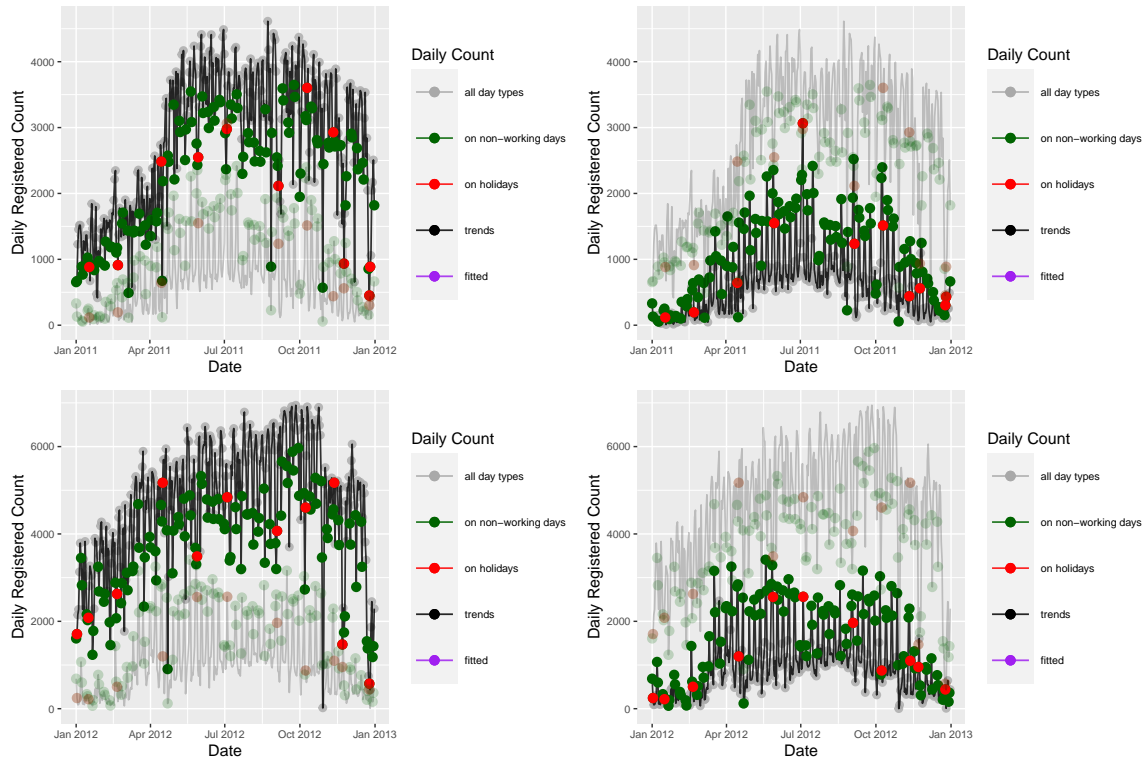# Lab Report: Bike-Sharing Data Analysis
MA 575 Fall 2021 - C3 Team #2

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12/01/2021

0.1 Modeling

- for casual counts: adding temp^2 makes the prediction even more unstable.
- for registered counts: adding temp^2 seems necessary.

```
evaluate_model <- function(cas, reg){
  get_mod_eval(cas, reg, data2011AUG, data2012AUG %>% filter(dteday != '2012-10-29'), scale_2012 = FALS
}
```

0.1.0.1 Modeling Using the Preceeding Weekly Average

name	rmse	normalized_rmse	percentage_error
2011 casual	457.5682	0.8222259	99.03969
2011 registered	716.0203	0.6837027	29.45603

name	rmse	normalized_rmse	percentage_error
2011 total	817.8157	0.6010197	27.81553
2012 casual	647.6210	0.8537184	79.46242
2012 registered	1155.3897	0.8332747	29.31823
2012 total	1294.6840	0.7443015	26.75234

name	rmse	normalized_rmse	percentage_error
2011 casual	455.3139	0.8181750	99.44776
2011 registered	672.9962	0.6426204	27.65543
2011 total	778.7264	0.5722927	26.11079
2012 casual	647.0135	0.8529174	81.14202
2012 registered	1387.4319	1.0006251	30.05216
2012 total	1511.7311	0.8690798	27.61778

name	rmse	normalized_rmse	percentage_error
2011 casual	287.6932	0.5169695	88.20683
2011 registered	444.0517	0.4240093	17.74977
2011 total	578.9634	0.4254852	18.92911
2012 casual	486.6250	0.6414873	54.26296
2012 registered	1391.5723	1.0036111	29.05157
2012 total	1661.7157	0.9553045	27.76976

name	rmse	normalized_rmse	percentage_error
2011 casual	258.6509	0.4647821	45.23014
2011 registered	403.9041	0.3856738	15.69499
2011 total	528.6216	0.3884885	16.23646
2012 casual	469.5755	0.6190120	33.94549
2012 registered	1497.1708	1.0797694	30.73861
2012 total	1785.7643	1.0266189	29.56530

name	rmse	normalized_rmse	percentage_error
2011 casual	258.6509	0.4647821	45.23014
2011 registered	403.9041	0.3856738	15.69499
2011 total	528.6216	0.3884885	16.23646
2012 casual	469.5755	0.6190120	33.94549

name	rmse	normalized_rmse	percentage_error
2012 registered	1497.1708	1.0797694	30.73861
2012 total	1785.7643	1.0266189	29.56530

name	rmse	normalized_rmse	percentage_error
2011 casual	236.2231	0.4244805	42.02772
2011 registered	403.9041	0.3856738	15.69499
2011 total	519.0702	0.3814691	15.97992
2012 casual	459.8283	0.6061629	35.30111
2012 registered	1497.1708	1.0797694	30.73861
2012 total	1781.7745	1.0243252	29.57437

name	rmse	normalized_rmse	percentage_error
2011 casual	457.4453	0.8220051	98.97551
2011 registered	715.9621	0.6836471	29.46174
2011 total	817.8203	0.6010232	27.81750
2012 casual	649.1297	0.8557071	79.64330
2012 registered	1154.3345	0.8325137	29.28940
2012 total	1294.9247	0.7444399	26.75713

name	rmse	normalized_rmse	percentage_error
2011 casual	455.1920	0.8179559	99.40886
2011 registered	672.8137	0.6424462	27.63062
2011 total	778.6894	0.5722655	26.10763
2012 casual	648.5272	0.8549129	81.39632
2012 registered	1386.6554	1.0000650	30.02120
2012 total	1511.3041	0.8688344	27.61891

name	rmse	normalized_rmse	percentage_error
2011 casual	287.5244	0.5166661	88.34049
2011 registered	442.8141	0.4228276	17.62768
2011 total	577.4356	0.4243624	18.82217
2012 casual	484.9598	0.6392922	54.10662
2012 registered	1393.8366	1.0052441	29.08099
2012 total	1661.8132	0.9553606	27.84260

name	rmse	normalized_rmse	percentage_error

name	rmse	normalized_rmse	percentage_error
2011 casual	258.4743	0.4644646	45.72181
2011 registered	402.2458	0.3840904	15.46409
2011 total	526.6929	0.3870711	16.06389
2012 casual	468.2756	0.6172984	33.59881
2012 registered	1504.8253	1.0852899	30.89856
2012 total	1791.7469	1.0300582	29.68021

name	rmse	normalized_rmse	percentage_error
2011 casual	235.8264	0.4237676	42.24450
2011 registered	402.2458	0.3840904	15.46409
2011 total	516.9149	0.3798852	15.81826
2012 casual	458.4563	0.6043542	35.15260
2012 registered	1504.8253	1.0852899	30.89856
2012 total	1788.5403	1.0282148	29.70485

name	rmse	normalized_rmse	percentage_error
2011 casual	287.5244	0.5166661	88.34049
2011 registered	402.2458	0.3840904	15.46409
2011 total	541.3706	0.3978579	17.47774
2012 casual	484.9598	0.6392922	54.10662
2012 registered	1504.8253	1.0852899	30.89856
2012 total	1767.2934	1.0160002	29.71109

```r
evaluate_tot_model <- function(tot, train_data = data2011, test_data = data2012, scale_2012 = TRUE){
  get_mod_eval_tot(tot, train_data, test_data %>% filter(dteday != '2012-10-29'), scale_2012 = scale_20
}
```

0.1.0.2 Modeling the Total Count

name	rmse	normalized_rmse	percentage_error
2011 total	717.9335	0.5207119	25.83215
2012 total	1069.7097	0.6053699	20.61370

name	rmse	normalized_rmse	percentage_error
2011 total	609.5414	0.4420959	20.02263
2012 total	984.4218	0.5571038	18.16068

name	rmse	normalized_rmse	percentage_error
2011 total	608.0809	0.4410366	19.94314
2012 total	1007.9807	0.5704363	17.66413

name	rmse	normalized_rmse	percentage_error
2011 total	544.4919	0.3949160	17.20829
2012 total	977.2584	0.5530499	17.13115

name	rmse	normalized_rmse	percentage_error
2011 total	514.5572	0.3732046	15.78358
2012 total	971.4367	0.5497553	17.47153

name	rmse	normalized_rmse	percentage_error
2011 total	510.8249	0.3704976	15.69366
2012 total	967.3904	0.5474654	17.42322

name	rmse	normalized_rmse	percentage_error
2011 total	510.8249	0.3704976	15.69366
2012 total	967.3904	0.5474654	17.42322

```r
evaluate_tot_model_v2 <- function(tot){
  evaluate_tot_model(tot, train_data = data2011AUG, test_data = data2012AUG, scale_2012 = FALSE)
}
```

0.1.0.2.1 With the weekly average:

name	rmse	normalized_rmse	percentage_error
2011 total	601.1491	0.4417896	19.79547
2012 total	1316.1231	0.7566266	22.45650

name	rmse	normalized_rmse	percentage_error
2011 total	573.2182	0.4212630	18.61261
2012 total	1579.4299	0.9079992	26.39077

name	rmse	normalized_rmse	percentage_error
2011 total	573.6831	0.4216046	18.56946
2012 total	1606.5239	0.9235753	27.20046

name	rmse	normalized_rmse	percentage_error
2011 total	527.5401	0.3876938	16.71148
2012 total	1745.6728	1.0035707	29.16381

name	rmse	normalized_rmse	percentage_error
2011 total	492.2638	0.3617689	15.17779
2012 total	1679.2098	0.9653618	28.95848

name	rmse	normalized_rmse	percentage_error
2011 total	486.8668	0.3578026	14.86958
2012 total	1666.1678	0.9578640	28.71218

0.1.0.2.2 With the weekly average and weekday:

name	rmse	normalized_rmse	percentage_error
2011 total	599.9244	0.4408896	19.73477
2012 total	1313.4949	0.7551157	22.47386

name	rmse	normalized_rmse	percentage_error
2011 total	572.2053	0.4205185	18.52513
2012 total	1581.3961	0.9091296	26.47519

name	rmse	normalized_rmse	percentage_error
2011 total	571.8643	0.4202680	18.47733
2012 total	1609.9200	0.9255277	27.30479

name	rmse	normalized_rmse	percentage_error
2011 total	525.5108	0.3862024	16.52021
2012 total	1755.4139	1.0091708	29.36890

name	rmse	normalized_rmse	percentage_error
2011 total	489.6042	0.3598143	14.97415
2012 total	1688.1652	0.9705101	29.12476

name	rmse	normalized_rmse	percentage_error
2011 total	484.8675	0.3563333	14.74384
2012 total	1674.6356	0.9627321	28.86568

0.1.0.3 Model Evals

name	rmse	normalized_rmse	percentage_error
2011 casual	300.0109	0.5393269	86.92996
2011 registered	584.5480	0.5514030	25.37314
2011 total	717.9335	0.5207119	25.83215
2012 casual	552.9404	0.7293218	60.29892
2012 registered	1938.3759	1.3785968	38.25394
2012 total	2292.3830	1.2973050	36.62353

name	rmse	normalized_rmse	percentage_error
2011 casual	294.0014	0.5285237	89.21123
2011 registered	467.3447	0.4408453	18.53863
2011 total	612.5973	0.4443124	20.20486
2012 casual	546.7586	0.7211682	59.97342
2012 registered	1929.3420	1.3721717	40.13517
2012 total	2287.0332	1.2942774	38.19389

name	rmse	normalized_rmse	percentage_error
2011 casual	264.2716	0.4750787	47.91001
2011 registered	467.8077	0.4412820	18.70630
2011 total	611.9905	0.4438723	19.40841
2012 casual	533.6604	0.7038918	39.92755

name	rmse	normalized_rmse	percentage_error
2012 registered	1928.1222	1.3713042	39.86740
2012 total	2307.1100	1.3056393	38.02116

name	rmse	normalized_rmse	percentage_error
2011 casual	263.5617	0.4738025	49.58510
2011 registered	469.3439	0.4427311	18.82047
2011 total	613.8773	0.4452407	19.74940
2012 casual	527.2497	0.6954361	38.09228
2012 registered	1928.2642	1.3714052	39.98486
2012 total	2301.4125	1.3024150	38.03126

name	rmse	normalized_rmse	percentage_error
2011 casual	262.3837	0.4716848	48.61389
2011 registered	422.6962	0.3987285	16.03281
2011 total	555.5568	0.4029413	17.03503
2012 casual	524.0291	0.6911881	37.88552
2012 registered	1935.5791	1.3766077	40.01017
2012 total	2300.0562	1.3016475	37.98557

name	rmse	normalized_rmse	percentage_error
2011 casual	257.7595	0.4633720	48.58100
2011 registered	425.4504	0.4013265	16.14189
2011 total	555.1608	0.4026541	17.07726
2012 casual	524.5566	0.6918839	44.33524
2012 registered	1935.8178	1.3767774	40.21089
2012 total	2301.9973	1.3027459	38.31648

name	rmse	normalized_rmse	percentage_error
2011 casual	238.0079	0.4278646	42.57321
2011 registered	417.4867	0.3938144	15.95029
2011 total	539.1466	0.3910391	16.71588
2012 casual	506.0175	0.6674311	39.35652
2012 registered	1935.6453	1.3766547	40.02335
2012 total	2286.7760	1.2941319	38.16804

name	rmse	normalized_rmse	percentage_error

name	rmse	normalized_rmse	percentage_error
2011 casual	262.3837	0.4716848	48.61389
2011 registered	417.4867	0.3938144	15.95029
2011 total	549.3818	0.3984626	16.86622
2012 casual	524.0291	0.6911881	37.88552
2012 registered	1935.6453	1.3766547	40.02335
2012 total	2299.5893	1.3013832	37.97317

name	rmse	normalized_rmse	percentage_error
2011 casual	238.0117	0.4278715	42.59560
2011 registered	417.4883	0.3938159	15.95184
2011 total	539.1133	0.3910150	16.71648
2012 casual	505.8015	0.6671463	39.32371
2012 registered	1935.1686	1.3763157	40.01835
2012 total	2285.8266	1.2935946	38.15818