Yang, Kun 301178299

Assignment 2 Part 2 - Accidents part of the raw data

Obs	AccidentID	Easting	Northing	Longitude	Latitude	Police	Acc_Severity	Vehicles	Casualties
1	201001BS70003	527580	177730	-0.16400	51.4841	1	3	2	1
2	201001BS70004	525340	180470	-0.19527	51.5092	1	3	1	1
3	201001BS70006	524800	180300	-0.20311	51.5078	1	3	2	1
4	201001BS70007	525080	180920	-0.19886	51.5133	1	3	2	1
5	201001BS70008	526760	177740	-0.17580	51.4844	1	3	2	1
6	201001BS70009	528020	177780	-0.15765	51.4844	1	3	2	1
7	201001BS70010	526360	177420	-0.18167	51.4816	1	3	2	1

Obs	AccidentDate	DayofWeek	AccidentTime	Auth_Dist	Auth_HW	st_RdCl	st_RdNO	Rd_Type
1	2010-01-11	2	7:30	12	E0900002	4	302	6
2	2010-01-11	2	18:35	12	E0900002	3	402	6
3	2010-01-12	3	10:22	12	E0900002	3	402	6
4	2010-01-02	7	21:21	12	E0900002	6	0	1
5	2010-01-04	2	20:35	12	E0900002	3	3217	6
6	2010-01-18	2	14:59	12	E0900002	3	3212	6
7	2010-01-03	1	8:05	12	E0900002	3	3217	6

Obs	Speed	Junc_De	Junc_Cont	nd_RdCl	nd_RdNO	Hum_Cont	Phyl_Faci	Light	Weather
1	30	3	4	6	0	0	0	1	8
2	30	3	2	3	4204	0	5	4	2
3	30	3	2	4	450	0	5	1	1
4	30	2	4	6	0	0	0	4	1
5	30	6	2	3	3220	0	0	4	1
6	30	0	-1	-1	0	0	0	1	1
7	30	6	2	3	3220	0	0	1	1

Obs	Rd_Surface	Spec_Con	Carr_Hazard	Urb_Rur	Pol_Attend	Acc_Location
1	2	0	0	1	1	E0100290
2	2	0	0	1	1	E0100288
3	1	0	0	1	1	E0100287
4	1	0	0	1	1	E0100288
5	2	0	0	1	1	E0100284
6	1	0	0	1	1	E0100290
7	1	0	0	1	1	E0100291

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Assignment 2 Part 2 - Accidents
part of the raw data

Obs	AccidentID	Easting	Northing	Longitude	Latitude	Police	Acc_Severity	Vehicles	Casualties
8	201001BS70011	523770	181000	-0.21770	51.5143	1	3	2	1
9	201001BS70012	524300	180070	-0.21039	51.5058	1	3	2	1
10	201001BS70013	526760	177740	-0.17580	51.4844	1	3	1	1

Obs	AccidentDate	DayofWeek	AccidentTime	Auth_Dist	Auth_HW	st_RdCl	st_RdNO	Rd_Type
8	2010-01-04	2	23:36	12	E0900002	6	0	6
9	2010-01-04	2	6:15	12	E0900002	3	402	6
10	2010-01-04	2	18:55	12	E0900002	3	3217	6

Obs	Speed	Junc_De	Junc_Cont	nd_RdCl	nd_RdNO	Hum_Cont	Phyl_Faci	Light	Weather
8	30	3	4	6	0	0	0	4	1
9	30	3	4	6	0	0	0	4	8
10	30	6	2	3	3220	0	5	4	1

Obs	Rd_Surface	Spec_Con	Carr_Hazard	Urb_Rur	Pol_Attend	Acc_Location
8	4	0	0	1	1	E0100288
9	4	0	0	1	1	E0100286
10	2	0	0	1	1	E0100284

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Assignment 2 Part 2 - Accidents part of the raw data

	N
Acc_Severity	
1	1731
2	20440
3	132243
All	154414

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Assignment 2 Part 2 - Accidents part of the raw data

	N
Rd_Type	
1	10419
2	3153
3	22943
6	115532
7	1663
9	704
All	154414

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Assignment 2 Part 2 - Accidents part of the raw data

	N
st_RdCl	
1	6066
2	434
3	70274
4	19755
5	13947
6	43938
All	154414

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Assignment 2 Part 2 - Accidents part of the raw data

	N
Light	
1	115281
4	29096
5	550
6	8132
7	1355
All	154414

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Assignment 2 Part 2 - Accidents part of the raw data

	N
Urb_Rur	
1	99488
2	54926
All	154414

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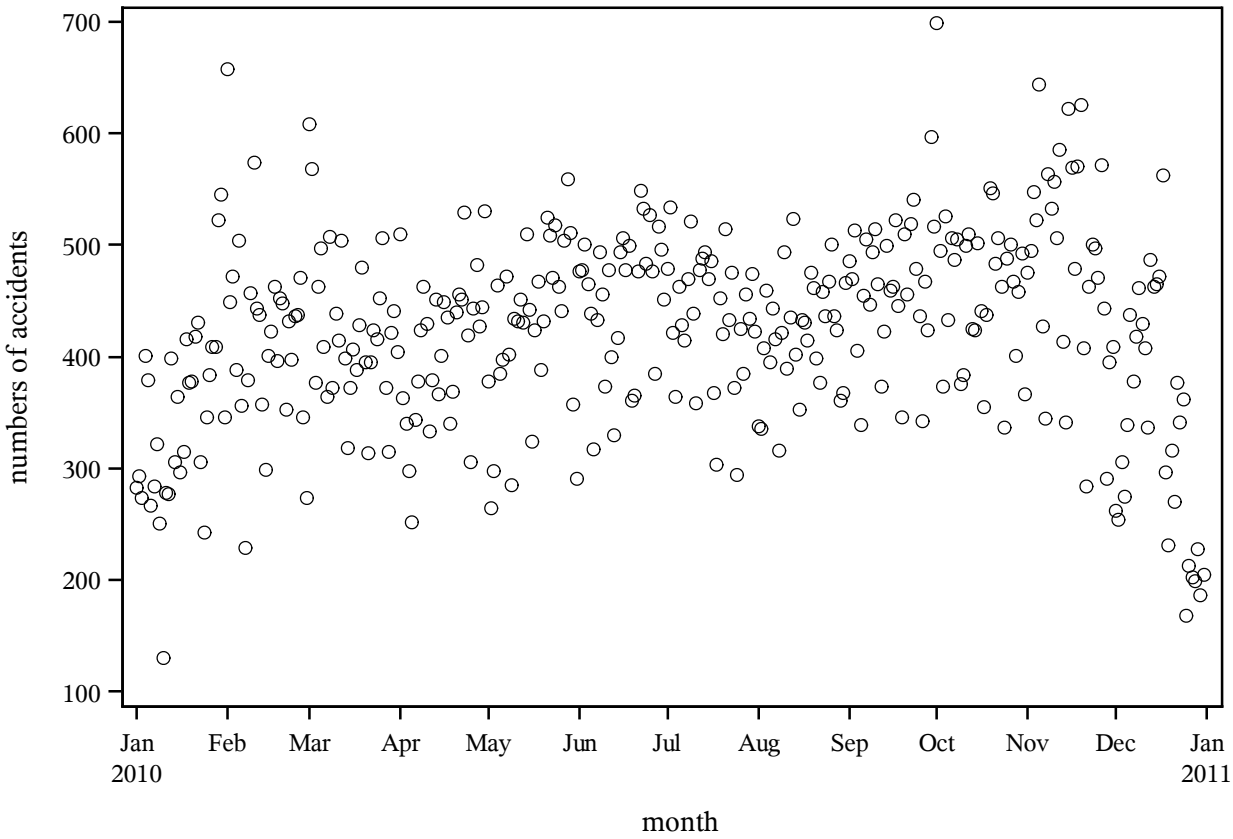
Assignment 2 Part 2 - Accidents part of the daily summary

Obs	AccidentDate	_TYPE_	_FREQ_	naccidents
1	2010-01-01	0	282	282
2	2010-01-02	0	293	293
3	2010-01-03	0	273	273
4	2010-01-04	0	401	401
5	2010-01-05	0	379	379
6	2010-01-06	0	266	266
7	2010-01-07	0	284	284
8	2010-01-08	0	322	322
9	2010-01-09	0	250	250
10	2010-01-10	0	130	130

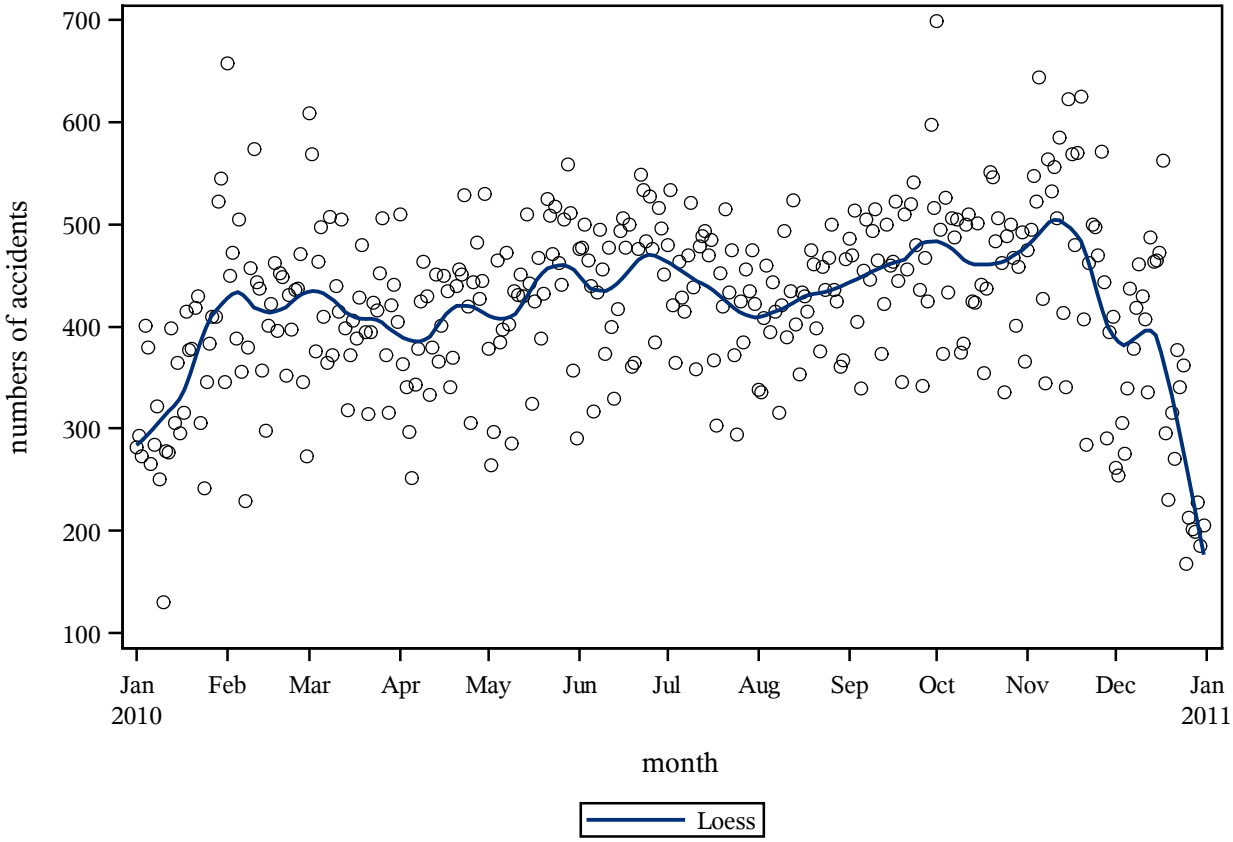
Yang, Kun 301178299 **Assignment 2 Part 2 - Accidents**

number of accidents by date



Yang, Kun 301178299 **Assignment 2 Part 2 - Accidents**

number of accidents by date WITH loess curve



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Assignment 2 Part 2 - Accidents
Extracting information from dates

Obs	AccidentDate	_TYPE_	_FREQ_	naccidents	month	day
1	2010-01-01	0	282	282	1	1
2	2010-01-02	0	293	293	1	2
3	2010-01-03	0	273	273	1	3
4	2010-01-04	0	401	401	1	4
5	2010-01-05	0	379	379	1	5
6	2010-01-06	0	266	266	1	6
7	2010-01-07	0	284	284	1	7
8	2010-01-08	0	322	322	1	8
9	2010-01-09	0	250	250	1	9
10	2010-01-10	0	130	130	1	10

Yang, Kun 301178299 ***Assignment 2 Part 2 - Accidents***

what is mean and std dev of daily accidents for each month

	Accident Date		
	N	**Mean**	**Std**
month			
1	31	343.1	84.0
2	28	418.7	84.9
3	31	424.7	68.3
4	30	408.3	68.2
5	31	426.5	76.5
6	30	454.8	60.9
7	31	436.4	58.7
8	31	420.2	50.3
9	30	463.5	60.3
10	31	465.5	72.5
11	30	484.8	95.5
12	31	333.7	106.6

Yang, Kun 301178299 ***Assignment 2 Part 2 - Accidents***

is there a difference in the mean number of accidents by month?

The GLM Procedure

Class Level Information		
Class	**Levels**	**Values**
month	12	1 2 3 4 5 6 7 8 9 10 11 12

Number of Observations Read	365
Number of Observations Used	365

Yang, Kun 301178299 ***Assignment 2 Part 2 - Accidents***

is there a difference in the mean number of accidents by month?

The GLM Procedure

Dependent Variable: naccidents Accident Date

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	708072.847	64370.259	11.29	<.0001
Error	353	2012575.164	5701.346		
Corrected Total	364	2720648.011			

R-Square	Coeff Var	Root MSE	naccidents Mean
0.260259	17.84822	75.50726	423.0521

Source	DF	Type I SS	Mean Square	F Value	Pr > F
month	11	708072.8472	64370.2588	11.29	<.0001

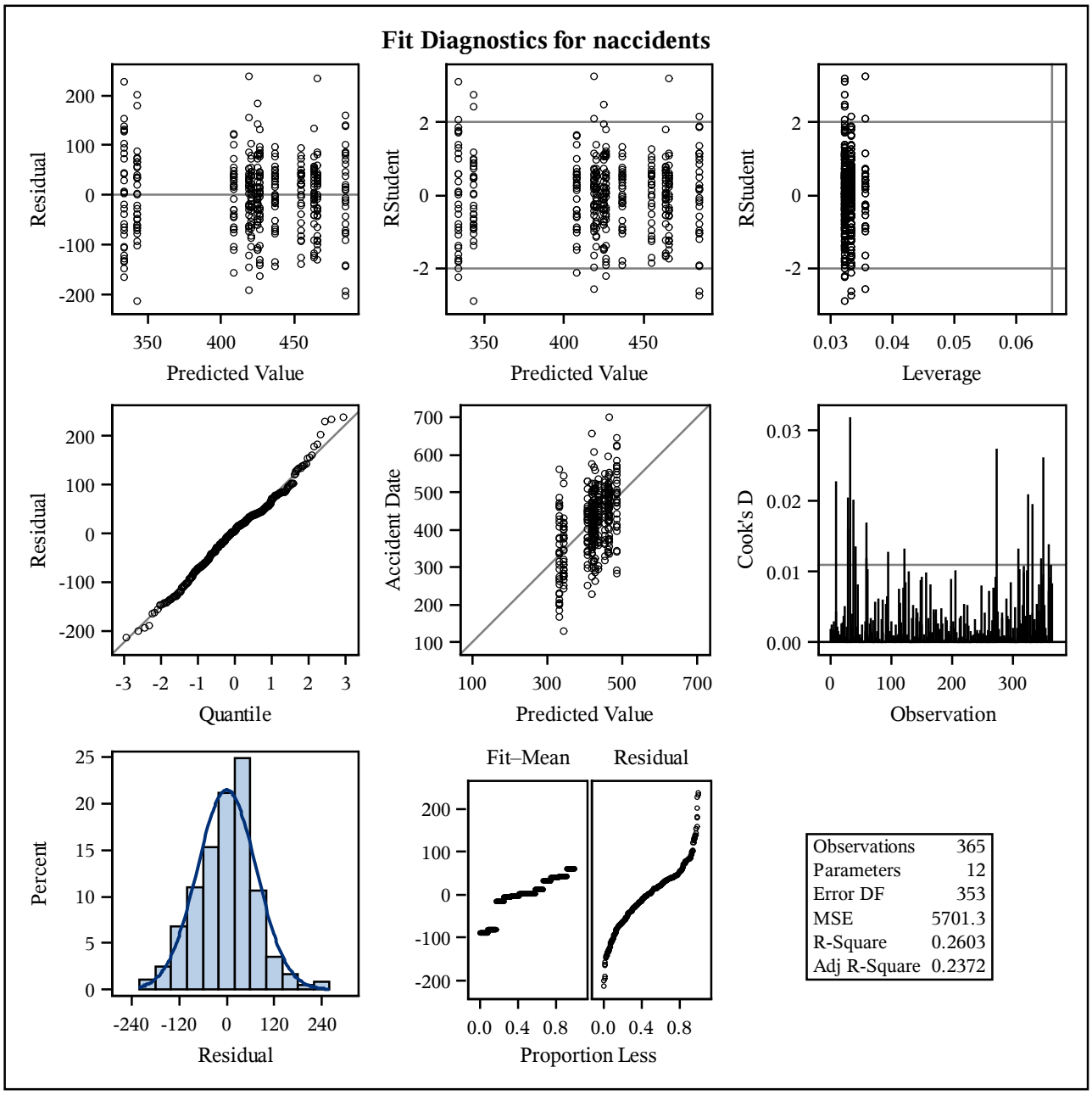
Source	DF	Type III SS	Mean Square	F Value	Pr > F
month	11	708072.8472	64370.2588	11.29	<.0001

Yang, Kun 301178299 ***Assignment 2 Part 2 - Accidents***

is there a difference in the mean number of accidents by month?

The GLM Procedure

Dependent Variable: naccidents Accident Date

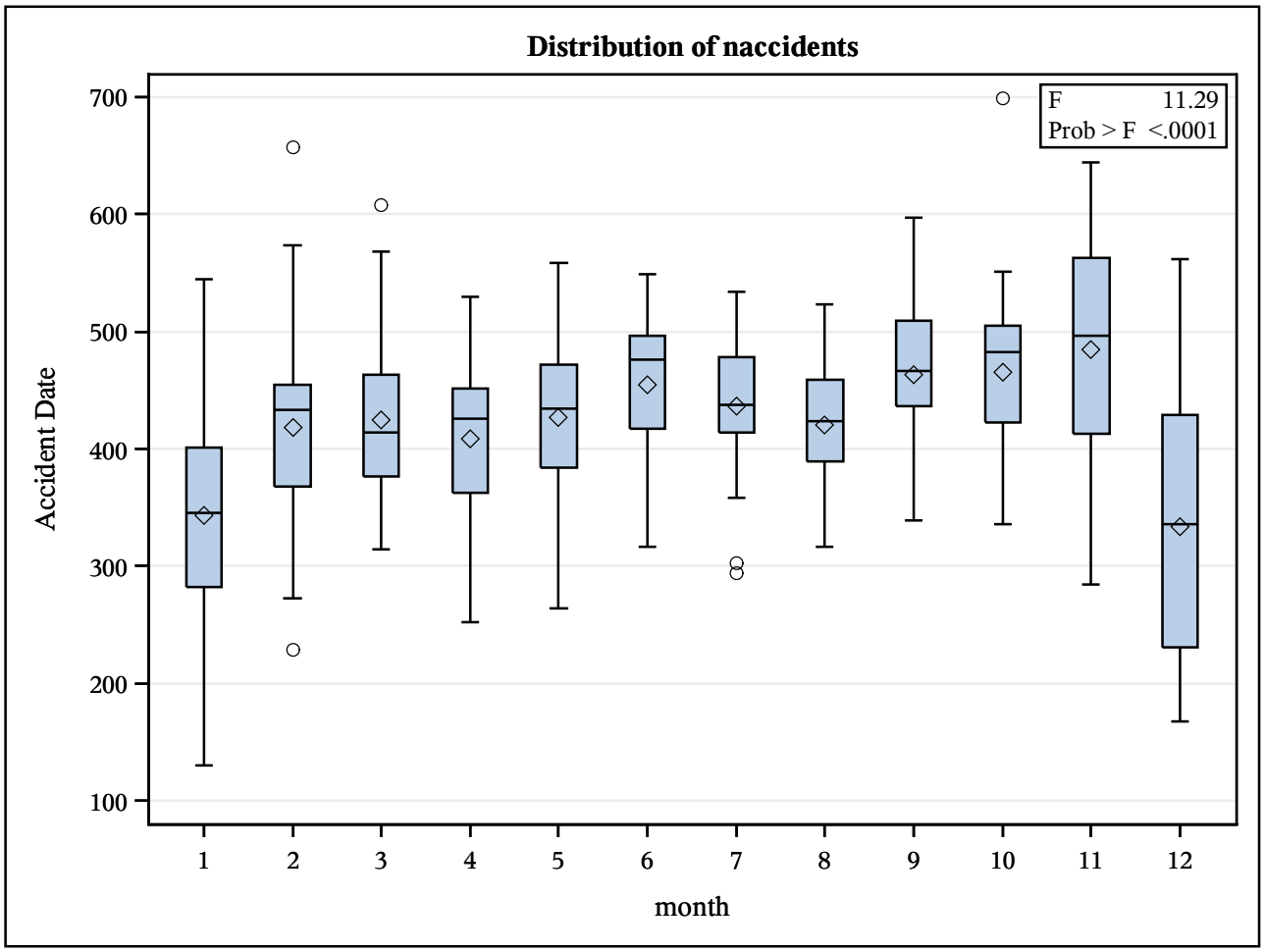


Yang, Kun 301178299 ***Assignment 2 Part 2 - Accidents***

is there a difference in the mean number of accidents by month?

The GLM Procedure

Dependent Variable: naccidents Accident Date



Yang, Kun 301178299 *Assignment 2 Part 2 - Accidents*

is there a difference in the mean number of accidents by month?

The GLM Procedure
Least Squares Means
Adjustment for Multiple Comparisons: Tukey-Kramer

month	naccidents LSMEAN	LSMEAN Number
1	343.129032	1
2	418.714286	2
3	424.677419	3
4	408.266667	4
5	426.451613	5
6	454.800000	6
7	436.354839	7
8	420.225806	8
9	463.466667	9
10	465.451613	10
11	484.800000	11
12	333.709677	12

Least Squares Means for effect month
Pr > |t| for H0: LSMean(i)=LSMean(j)

Dependent Variable: naccidents

i/j	1	2	3	4	5	6	7	8	9	10	11	12
1		0.0080	0.0016	0.0394	0.0011	<.0001	0.0001	0.0040	<.0001	<.0001	<.0001	1.0000
2	0.0080		1.0000	1.0000	1.0000	0.8068	0.9991	1.0000	0.5105	0.4265	0.0442	0.0012
3	0.0016	1.0000		0.9995	1.0000	0.9228	1.0000	1.0000	0.6892	0.6044	0.0843	0.0002
4	0.0394	1.0000	0.9995		0.9986	0.4178	0.9519	1.0000	0.1715	0.1261	0.0058	0.0075
5	0.0011	1.0000	1.0000	0.9986		0.9487	1.0000	1.0000	0.7498	0.6702	0.1079	0.0001
6	<.0001	0.8068	0.9228	0.4178	0.9487		0.9985	0.8237	1.0000	1.0000	0.9287	<.0001
7	0.0001	0.9991	1.0000	0.9519	1.0000	0.9985		0.9995	0.9626	0.9352	0.3401	<.0001
8	0.0040	1.0000	1.0000	1.0000	1.0000	0.8237	0.9995		0.5246	0.4376	0.0431	0.0005
9	<.0001	0.5105	0.6892	0.1715	0.7498	1.0000	0.9626	0.5246		1.0000	0.9948	<.0001
10	<.0001	0.4265	0.6044	0.1261	0.6702	1.0000	0.9352	0.4376	1.0000		0.9976	<.0001
11	<.0001	0.0442	0.0843	0.0058	0.1079	0.9287	0.3401	0.0431	0.9948	0.9976		<.0001
12	1.0000	0.0012	0.0002	0.0075	0.0001	<.0001	<.0001	0.0005	<.0001	<.0001	<.0001	

Yang, Kun 301178299 ***Assignment 2 Part 2 - Accidents***

is there a difference in the mean number of accidents by month?

The GLM Procedure
Least Squares Means

month	naccidents LSMEAN	95% Confidence Limits	
1	343.129032	316.457527	369.800537
2	418.714286	390.650300	446.778271
3	424.677419	398.005914	451.348924
4	408.266667	381.154281	435.379053
5	426.451613	399.780108	453.123118
6	454.800000	427.687614	481.912386
7	436.354839	409.683334	463.026344
8	420.225806	393.554302	446.897311
9	463.466667	436.354281	490.579053
10	465.451613	438.780108	492.123118
11	484.800000	457.687614	511.912386
12	333.709677	307.038173	360.381182

Least Squares Means for Effect month				
i	j	Difference Between Means	Simultaneous 95% Confidence Limits for LSMean(i)-LSMean(j)	
1	2	-75.585253	-140.355570	-10.814937
1	3	-81.548387	-144.650518	-18.446256
1	4	-65.137634	-128.763444	-1.511825
1	5	-83.322581	-146.424712	-20.220450
1	6	-111.670968	-175.296777	-48.045159
1	7	-93.225806	-156.327938	-30.123675
1	8	-77.096774	-140.198905	-13.994643
1	9	-120.337634	-183.963444	-56.711825
1	10	-122.322581	-185.424712	-59.220450
1	11	-141.670968	-205.296777	-78.045159
1	12	9.419355	-53.682776	72.521486
2	3	-5.963134	-70.733450	58.807183
2	4	10.447619	-54.832995	75.728233
2	5	-7.737327	-72.507644	57.032989

Yang, Kun 301178299 *Assignment 2 Part 2 - Accidents*

is there a difference in the mean number of accidents by month?

The GLM Procedure
Least Squares Means
Adjustment for Multiple Comparisons: Tukey-Kramer

Least Squares Means for Effect month				
i	j	Difference Between Means	Simultaneous 95% Confidence Limits for LSMean(i)-LSMean(j)	
2	6	-36.085714	-101.366328	29.194900
2	7	-17.640553	-82.410869	47.129763
2	8	-1.511521	-66.281837	63.258796
2	9	-44.752381	-110.032995	20.528233
2	10	-46.737327	-111.507644	18.032989
2	11	-66.085714	-131.366328	-0.805100
2	12	85.004608	20.234292	149.774925
3	4	16.410753	-47.215056	80.036562
3	5	-1.774194	-64.876325	61.327938
3	6	-30.122581	-93.748390	33.503229
3	7	-11.677419	-74.779550	51.424712
3	8	4.451613	-58.650518	67.553744
3	9	-38.789247	-102.415056	24.836562
3	10	-40.774194	-103.876325	22.327938
3	11	-60.122581	-123.748390	3.503229
3	12	90.967742	27.865611	154.069873
4	5	-18.184946	-81.810755	45.440863
4	6	-46.533333	-110.678545	17.611879
4	7	-28.088172	-91.713981	35.537637
4	8	-11.959140	-75.584949	51.666669
4	9	-55.200000	-119.345212	8.945212
4	10	-57.184946	-120.810755	6.440863
4	11	-76.533333	-140.678545	-12.388121
4	12	74.556989	10.931180	138.182798
5	6	-28.348387	-91.974196	35.277422
5	7	-9.903226	-73.005357	53.198905
5	8	6.225806	-56.876325	69.327938
5	9	-37.015054	-100.640863	26.610755

Yang, Kun 301178299 ***Assignment 2 Part 2 - Accidents***

is there a difference in the mean number of accidents by month?

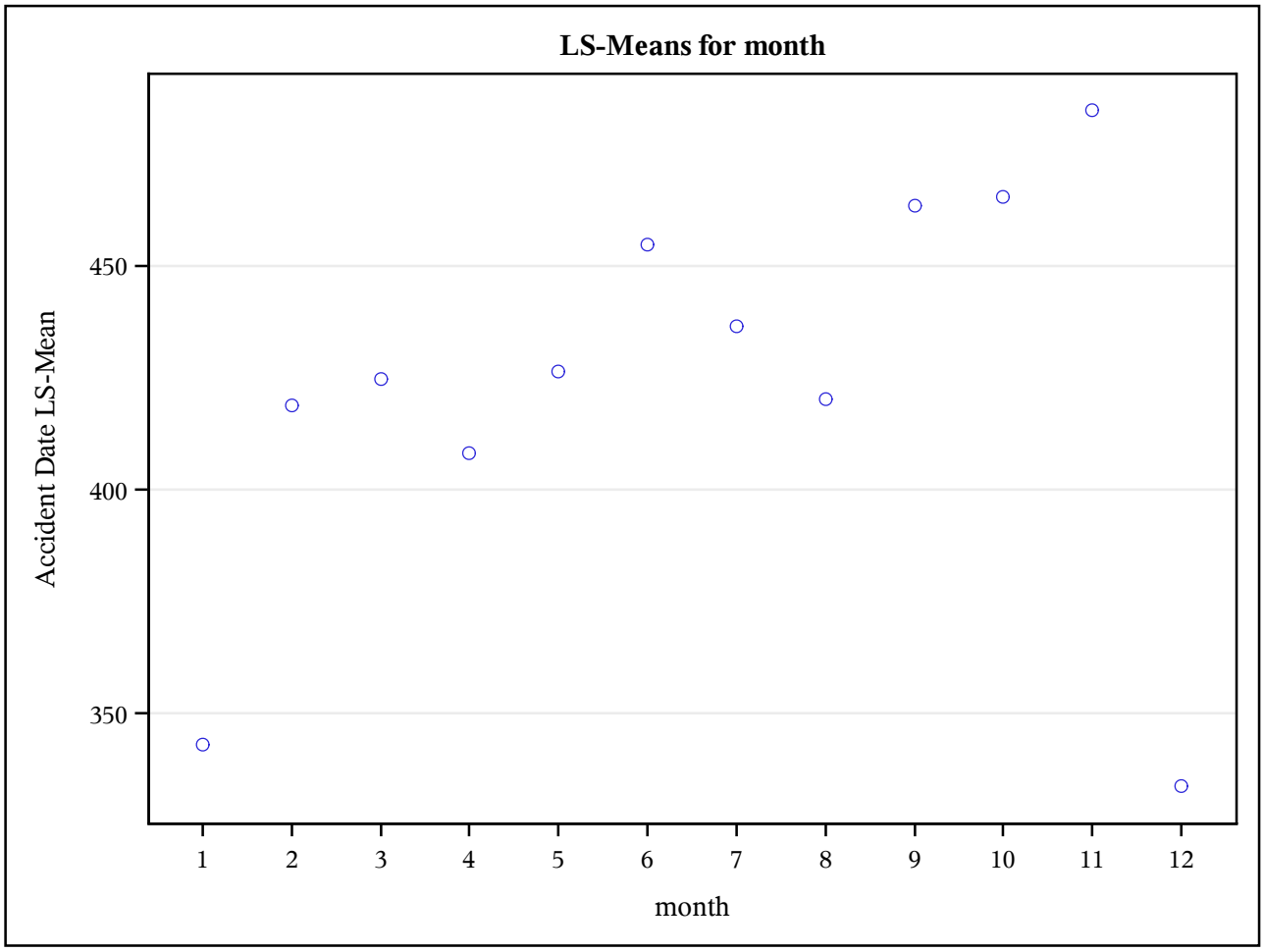
The GLM Procedure
Least Squares Means
Adjustment for Multiple Comparisons: Tukey-Kramer

Least Squares Means for Effect month				
i	j	Difference Between Means	Simultaneous 95% Confidence Limits for LSMean(i)-LSMean(j)	
5	10	-39.000000	-102.102131	24.102131
5	11	-58.348387	-121.974196	5.277422
5	12	92.741935	29.639804	155.844067
6	7	18.445161	-45.180648	82.070970
6	8	34.574194	-29.051616	98.200003
6	9	-8.666667	-72.811879	55.478545
6	10	-10.651613	-74.277422	52.974196
6	11	-30.000000	-94.145212	34.145212
6	12	121.090323	57.464513	184.716132
7	8	16.129032	-46.973099	79.231163
7	9	-27.111828	-90.737637	36.513981
7	10	-29.096774	-92.198905	34.005357
7	11	-48.445161	-112.070970	15.180648
7	12	102.645161	39.543030	165.747292
8	9	-43.240860	-106.866669	20.384949
8	10	-45.225806	-108.327938	17.876325
8	11	-64.574194	-128.200003	-0.948384
8	12	86.516129	23.413998	149.618260
9	10	-1.984946	-65.610755	61.640863
9	11	-21.333333	-85.478545	42.811879
9	12	129.756989	66.131180	193.382798
10	11	-19.348387	-82.974196	44.277422
10	12	131.741935	68.639804	194.844067
11	12	151.090323	87.464513	214.716132

Yang, Kun 301178299 ***Assignment 2 Part 2 - Accidents***

is there a difference in the mean number of accidents by month?

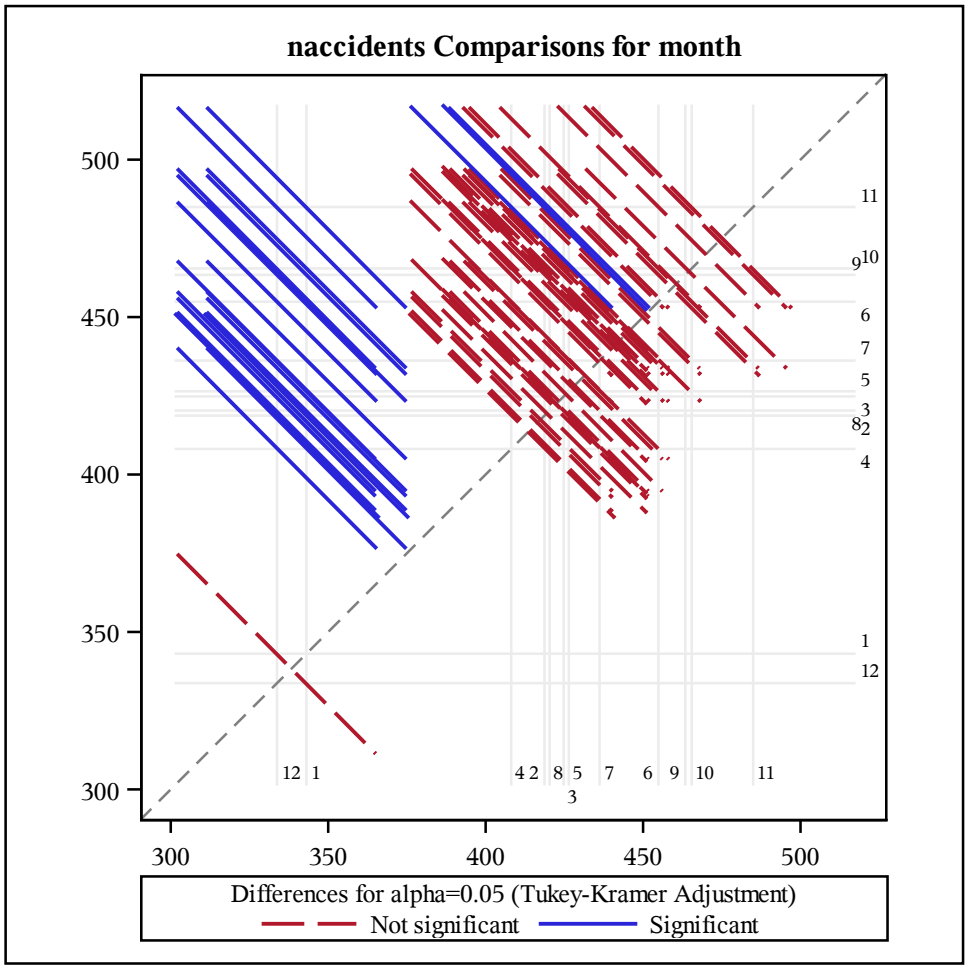
The GLM Procedure
Least Squares Means
Adjustment for Multiple Comparisons: Tukey-Kramer



Yang, Kun 301178299 *Assignment 2 Part 2 - Accidents*

is there a difference in the mean number of accidents by month?

The GLM Procedure
Least Squares Means
Adjustment for Multiple Comparisons: Tukey-Kramer



Tukey-Kramer Comparison Lines for Least Squares Means of month				
LS-means with the same letter are not significantly different.				
		naccidents LSMEAN	month	LSMEAN Number
	A	484.800	**11**	11
	A			
B	A	465.452	**10**	10
B	A			
B	A	463.467	**9**	9
B	A			
B	A	454.800	**6**	6
B	A			
B	A	436.355	**7**	7

Yang, Kun 301178299 ***Assignment 2 Part 2 - Accidents***

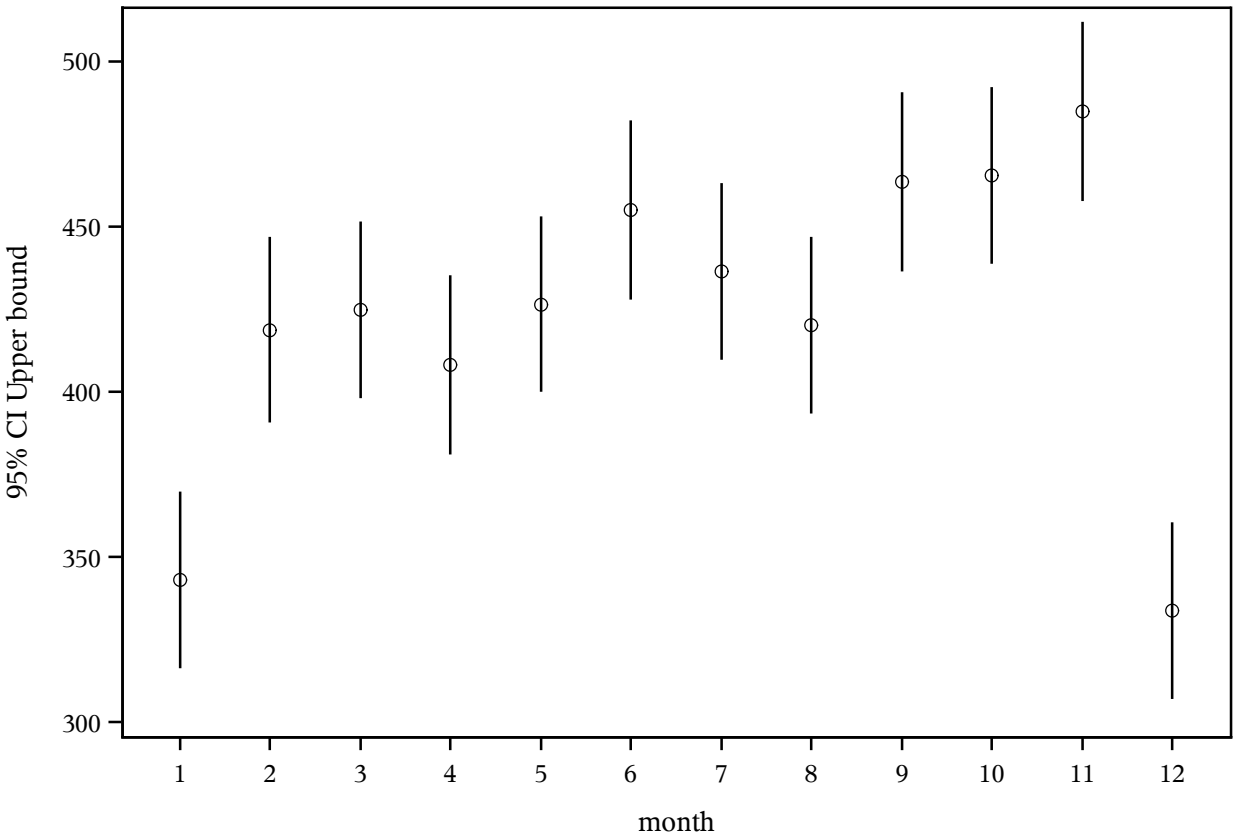
is there a difference in the mean number of accidents by month?

The GLM Procedure
Least Squares Means
Adjustment for Multiple Comparisons: Tukey-Kramer

Tukey-Kramer Comparison Lines for Least Squares Means of month				
LS-means with the same letter are not significantly different.				
		naccidents LSMEAN	month	LSMEAN Number
B	A			
B	A	426.452	**5**	5
B	A			
B	A	424.677	**3**	3
B				
B		420.226	**8**	8
B				
B		418.714	**2**	2
B				
B		408.267	**4**	4
	C	343.129	**1**	1
	C			
	C	333.710	**12**	12

Yang, Kun 301178299 **Assignment 2 Part 2 - Accidents**

Estimated mean number of accidents by month along with 95% CI



Yang, Kun 301178299

Assignment 2 Part 2 - Accidents
Extracting information from time

Obs	AccidentID	Easting	Northing	Longitude	Latitude	Police	Acc_Severity	Vehicles	Casualties
1	201001CP00005	532760	180720	-0.08832	51.5098	48	3	2	5
2	201001CP00006	532770	180320	-0.08833	51.5062	1	3	1	1
3	201001CW10009	524850	181810	-0.20186	51.5214	1	3	1	1
4	201001CW10435	528040	181040	-0.15618	51.5137	1	3	1	1
5	201001CW10439	526630	184330	-0.17531	51.5436	1	2	1	1
6	201001CW10440	525780	181640	-0.18852	51.5196	1	3	1	1
7	201001CW10755	525480	183530	-0.19217	51.5367	1	3	3	1

Obs	AccidentDate	DayofWeek	AccidentTime	Auth_Dist	Auth_HW	st_RdCl	st_RdNO	Rd_Type
1	2010-01-01	6	2:51	570	E0900000	3	3211	3
2	2010-01-01	6	3:36	8	E0900002	3	3	3
3	2010-01-01	6	4:10	12	E0900002	3	40	3
4	2010-01-01	6	13:40	1	E0900003	3	40	6
5	2010-01-01	6	1:00	2	E0900000	3	41	3
6	2010-01-01	6	4:26	1	E0900003	3	404	3
7	2010-01-01	6	20:35	2	E0900000	3	5	6

Obs	Speed	Junc_De	Junc_Cont	nd_RdCl	nd_RdNO	Hum_Cont	Phyl_Faci	Light	Weather
1	30	6	2	5	0	0	5	4	1
2	30	3	2	3	200	0	0	4	3
3	50	0	-1	-1	0	0	0	6	2
4	30	6	2	3	41	0	5	1	1
5	30	6	2	3	41	0	5	4	1
6	50	0	-1	-1	0	0	0	4	1
7	30	3	2	5	0	0	5	4	1

Obs	Rd_Surface	Spec_Con	Carr_Hazard	Urb_Rur	Pol_Attend	Acc_Location	hour	minute
1	2	0	0	1	1	E0100000	2	51
2	2	0	0	1	1	E0100402	3	36
3	2	0	0	1	1	E0100285	4	10
4	1	0	0	1	1	E0100465	13	40
5	4	0	0	1	1	E0100096	1	0
6	1	0	0	1	1	E0100475	4	26
7	1	0	0	1	1	E0100055	20	35

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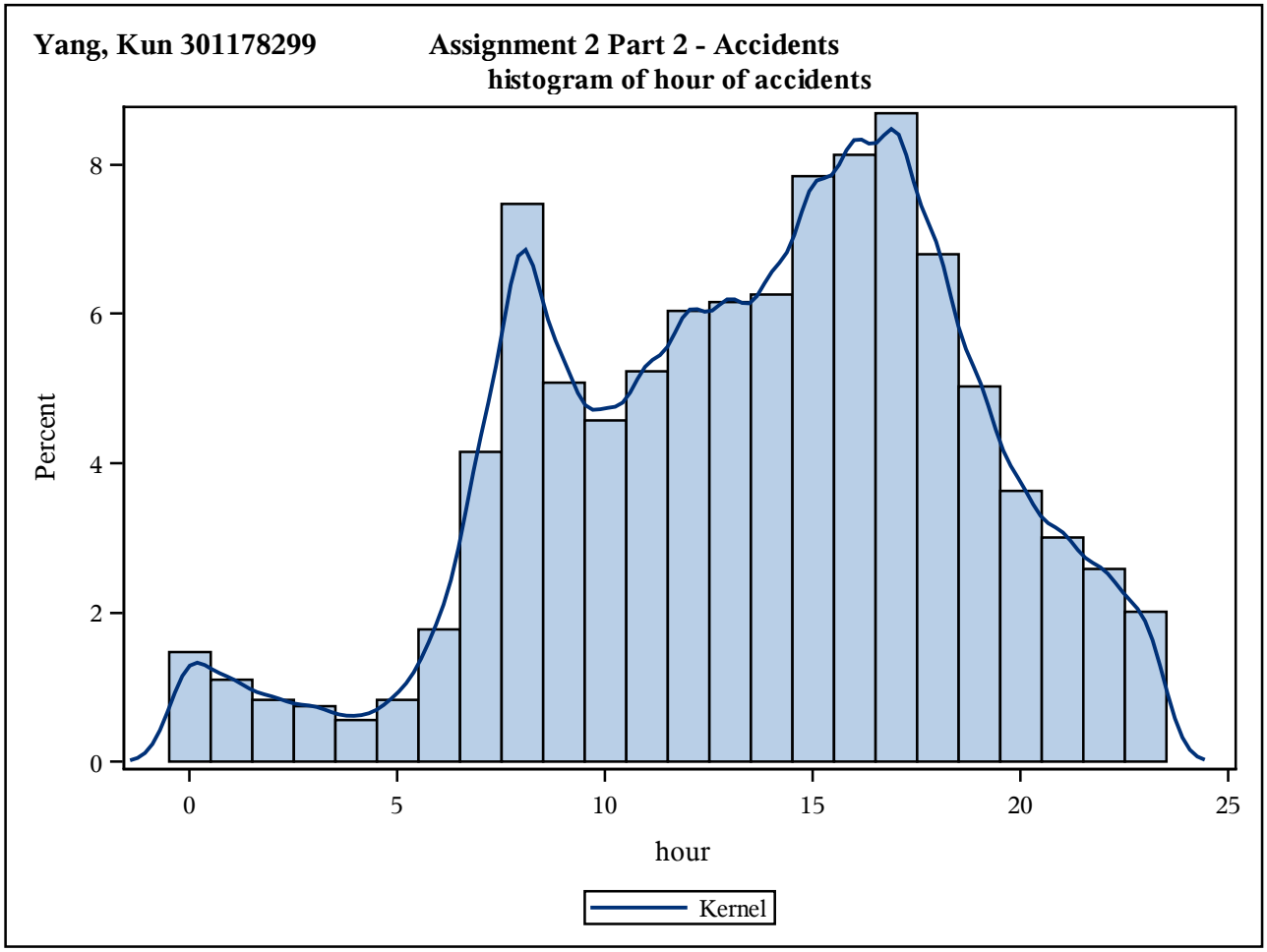
Assignment 2 Part 2 - Accidents
Extracting information from time

Obs	AccidentID	Easting	Northing	Longitude	Latitude	Police	Acc_Severity	Vehicles	Casualties
8	201001EO40106	530720	187420	-0.11521	51.5705	1	3	1	1
9	201001EO40109	531580	184770	-0.10380	51.5464	1	3	2	1
10	201001HT20001	537820	183060	-0.01454	51.5296	1	3	3	1

Obs	AccidentDate	DayofWeek	AccidentTime	Auth_Dist	Auth_HW	st_RdCl	st_RdNO	Rd_Type
8	2010-01-01	6	7:30	3	E0900001	5	0	6
9	2010-01-01	6	21:00	3	E0900001	3	1	6
10	2010-01-01	6	14:00	5	E0900003	3	12	7

Obs	Speed	Junc_De	Junc_Cont	nd_RdCl	nd_RdNO	Hum_Cont	Phyl_Faci	Light	Weather
8	30	6	2	5	0	0	5	4	1
9	30	0	-1	-1	0	0	4	4	1
10	50	1	2	3	11	0	0	1	1

Obs	Rd_Surface	Spec_Con	Carr_Hazard	Urb_Rur	Pol_Attend	Acc_Location	hour	minute
8	2	0	0	1	1	E0100280	7	30
9	1	0	0	1	1	E0100279	21	0
10	1	0	0	1	1	E0100422	14	0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Assignment 2 Part 2 - Accidents
histogram of hour of accidents
Percent
0
2
4
6
8
0
5
10
15
20
25
hour
Kernel