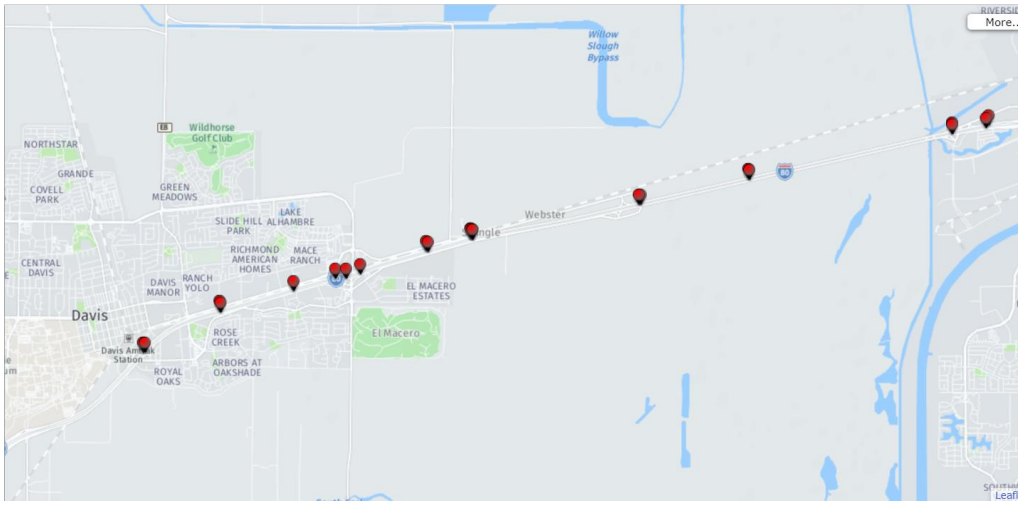
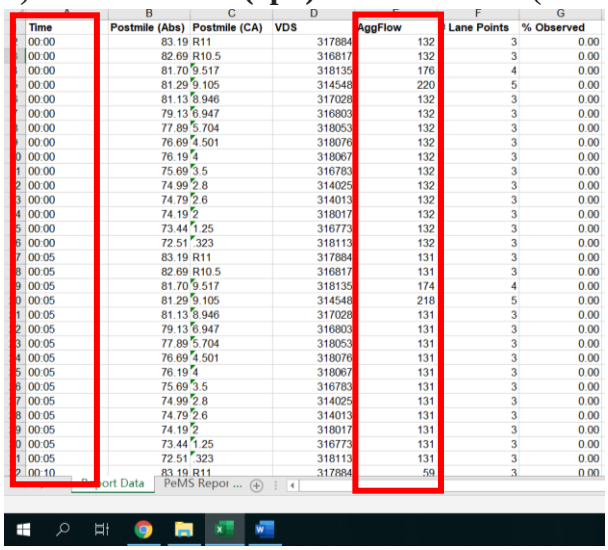
There are 15 detectors in the selected freeway segment:



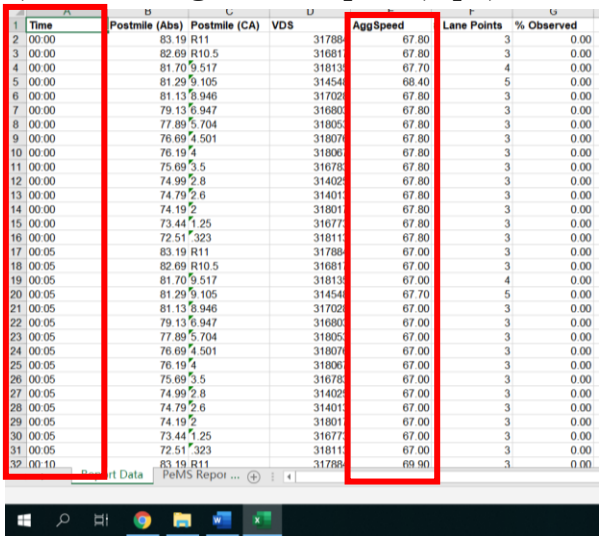
Actually, I have 4 data sets:

1) **The flow rate (vph) of 15 detectors** (resolution: 5 min)



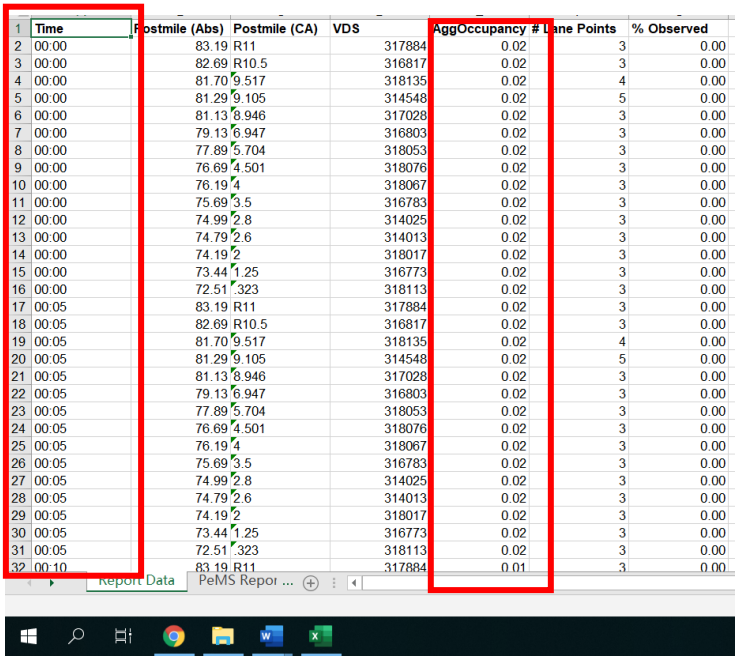
Time	Postmile (Abs)	Postmile (CA)	VDS	AggFlow	Lane Points	% Observed
00:00	83.19	R11	317884	132	3	0.00
00:00	82.69	R10.5	316817	132	3	0.00
00:00	81.70	9.517	318135	176	4	0.00
00:00	81.29	9.105	314548	220	5	0.00
00:00	81.13	8.946	317028	132	3	0.00
00:00	79.13	6.947	316803	132	3	0.00
00:00	77.89	5.704	318053	132	3	0.00
00:00	76.69	4.501	318076	132	3	0.00
00:00	76.19	4	318067	132	3	0.00
00:00	75.69	3.5	316783	132	3	0.00
00:00	74.99	2.8	314025	132	3	0.00
00:00	74.79	2.6	314013	132	3	0.00
00:00	74.19	2	318017	132	3	0.00
00:00	73.44	1.25	316773	132	3	0.00
00:00	72.51	323	318113	132	3	0.00
00:05	83.19	R11	317884	131	3	0.00
00:05	82.69	R10.5	316817	131	3	0.00
00:05	81.70	9.517	318135	174	4	0.00
00:05	81.29	9.105	314548	218	5	0.00
00:05	81.13	8.946	317028	131	3	0.00
00:05	79.13	6.947	316803	131	3	0.00
00:05	77.89	5.704	318053	131	3	0.00
00:05	76.69	4.501	318076	131	3	0.00
00:05	76.19	4	318067	131	3	0.00
00:05	75.69	3.5	316783	131	3	0.00
00:05	74.99	2.8	314025	131	3	0.00
00:05	74.79	2.6	314013	131	3	0.00
00:05	74.19	2	318017	131	3	0.00
00:05	73.44	1.25	316773	131	3	0.00
00:05	72.51	323	318113	131	3	0.00
00:10	83.19	R11	317884	59	3	0.00

2) **The average vehicle speed (mph) of 15 detectors**(resolution: 5min)



Time	Postmile (Abs)	Postmile (CA)	VDS	AggSpeed	Lane Points	% Observed
00:00	83.19	R11	317884	67.80	3	0.00
00:00	82.69	R10.5	316817	67.80	3	0.00
00:00	81.70	9.517	318135	67.70	4	0.00
00:00	81.29	9.105	314548	68.40	5	0.00
00:00	81.13	8.946	317028	67.80	3	0.00
00:00	79.13	6.947	316803	67.80	3	0.00
00:00	77.89	5.704	318053	67.80	3	0.00
00:00	76.69	4.501	318076	67.80	3	0.00
00:00	76.19	4	318067	67.80	3	0.00
00:00	75.69	3.5	316783	67.80	3	0.00
00:00	74.99	2.8	314025	67.80	3	0.00
00:00	74.79	2.6	314013	67.80	3	0.00
00:00	74.19	2	318017	67.80	3	0.00
00:00	73.44	1.25	316773	67.80	3	0.00
00:00	72.51	323	318113	67.80	3	0.00
00:05	83.19	R11	317884	67.00	3	0.00
00:05	82.69	R10.5	316817	67.00	3	0.00
00:05	81.70	9.517	318135	67.00	4	0.00
00:05	81.29	9.105	314548	67.70	5	0.00
00:05	81.13	8.946	317028	67.00	3	0.00
00:05	79.13	6.947	316803	67.00	3	0.00
00:05	77.89	5.704	318053	67.00	3	0.00
00:05	76.69	4.501	318076	67.00	3	0.00
00:05	76.19	4	318067	67.00	3	0.00
00:05	75.69	3.5	316783	67.00	3	0.00
00:05	74.99	2.8	314025	67.00	3	0.00
00:05	74.79	2.6	314013	67.00	3	0.00
00:05	74.19	2	318017	67.00	3	0.00
00:05	73.44	1.25	316773	67.00	3	0.00
00:05	72.51	323	318113	67.00	3	0.00
00:10	83.19	R11	317884	69.90	3	0.00

3) **The occupancy (%) of 15 detectors**(resolution: 5min)



	Time	Postmile (Abs)	Postmile (CA)	VDS	AggOccupancy	# Lane Points	% Observed
2	00:00	83.19	R11	317884	0.02	3	0.00
3	00:00	82.69	R10.5	316817	0.02	3	0.00
4	00:00	81.70	9.517	318135	0.02	4	0.00
5	00:00	81.29	9.105	314548	0.02	5	0.00
6	00:00	81.13	8.946	317028	0.02	3	0.00
7	00:00	79.13	6.947	316803	0.02	3	0.00
8	00:00	77.89	5.704	318053	0.02	3	0.00
9	00:00	76.69	4.501	318076	0.02	3	0.00
10	00:00	76.19	4	318067	0.02	3	0.00
11	00:00	75.69	3.5	316783	0.02	3	0.00
12	00:00	74.99	2.8	314025	0.02	3	0.00
13	00:00	74.79	2.6	314013	0.02	3	0.00
14	00:00	74.19	2	318017	0.02	3	0.00
15	00:00	73.44	1.25	316773	0.02	3	0.00
16	00:00	72.51	.323	318113	0.02	3	0.00
17	00:05	83.19	R11	317884	0.02	3	0.00
18	00:05	82.69	R10.5	316817	0.02	3	0.00
19	00:05	81.70	9.517	318135	0.02	4	0.00
20	00:05	81.29	9.105	314548	0.02	5	0.00
21	00:05	81.13	8.946	317028	0.02	3	0.00
22	00:05	79.13	6.947	316803	0.02	3	0.00
23	00:05	77.89	5.704	318053	0.02	3	0.00
24	00:05	76.69	4.501	318076	0.02	3	0.00
25	00:05	76.19	4	318067	0.02	3	0.00
26	00:05	75.69	3.5	316783	0.02	3	0.00
27	00:05	74.99	2.8	314025	0.02	3	0.00
28	00:05	74.79	2.6	314013	0.02	3	0.00
29	00:05	74.19	2	318017	0.02	3	0.00
30	00:05	73.44	1.25	316773	0.02	3	0.00
31	00:05	72.51	.323	318113	0.02	3	0.00
32	00:10	83.19	R11	317884	0.01	3	0.00

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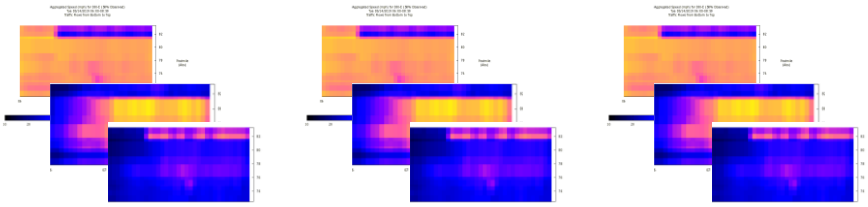
4) **Travel time (s) of selected freeway segment** (resolution: 5s, will be aggregated into 5 min).

	A	B	C	D	E
1	time	traveltime	segment	date	
2	0.001991	185	80_Richa	10/14/2018	
3	0.002535	198	80_Richa	10/14/2018	
4	0.005081	181	80_Richa	10/14/2018	
5	0.005833	177	80_Richa	10/14/2018	
6	0.006701	206	80_Richa	10/14/2018	
7	0.007778	192	80_Richa	10/14/2018	
8	0.008368	222	80_Richa	10/14/2018	
9	0.009641	189	80_Richa	10/14/2018	
10	0.012083	159	80_Richa	10/14/2018	
11	0.012292	166	80_Richa	10/14/2018	
12	0.012813	210	80_Richa	10/14/2018	
13	0.013067	183	80_Richa	10/14/2018	
14	0.015208	164	80_Richa	10/14/2018	
15	0.015984	151	80_Richa	10/14/2018	
16	0.016725	224	80_Richa	10/14/2018	
17	0.016806	226	80_Richa	10/14/2018	
18	0.016863	222	80_Richa	10/14/2018	
19	0.016875	186	80_Richa	10/14/2018	
20	0.017604	184	80_Richa	10/14/2018	
21	0.018588	170	80_Richa	10/14/2018	
22	0.019375	161	80_Richa	10/14/2018	
23	0.019421	173	80_Richa	10/14/2018	
24	0.019699	154	80_Richa	10/14/2018	
25	0.022361	198	80_Richa	10/14/2018	
26	0.022361	207	80_Richa	10/14/2018	
27	0.022604	180	80_Richa	10/14/2018	
28	0.023148	163	80_Richa	10/14/2018	
29	0.024931	175	80_Richa	10/14/2018	

Independent variables(Input of the convolutional neural network):

Three channels of pictures generated by dataset 1-3, x-axis of the pictures is the sequence of 15 detectors, y-axis of the pictures is time series, pixel value is {flow rate, speed, occupancy}

I have not decided how long the time series of data to use(may be 30min or 1 hr)



Dependent variables (Output of the convolutional neural network):

If the input images represent the spatio-temporal information of 6:00-7:00, the dependent variable (to be predicted) will be the travel of that freeway segemnt at 7:30.

Architecture of CNN: