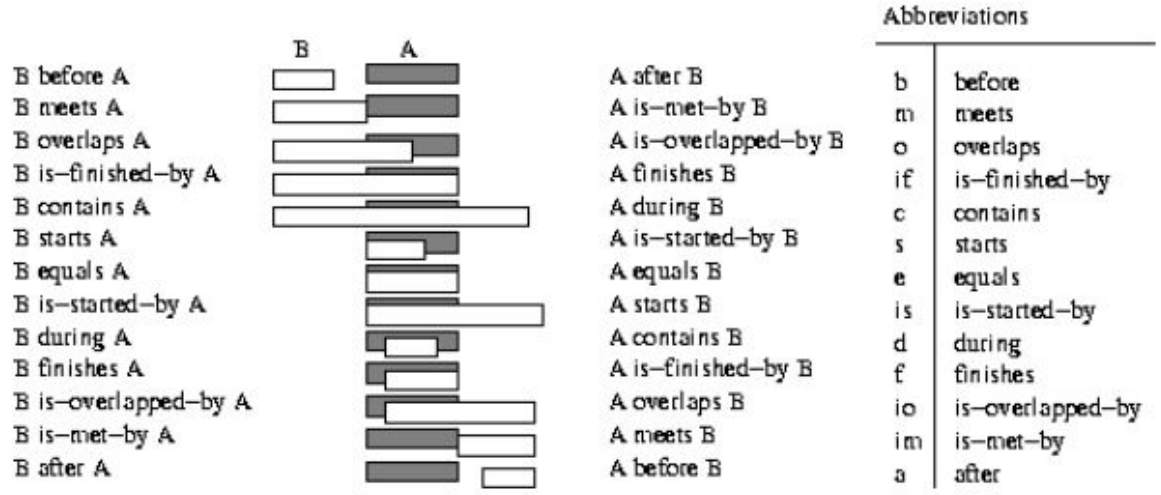
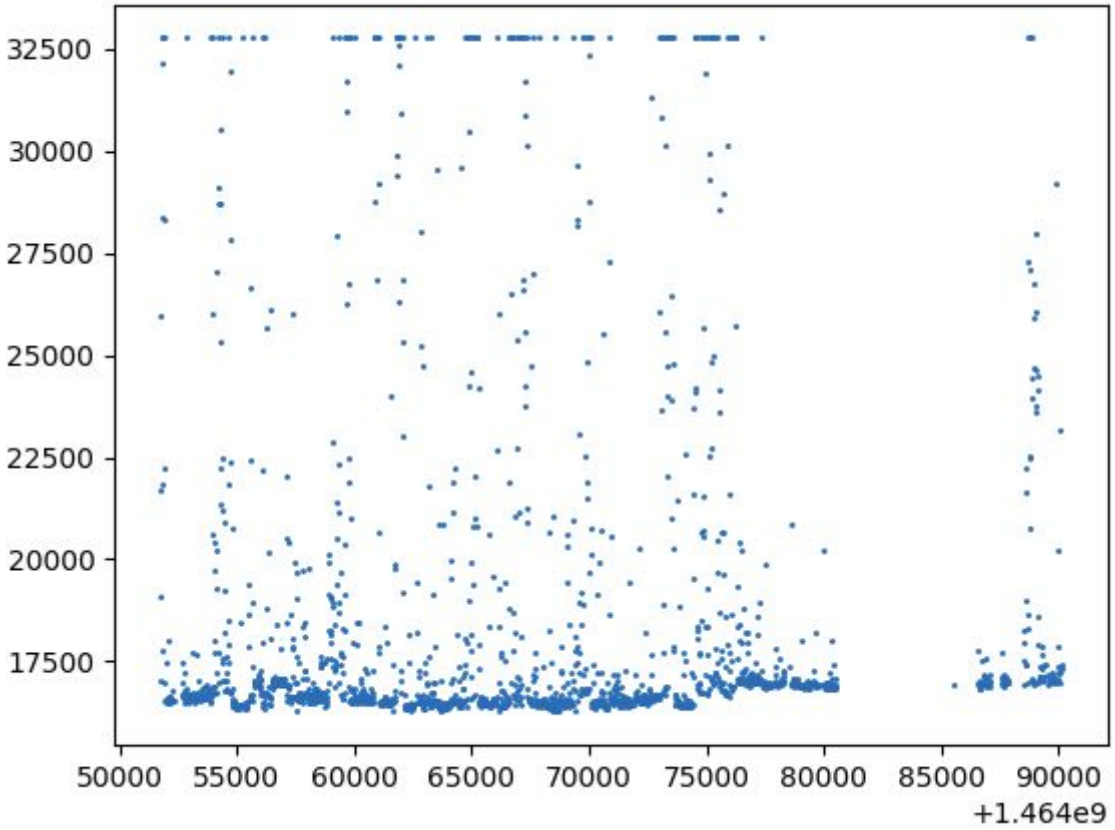


Figure 3.1: Allen's interval relationships.

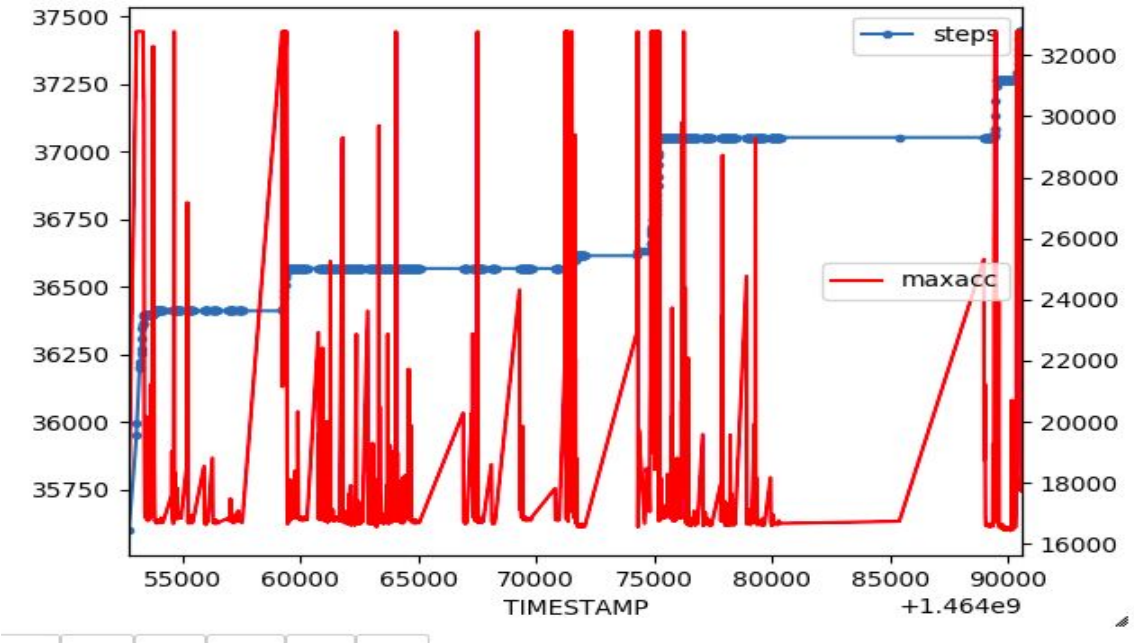
```
Lift 4
stairs 6
Lift 10
stairs 5
Lift 2
stairs 0
Lift 1
stairs 0
Lift 2
stairs 0
Lift 2
stairs 1
Lift 1
stairs 0
Lift 2
stairs 4
Lift 3
stairs 0
Lift 1
stairs 0
Lift 5
stairs 3
Lift 2
stairs 3
Lift 2
stairs 0
Lift 3
stairs 5
Lift 3
stairs 17
Lift 5
```

Classification between stairs and lift for each student
CONDITION:
If press_change occurs inside steps_change (completely inside) then it is considered as stairs
Else if pressure change occurs in between 2 step_changes or
press_change follows step_change, then it is classified as lift

Analysis of MAXACC in NSE data:



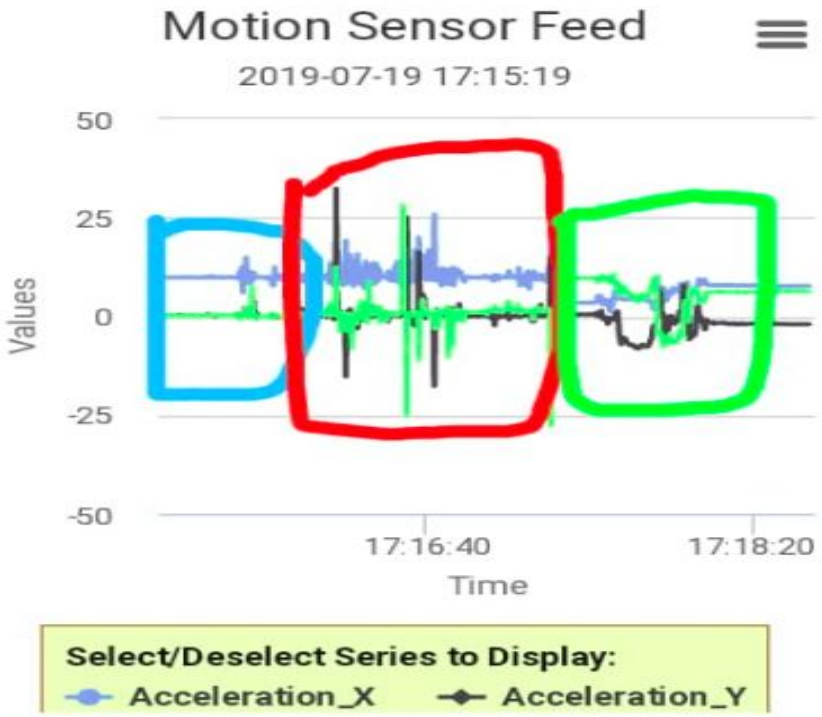
Scatter plot of maxacc with respect to TIMESTAMPS



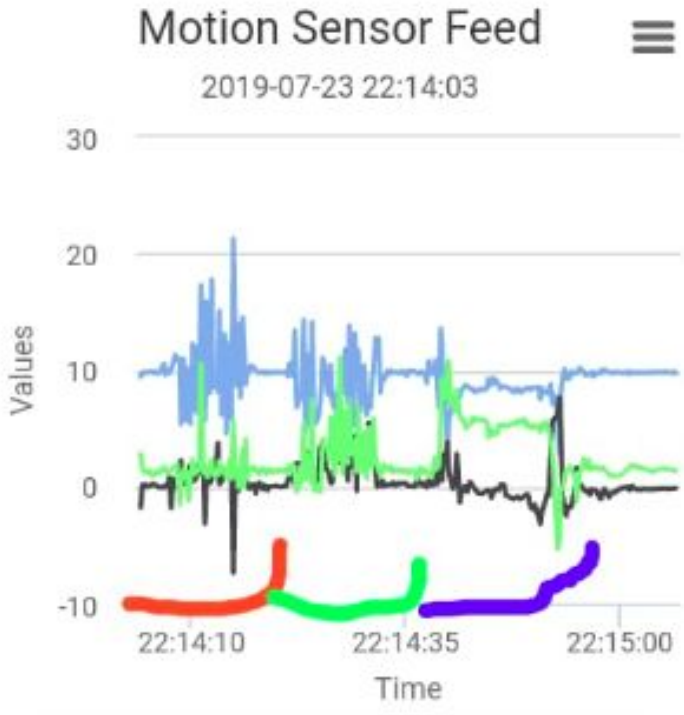
Steps_change and maxacc of a particular student (702660)

Observation:
Varies significantly within between values
For maxacc > 32000, step_change varies widely from zero to maximum values..

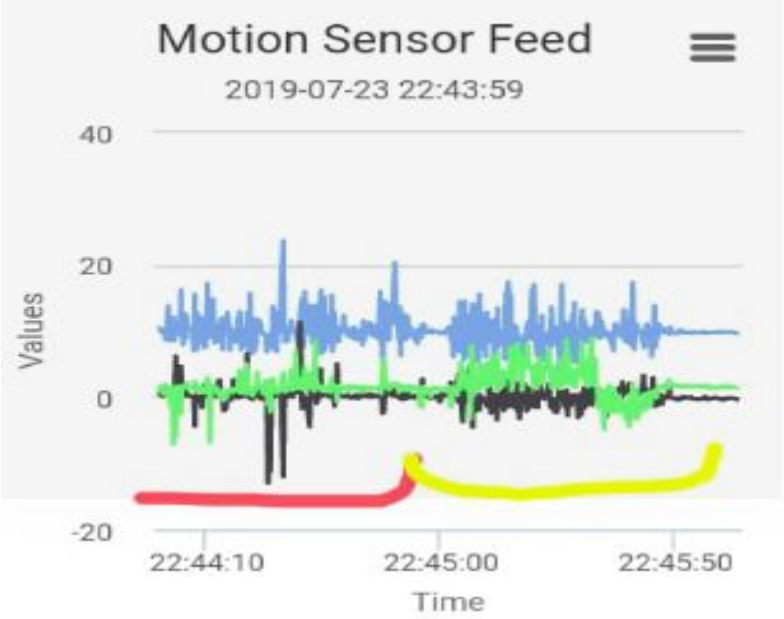
Analysis of maxacc in ModeB:



R - walking
G - sitting (with slight natural movements)
B - idle



R - walking with free motion
G - walking with device in pocket
B - sitting



R - greater length of lanyard
Y - lanyard of lesser length for the same person

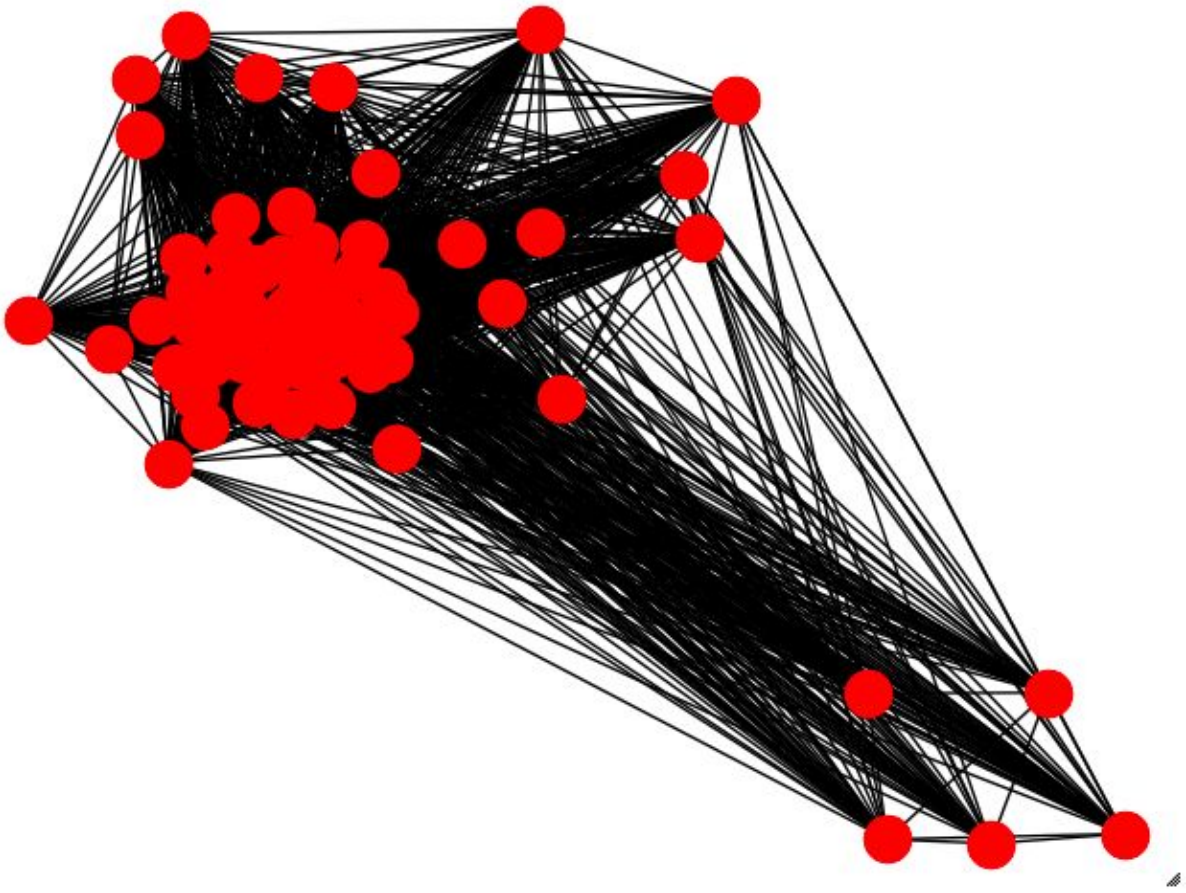
Pressure Data collected from ModeB (along with ground truth)

Time(s)	Acceleration_X	Acceleration_Y	Acceleration_Z	squared sum
1563541577768	9.038	0.938	1.125	83.830913
1563541577965	8.847	0.124	3.803	92.747594
1563541578165	9.072	0.847	3.209	93.316274
1563541578369	4.948	0.857	0.263	25.286322
1563541578570	10.346	0.301	1.096	108.331533
1563541578782	10.336	0.881	1.571	110.077098
1563541578968	8.167	1.12	0.684	68.422145
1563541579171	8.497	-0.689	1.269	74.284091
1563541579377	9.872	0.493	1.959	101.537114
1563541579571	10.049	0.493	1.072	102.374634
1563541579770	9.963	0.742	1.954	103.630049
1563541579969	10.097	-0.057	1.14	103.252258
1563541580166	9.982	0.095	1.686	102.491945
1563541580370	9.704	0.105	1.451	96.284042
1563541580568	9.805	-0.32	1.968	100.113449
1563541580770	9.742	0.086	1.547	97.307169
1563541580965	9.493	-0.474	1.489	92.558846
1563541581172	9.589	-0.498	1.599	94.753726
1563541581368	10.035	0.277	2.169	105.482515
1563541581575	9.699	-0.11	2.663	101.17427
1563541581768	9.81	-0.239	2.059	100.532702
1563541581971	9.608	-0.359	2.002	96.450549
1563541582174	9.584	-0.033	1.868	95.343569
1563541582375	9.757	0	2.174	99.925325
1563541582564	9.69	0.162	2.16	98.587944
1563541582766	9.771	0.033	2.222	100.410814

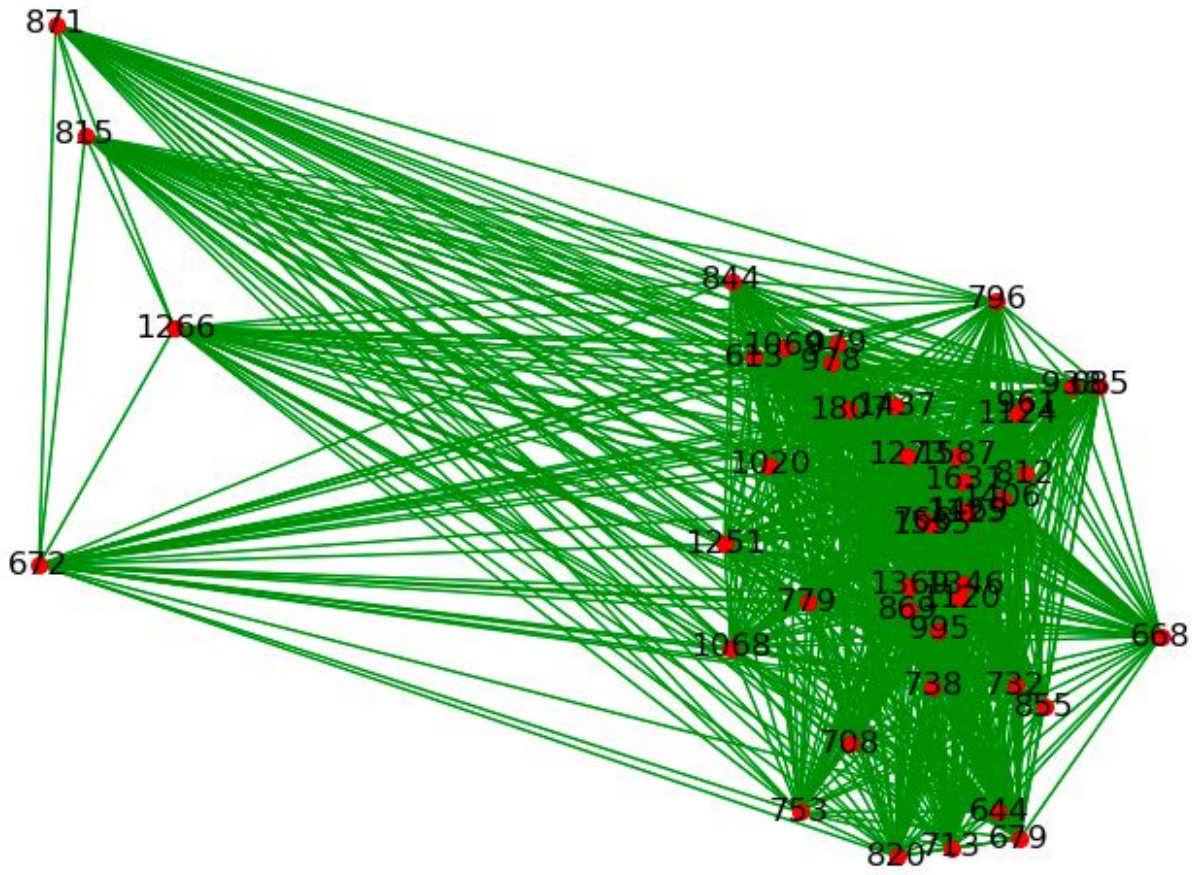
Squared sum of all MAXACC values collected from Mode B device for walking(ground truth)

Copresence networks done for Clementi Town Secondary school data

Copresence network was made for the data on Tuesday with 66 student IDs. The edge weights correspond to the number of minute intervals in which the two students were having the same common MAC address.



After the network analysis, it was found that the number of data for the nodes in most of the groups except the main cluster was less than 600. Hence, those outliers were removed so as to group the rest of the students with more data points.



Final network after removal of outliers

This when analysed, does not give a satisfying result when compared with the output of the correlation matrix that had been obtained before. Hence it is more likely that the data from this particular school is insufficient to draw any direct conclusion for group movement. Similar schools can be taken under consideration and can be analysed in a similar fashion