In [3]:

```python
import pandas as pd
G1 = pd.read_csv('G1unlabel.csv', index_col=0)
G1
```

Out[3]:

| Time window	G1: Average	G2: Average	G3: Average	A1: Average	A2: Average	Unnamed: 6	G1: Max
9:12:59 PM	-395.042105	194.305263	75.547368	-14617.00000	-1777.273684	-5420.210526	-48
9:13:00 PM	-335.675439	227.412281	32.798246	-14628.78947	-1713.868421	-5320.885965	-5
9:13:01 PM	-526.376344	481.397850	-22.182796	-14614.88172	-1815.645161	-5335.784946	-58
9:13:02 PM	-362.518519	235.055556	32.259259	-14690.69444	-1766.212963	-5186.685185	-10
9:13:03 PM	-446.113043	407.000000	19.704348	-14683.90435	-1785.756522	-5144.652174	-73
...	...	...	...	...	...	...	..
11:53:12 AM	-333.218182	379.572727	83.900000	-11742.78182	-6676.927273	-7327.318182	1687
11:53:13 AM	-740.684685	888.540540	304.549550	-12588.88288	-5779.234234	-6577.495495	609
11:53:14 AM	-353.706422	115.678899	449.651376	-13582.19266	-4554.834862	-5736.201835	1591
11:53:15 AM	17.389381	12.566372	315.840708	-13989.17699	-3828.522124	-5215.345133	2245
11:53:16 AM	-28.747748	-55.837838	233.666667	-14279.85586	-3511.441441	-5124.090090	1467

173 rows × 24 columns

In [4]:
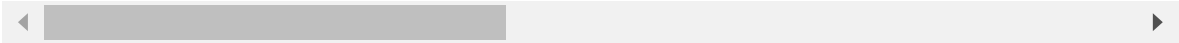
```python
from sklearn.preprocessing import MinMaxScaler
mms = MinMaxScaler()
G1_scaled = pd.DataFrame(mms.fit_transform(G1),
            columns=G1.columns,
            index=G1.index)
G1_scaled
```

Out[4]:

Time window	G1: Average	G2: Average	G3: Average	A1: Average	A2: Average	Unnamed: 6	G1: Max	G2: Max	
9:12:59 PM	0.472792	0.562307	0.345897	0.029524	0.534957	0.530204	0.025324	0.197160	
9:13:00 PM	0.488677	0.565486	0.341056	0.029093	0.537801	0.536942	0.029578	0.199427	
9:13:01 PM	0.437651	0.589876	0.334829	0.029601	0.533236	0.535932	0.024335	0.207243	
9:13:02 PM	0.481494	0.566220	0.340995	0.026832	0.535454	0.546047	0.029083	0.190130	
9:13:03 PM	0.459127	0.582732	0.339573	0.027080	0.534577	0.548899	0.022851	0.211821	
...	...	...	...	...	...	...	...	...	
11:53:12 AM	0.489334	0.580098	0.346843	0.134511	0.315194	0.400815	0.196953	0.319813	
11:53:13 AM	0.380309	0.628974	0.371831	0.103605	0.355458	0.451687	0.090316	0.284664	
11:53:14 AM	0.483852	0.554757	0.388264	0.067322	0.410376	0.508765	0.187457	0.228748	
11:53:15 AM	0.583145	0.544855	0.373110	0.052456	0.442953	0.544103	0.252152	0.217741	
11:53:16 AM	0.570800	0.538286	0.363804	0.041839	0.457175	0.550294	0.175190	0.242392	

173 rows × 24 columns
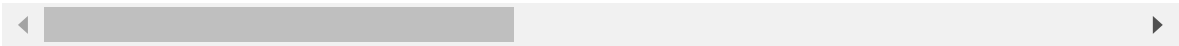
```python
from sklearn.cluster import KMeans
cls = KMeans(n_clusters=2, n_jobs=-1)
cls.fit(G1_scaled)
```

```
KMeans(algorithm='auto', copy_x=True, init='k-means++', max_iter=300,
    n_clusters=2, n_init=10, n_jobs=-1, precompute_distances='auto',
    random_state=None, tol=0.0001, verbose=0)
```

```python
centroid = pd.DataFrame(cls.cluster_centers_, columns=G1.columns)

import seaborn as sns
sns.heatmap(centroid)

print(centroid)
```

```
   G1: Average  G2: Average  G3: Average  A1: Average  A2: Average  \
0    0.478700     0.579471     0.341463     0.083814     0.575283
1    0.587298     0.548323     0.344010     0.774982     0.312877

   Unnamed: 6   G1: Max   G2: Max   G3: Max   A1: Max  ...   G3: Min  \
0    0.508707  0.189240  0.299547  0.210672  0.104135  ...  0.781189
1    0.320724  0.199332  0.227035  0.222672  0.762903  ...  0.769467

    A1: Min   A2: Min   A3: Min  G1: Standard deviation  \
0  0.322925  0.555548  0.600862                0.200983
1  0.815661  0.291214  0.488090                0.168437

   G2: Standard deviation  G3: Standard deviation  A1: Standard deviation  \
0                0.179782                0.154941                0.167021
1                0.099487                0.160590                0.133372

   A2: Standard deviation  A3: Standard deviation
0                0.092392                0.169728
1                0.071446                0.146203

[2 rows x 24 columns]
```

```
x = G1
x['G1'] = cls.predict(G1_scaled)
x['G1']
```

```
Time window
9:12:59 PM     0
9:13:00 PM     0
9:13:01 PM     0
9:13:02 PM     0
9:13:03 PM     0
              ..
11:53:12 AM    0
11:53:13 AM    0
11:53:14 AM    0
11:53:15 AM    0
11:53:16 AM    0
Name: G1, Length: 173, dtype: int32
```

```
G2 = pd.read_csv('G2unlabel.csv', index_col=0)
G2
```

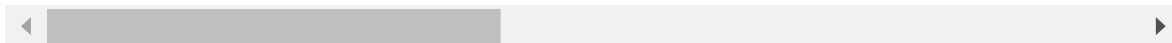|	-35.6	128.155556	-15.6777778	-14130.8444	-3518.46667	-5014.58889	238
11:53:17 AM							
11:54:59 AM	-161.647059	-90.470588	79.137255	-15280.2549	-1116.411770	-3694.39216	111
11:55:00 AM	145.657895	124.307018	24.657895	-15122.0614	-865.894737	-3759.42983	150
11:55:01 AM	26.723214	29.741071	52.776786	-15094.3036	-1022.535710	-3853.02679	120
11:55:02 AM	708.781250	556.250000	-1352.625000	-14475.1250	-1988.437500	-4028.81250	282
11:55:03 AM	1056.911770	-93.676471	-1295.500000	-11769.2941	-5657.205880	-8273.97059	366
11:55:04 AM	228.138889	-171.120370	-21.000000	-10237.1944	-6741.685190	-9026.84259	247
11:55:05 AM	-411.945946	297.585586	310.432432	-10725.1441	-5945.864870	-8903.17117	113
11:55:06 AM	91.642202	29.889908	205.275229	-11192.3486	-5776.431190	-8518.57798	96
11:55:07 AM	44.964602	-0.690265	101.681416	-11233.5841	-5557.973450	-8567.69027	85
11:55:08 AM	-61.027027	-227.927928	26.162162	-11242.1532	-5870.360360	-8393.69369	75
11:55:09 AM	191.394231	302.682692	119.048077	-11324.1058	-5770.192310	-8369.82692	100
9:14:22 PM	-480.626000	-9.043480	146.982600	-12847.3000	6740.643000	-5740.45000	-12
9:14:23 PM	-429.921000	317.649100	-3.210530	-12942.4000	6646.781000	-5597.13000	-11
9:14:24 PM	-364.754000	423.552600	43.657890	-12982.0000	6819.044000	-5402.47000	-3
9:14:25 PM	-448.746000	235.833300	46.508770	-13031.2000	6802.588000	-5274.74000	-14
9:14:26 PM	-394.193000	220.403500	34.508770	-13082.4000	6827.333000	-5231.25000	-8
9:14:27 PM	-380.052000	247.391300	37.878260	-13094.4000	6763.209000	-5226.63000	-5
9:14:28 PM	-398.860000	264.337200	-43.558100	-13123.9000	6671.244000	-5278.16000	1
9:14:29 PM	-282.243000	464.113000	5.669565	-13127.8000	6731.191000	-5234.35000	4
9:14:30 PM	-392.796000	400.840700	-42.654900	-13156.1000	6672.690000	-5142.27000	15
9:14:31 PM	-371.070000	351.587700	12.903510	-13232.3000	6796.412000	-4938.13000	-13
9:14:32 PM	-383.374000	253.321700	38.843480	-13254.0000	6718.383000	-4928.38000	-7
9:14:33 PM	-393.235000	242.208700	16.756520	-13270.0000	6706.878000	-4919.04000	-11

	-35.6	128.155556	-15.6777778	-14130.8444	-3518.46667	-5014.58889	238
11:53:17 AM							
9:14:34 PM	-354.670000	269.930400	27.469570	-13310.8000	6677.330000	-4930.57000	-1
9:14:35 PM	-435.711000	269.350900	24.850880	-13315.1000	6619.904000	-4867.54000	-9
9:14:36 PM	-347.643000	288.417400	28.800000	-13322.0000	6653.809000	-4847.06000	9
9:14:37 PM	-382.202000	567.780700	204.903500	-13337.4000	6842.851000	-4607.97000	125
9:14:38 PM	-293.026000	99.000000	38.078260	-13165.9000	7146.965000	-4704.96000	38
9:14:39 PM	-368.526000	93.552630	-51.219300	-13218.3000	6837.728000	-5149.77000	36
9:14:40 PM	-411.235000	310.747800	34.226090	-13211.6000	6776.078000	-4998.32000	-16
9:14:41 PM	-353.920000	107.919500	16.149430	-13260.9000	6649.046000	-5047.76000	25
9:14:42 PM	-433.983000	352.721700	18.904350	-13267.1000	6554.435000	-5158.43000	1
9:14:43 PM	-598.289000	76.754390	250.105300	-13361.0000	6633.026000	-4764.99000	5
9:14:44 PM	-482.605000	-217.974000	340.938600	-13078.2000	7050.579000	-4939.39000	48
9:14:45 PM	-197.000000	537.201800	-247.526000	-13084.6000	6832.096000	-5190.36000	66
9:14:46 PM	-484.000000	377.904800	1.333333	-13196.4000	6489.667000	-5194.95000	-39

36 rows × 24 columns

```python
from sklearn.preprocessing import MinMaxScaler
mms = MinMaxScaler()
G2_scaled = pd.DataFrame(mms.fit_transform(G2),
                         columns=G2.columns,
                         index=G2.index)
G2_scaled
```

Out[10]:

	-35.6	128.155556	-15.6777778	-14130.8444	-3518.46667	-5014.58889	2388
11:53:17 AM							
11:54:59 AM	0.263800	0.172748	0.845414	0.000000	0.405027	1.000000	0.371710
11:55:00 AM	0.449460	0.442668	0.813245	0.031369	0.423064	0.987803	0.467651
11:55:01 AM	0.377605	0.323823	0.829849	0.036873	0.411786	0.970251	0.394834
11:55:02 AM	0.789675	0.985509	0.000000	0.159651	0.342240	0.937286	0.793112
11:55:03 AM	1.000000	0.168719	0.033731	0.696196	0.078084	0.141187	1.000000
11:55:04 AM	0.499292	0.071392	0.786286	1.000000	0.000000	0.000000	0.705781
11:55:05 AM	0.112580	0.660435	0.981987	0.903243	0.057300	0.023192	0.376876
11:55:06 AM	0.416826	0.324010	0.919895	0.810600	0.069499	0.095315	0.334317
11:55:07 AM	0.388626	0.285579	0.858726	0.802424	0.085229	0.086105	0.307503
11:55:08 AM	0.324590	0.000000	0.814134	0.800724	0.062736	0.118735	0.283887
11:55:09 AM	0.477092	0.666840	0.868980	0.784474	0.069949	0.123211	0.344403
9:14:22 PM	0.071087	0.275081	0.885475	0.482436	0.970744	0.616301	0.066667
9:14:23 PM	0.101721	0.685649	0.796790	0.463579	0.963986	0.643178	0.068881
9:14:24 PM	0.141092	0.818743	0.824464	0.455726	0.976389	0.679682	0.090283
9:14:25 PM	0.090347	0.582828	0.826148	0.445970	0.975204	0.703636	0.061993
9:14:26 PM	0.123306	0.563437	0.819062	0.435818	0.976986	0.711791	0.077737
9:14:27 PM	0.131849	0.597353	0.821052	0.433438	0.972369	0.712658	0.085363
9:14:28 PM	0.120486	0.618650	0.772966	0.427589	0.965747	0.702994	0.100615
9:14:29 PM	0.190941	0.869717	0.802033	0.426815	0.970064	0.711210	0.108241
9:14:30 PM	0.124150	0.790200	0.773499	0.421204	0.965852	0.728478	0.135793
9:14:31 PM	0.137276	0.728301	0.806305	0.406094	0.974760	0.766761	0.065191
9:14:32 PM	0.129842	0.604806	0.821622	0.401791	0.969142	0.768589	0.080443
9:14:33 PM	0.123885	0.590840	0.808580	0.398618	0.968313	0.770341	0.068389

	-35.6	128.155556	-15.6777778	-14130.8444	-3518.46667	-5014.58889		2388
11:53:17 AM								
9:14:34 PM	0.147184	0.625679	0.814906	0.390528	0.966186	0.768178	0.093481
9:14:35 PM	0.098223	0.624951	0.813359	0.389675	0.962051	0.779998	0.075277
9:14:36 PM	0.151429	0.648913	0.815691	0.388307	0.964492	0.783839	0.120541
9:14:37 PM	0.130550	1.000000	0.919675	0.385253	0.978103	0.828676	0.405412
9:14:38 PM	0.184427	0.410864	0.821170	0.419260	1.000000	0.810487	0.193358
9:14:39 PM	0.138813	0.404018	0.768442	0.408870	0.977735	0.727071	0.187700
9:14:40 PM	0.113010	0.676976	0.818895	0.410198	0.973296	0.755473	0.056089
9:14:41 PM	0.147637	0.422073	0.808221	0.400423	0.964149	0.746202	0.160886
9:14:42 PM	0.099267	0.729726	0.809848	0.399193	0.957337	0.725447	0.101353
9:14:43 PM	0.000000	0.382907	0.946366	0.380573	0.962996	0.799230	0.111439
9:14:44 PM	0.069891	0.012510	1.000000	0.436651	0.993060	0.766524	0.217466
9:14:45 PM	0.242441	0.961570	0.652529	0.435381	0.977329	0.719460	0.261501
9:14:46 PM	0.069048	0.761375	0.799473	0.413212	0.952674	0.718599	0.000000

36 rows × 24 columns
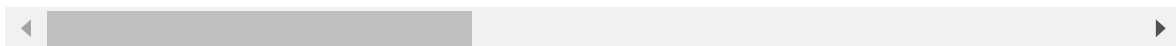
In [11]:

```python
x = G2
x['G2'] = cls.predict(G2_scaled)
x['G2']
```

Out[11]:

```
11:53:17 AM
11:54:59 AM    0
11:55:00 AM    0
11:55:01 AM    0
11:55:02 AM    0
11:55:03 AM    1
11:55:04 AM    1
11:55:05 AM    1
11:55:06 AM    1
11:55:07 AM    1
11:55:08 AM    1
11:55:09 AM    1
9:14:22 PM     0
9:14:23 PM     0
9:14:24 PM     0
9:14:25 PM     0
9:14:26 PM     0
9:14:27 PM     0
9:14:28 PM     0
9:14:29 PM     0
9:14:30 PM     0
9:14:31 PM     0
9:14:32 PM     0
9:14:33 PM     0
9:14:34 PM     0
9:14:35 PM     0
9:14:36 PM     0
9:14:37 PM     0
9:14:38 PM     0
9:14:39 PM     0
9:14:40 PM     0
9:14:41 PM     0
9:14:42 PM     0
9:14:43 PM     0
9:14:44 PM     0
9:14:45 PM     0
9:14:46 PM     0
Name: G2, dtype: int32
```

In [ ]: