

Modeling Frequency of Terrorist Attacks

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From the

$(p, d, q) \times (P, D, Q)_s$	AIC	AICc	BIC	MSE
$(0, 1, 1)$	5.248	5.252	4.265	13212.18
$(0, 1, 1) \times (1, 0, 1)_4$	5.237	5.241	4.270	13451.05
$(0, 1, 1) \times (1, 1, 1)_4$	5.249	5.254	4.274	13325.71
$(0, 1, 1) \times (1, 1, 2)_4$	5.242	5.246	4.275	13728.1
$(1, 1, 2)$	5.256	5.260	4.288	13237.34
$(1, 1, 2) \times (1, 0, 1)_4$	5.243	5.247	4.292	13785.23
$(1, 1, 2) \times (1, 1, 1)_4$	5.252	5.257	4.294	14144.5
$(1, 1, 2) \times (1, 1, 2)_4$	5.250	5.254	4.299	13826.03

Tab. 1: The metrics associated with different SARIMA models denoted by the left hand column.

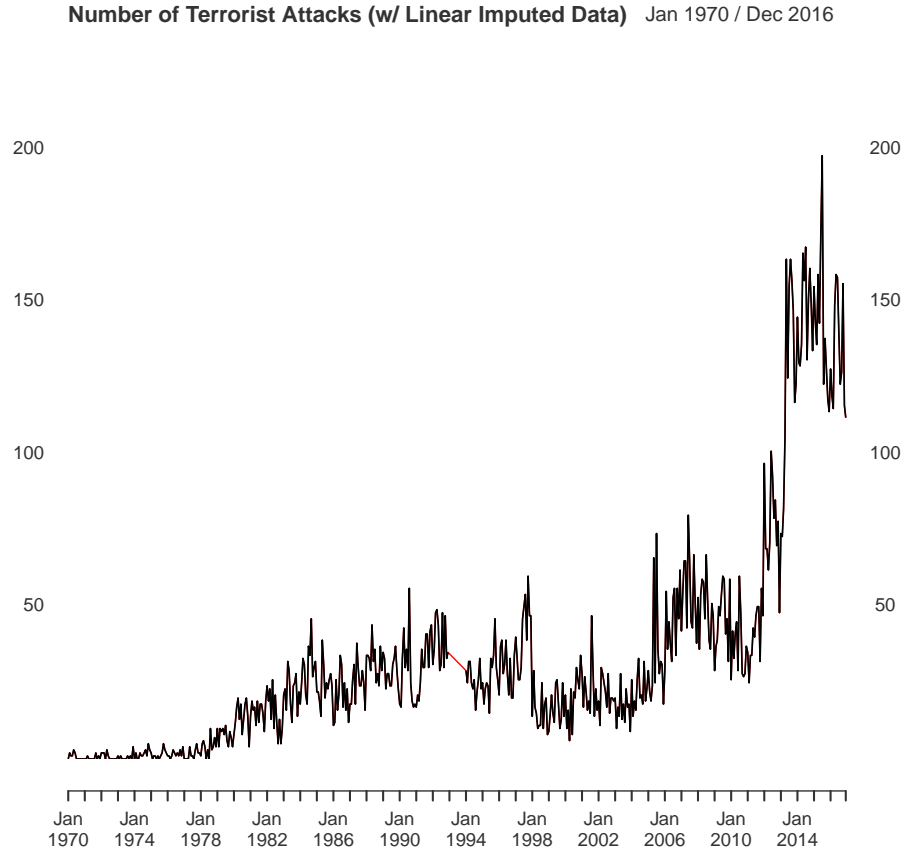


Fig. 1: The original time series with a linear imputation (in red) for the missing data in 1993.

AR/MA	0	1	2	3	4	5	6	7	AR/MA	0	1	2	3	4	5	6	7
0	x	o	x	x	o	o	o	o	0	x	x	x	x	o	o	o	o
1	x	x	o	x	o	o	o	o	1	x	x	x	x	o	o	o	o
2	x	x	x	x	o	o	o	o	2	x	x	x	x	o	o	o	o
3	x	x	x	x	o	o	o	o	3	x	o	o	o	o	o	o	o
4	x	o	o	o	o	o	o	o	4	x	x	o	o	o	o	o	o
5	x	x	o	o	o	o	o	o	5	x	x	o	o	o	o	x	o
6	x	x	o	o	o	o	o	o	6	x	x	x	o	o	o	o	o
7	x	x	o	o	o	o	o	o	7	x	x	o	o	o	o	o	o

Tab. 2: The EACF table for once diffed (left) and twice diffed data (right).

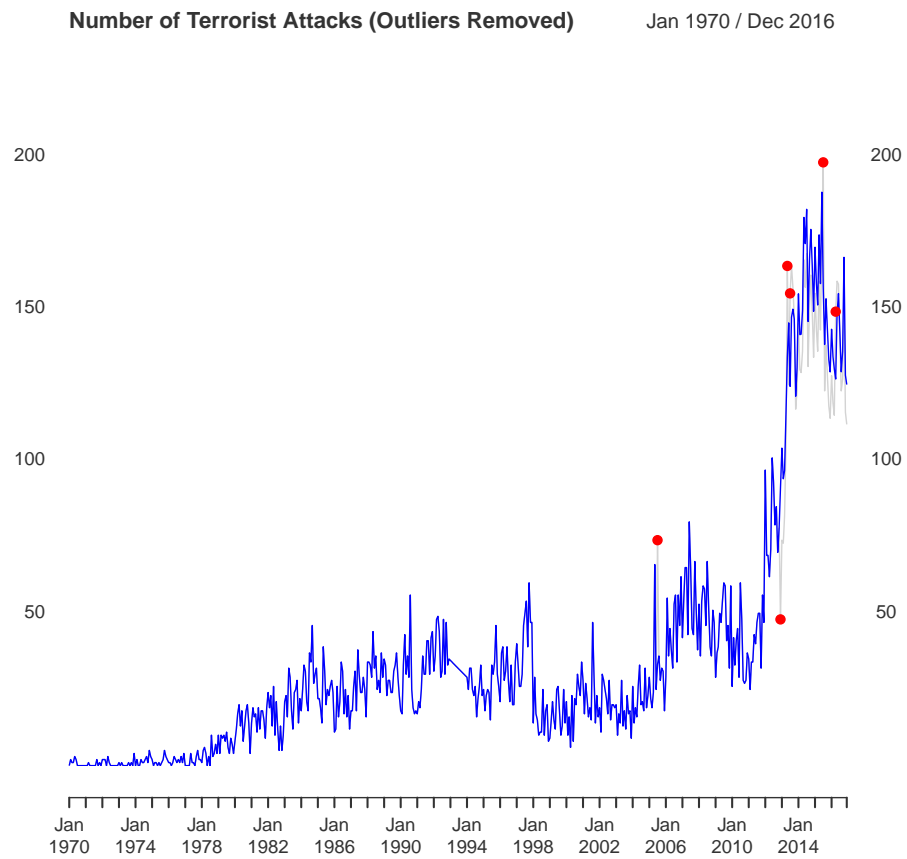


Fig. 2: The imputed time series (in blue) with outliers removed. The original time series shown in gray. The 6 outliers are shown in red.

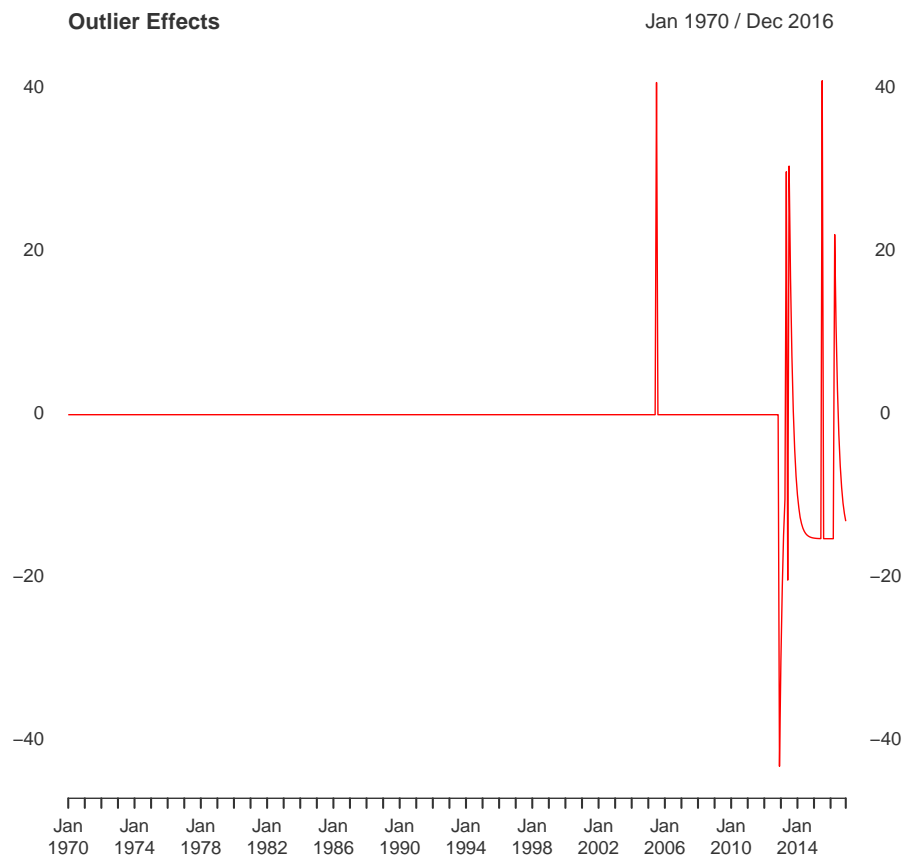


Fig. 3: The outlier effects of the identified outliers are displayed here.

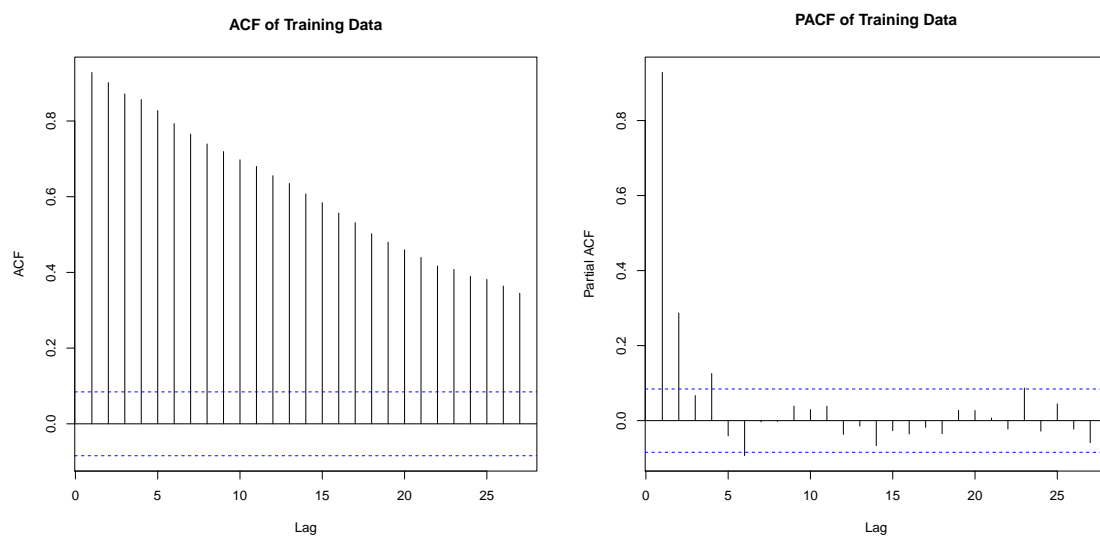


Fig. 4: The ACF and PACF of the time series

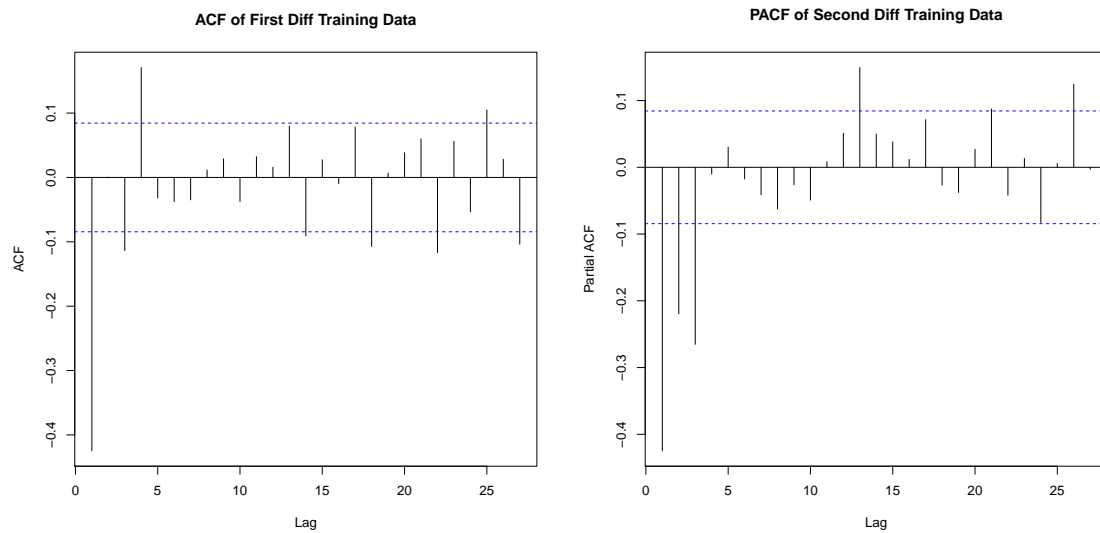


Fig. 5: The ACF and PACF of the first diff time series

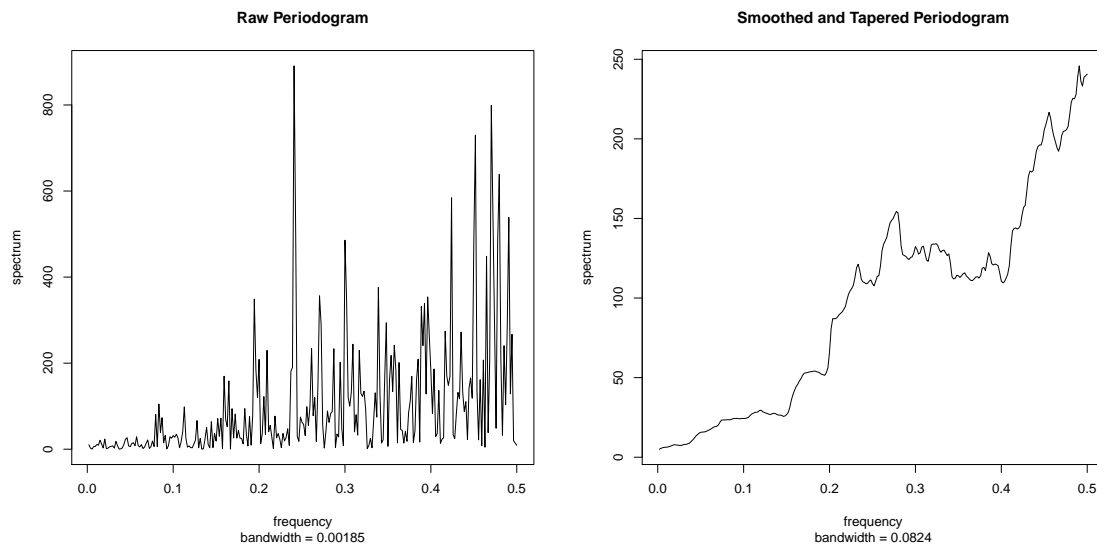


Fig. 6: The Periodogram (left) and a Smoothed and Tapered Periodogram (right). Smoothed with a Daniell Kernel with window size $m = \sqrt{n} \approx 22$ and tapered with a cosine bell taper with a value of 0.1

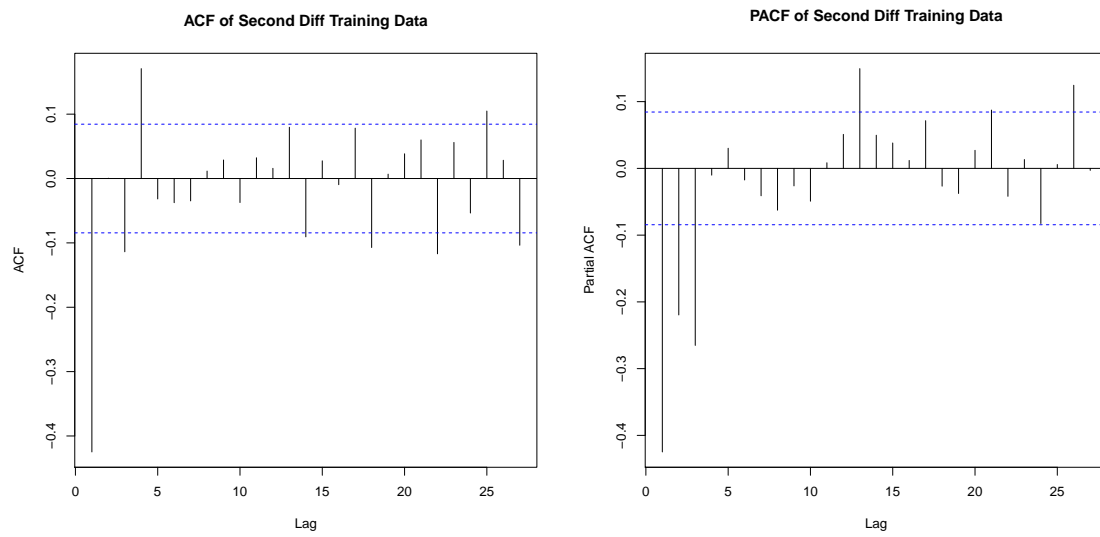


Fig. 7: The ACF and PACF of the second diff time series

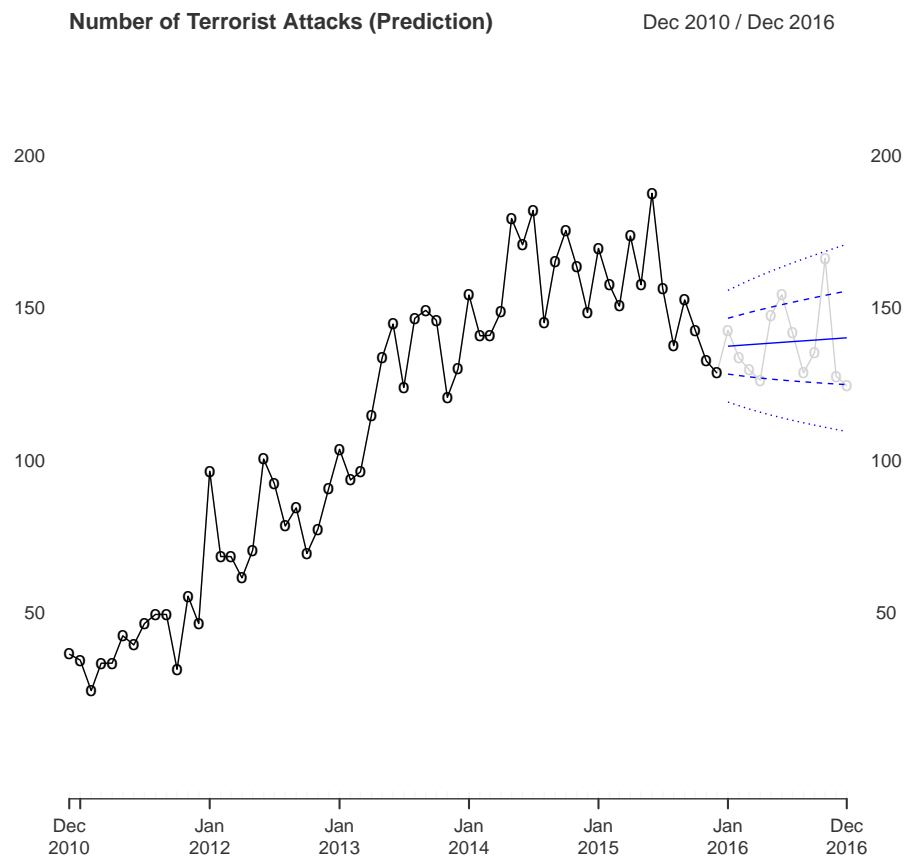


Fig. 8: We use the model ——— to generate a 12 month prediction denoted by the blue line. 1 sd and 2 sd error bars are the dotted lines. What actually occurred is shown by the light gray.

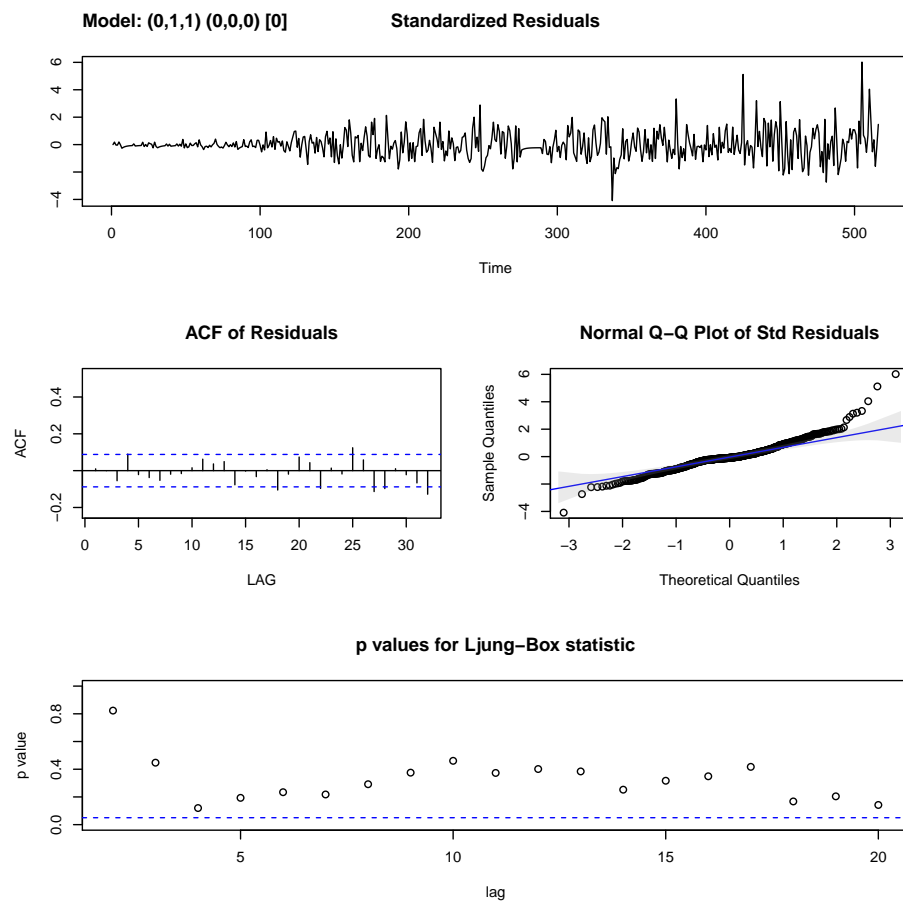


Fig. 9: This is the information from our best model.