Predicting Impacts of UN Intervention

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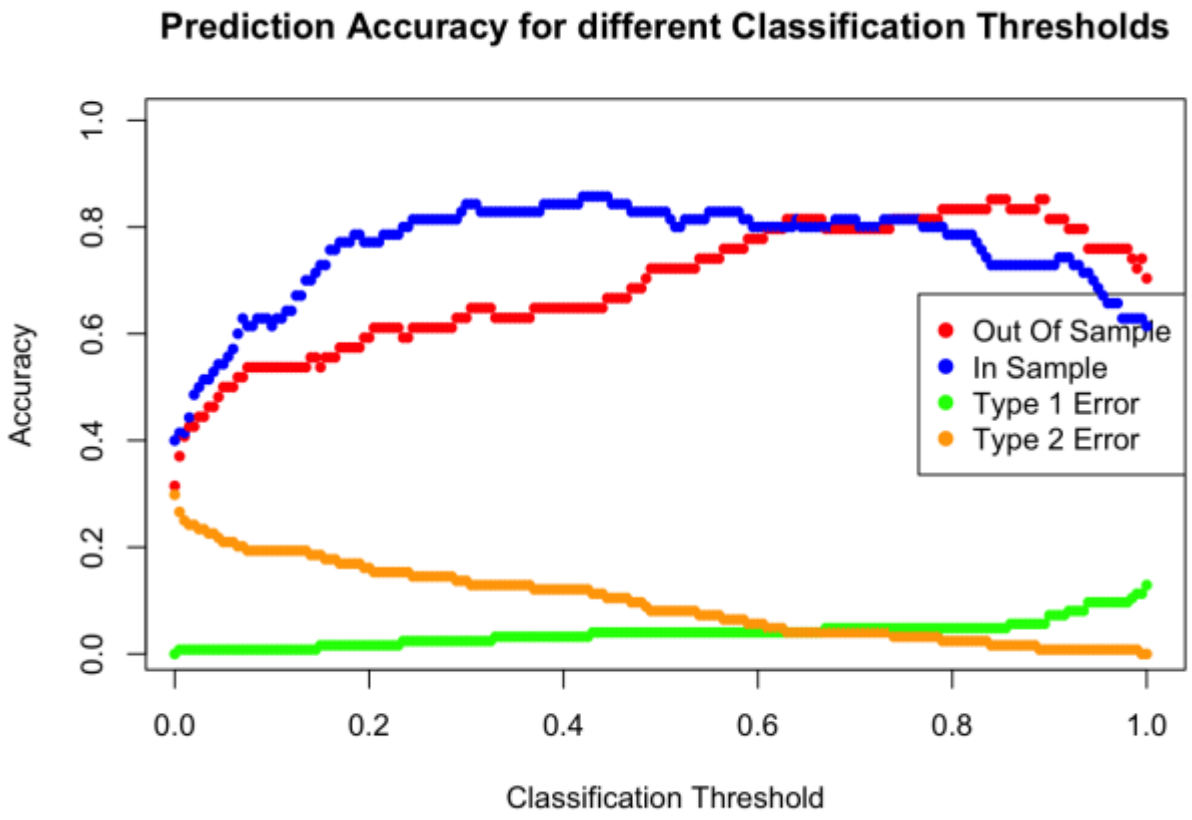
The United Nations spend a large part of their budget on peacekeeping operations and interventions in civil wars. Due to the large number of different factors in conflicts involving wars, it is hard to evaluate in how far these UN interventions lead to stability and democracy after the war. We will evaluate a dataset based on 124 post World-War 2 civil wars in order to address the question: Can we make predictions on the likelihood of democratization two years after conclusion of the war based on the existence or nonexistence of a UN intervention during a civil war with a certain set of parameters increase. Having an accurate prediction model can help decision makers in the UN determine where an intervention might be beneficial or harmful and how much funds to allocate for different causes. The models created achieved an accuracy of up to around 75% on out-of-sample predictions, allowing us to make likely predictions about peacebuilding success, but especially in our classification tree and random forest model, the UN intervention has no to little influence on outcome. The models used in this paper are predictive models, this means they cannot answer any causal questions regarding the impact of a UN intervention. All findings simply reflect correlations, such as a correlation between an intervention and an increased likelihood of peace. We use prior data in an attempt to predict the future based on a large amount of data, but in this process no claims about causal relationships can be made.

Our model uses the categorical variable strict peacebuilding success two years after the war as the outcome; 43 of the observed wars had such success, while 81 failed to establish peace. In 45 conflicts some form of UN Intervention occurred, this could be military, mediation, fact-finding or peace enforcement missions. 79 conflicts saw no intervention. Out of the 45 conflicts with interventions, 19 saw strict peacebuilding success 2 years later.

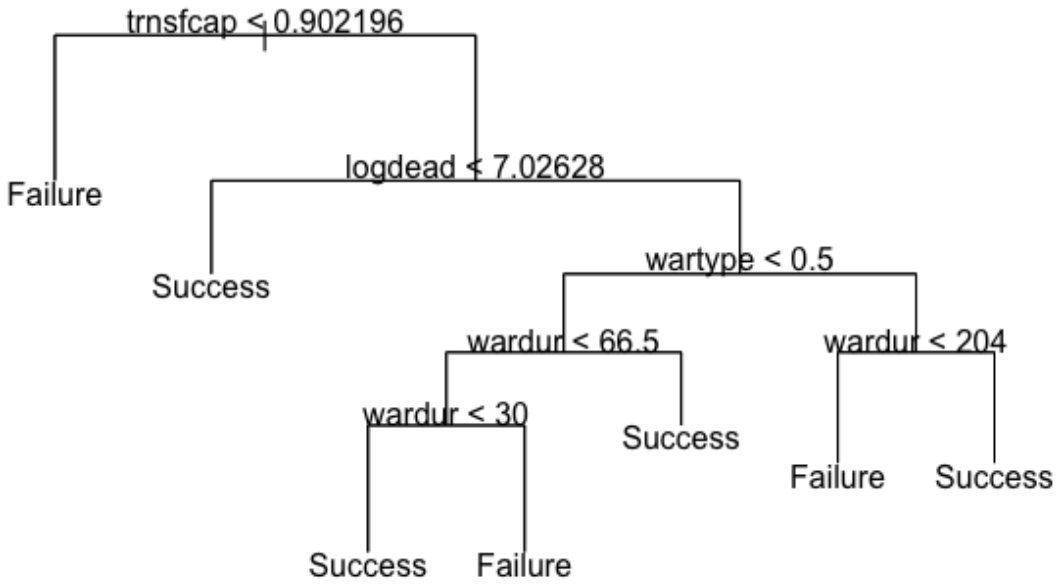
Due to the small number of observations, a test validation set approach lead to highly variable numbers of misclassified observations, depending on the training set. To mitigate this issue, I used 10-fold cross validation as a method with lower bias and appropriate variance. To fine-tune decisions about the logistical regression model, such as whether including polynomials of deaths during battle would yield improvements.

	Estimate	Std. Error	z value	Pr(>|z|)	
(Intercept)	6.4728763	1.9552215	3.311	0.000931	***
un2int	0.7244022	0.6032781	1.201	0.229838	
wartype	-1.8064493	0.5949754	-3.036	0.002396	**
logdead	-0.3968837	0.1528341	-2.597	0.009409	**
wardur	0.0071946	0.0036198	1.988	0.046861	*
factnum	-0.6018421	0.2396792	-2.511	0.012038	*
trnsfcap	0.0028580	0.0022243	1.285	0.198832	
develop	0.0006373	0.0005448	1.170	0.242094	
exp	-6.0112155	3.3038626	-1.819	0.068843	.
decade	-0.4610318	0.1972491	-2.337	0.019423	*
treaty	2.0846214	0.7261093	2.871	0.004092	**
geo	0.0314632	0.2740675	0.115	0.908603	
eh	0.0023087	0.0077192	0.299	0.764879	

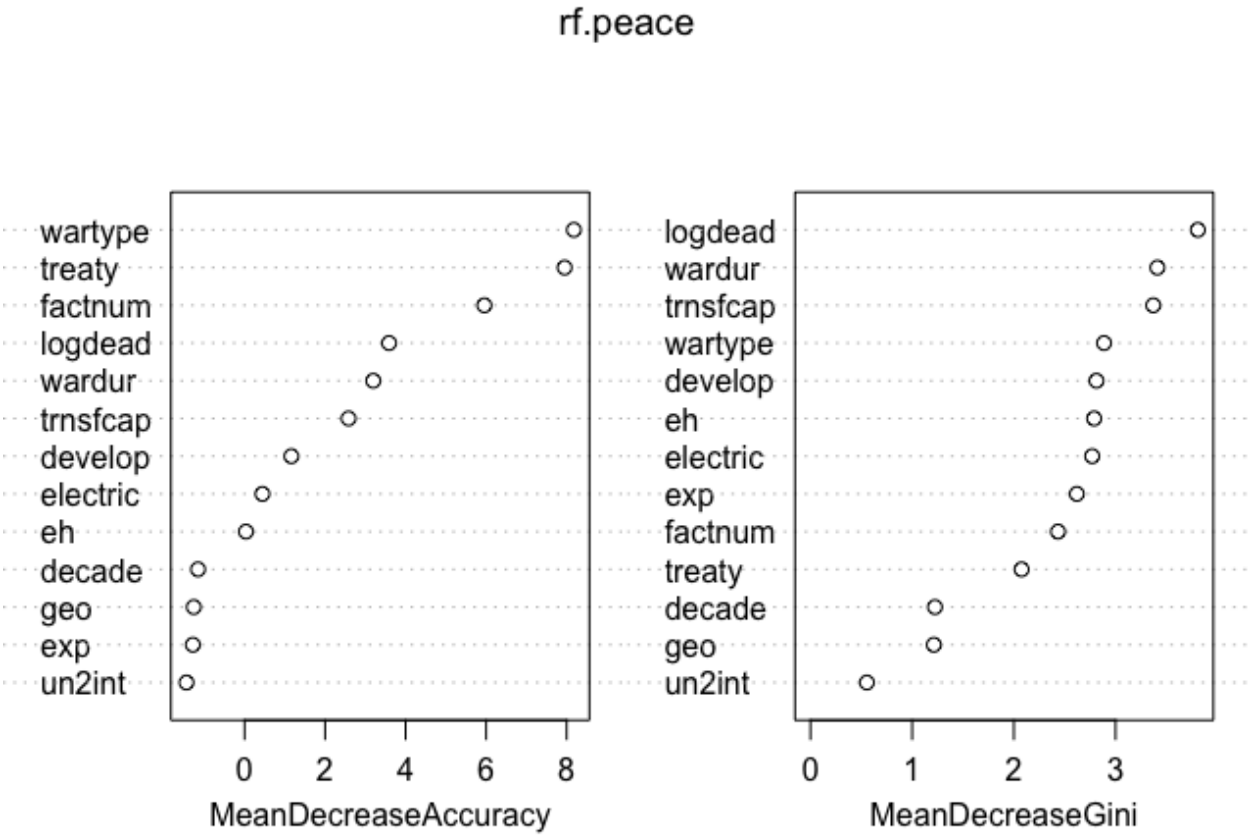
Furthermore, we tried a range of different classification thresholds between 0 and 1 to balance Type 1 and Type 2 error as well as out-of-sample prediction accuracy efficiently. For UN decision making, it is more important to reduce Type 1 Errors, in which a Success is predicted as a failure. To do that, we want to choose lower threshold values. Considering how flat the Type 1 Error curve is, we would choose around .6 as our classification criteria in below scenario.



Besides logistical regression, we also built a classification tree using cross validation to determine the best pruning parameter. The tree with 7 nodes has the lowest misclassification rate, but only uses the variables “trnsfcap”, “logdead”, “wartype” and “wardur”. “Un2Int” is not used. We achieve an accuracy of 72.7% on our trainingset.



To improve on our tree model, we also build a random forest. The random forest uses many trees from bootstrapped data with slightly different variables used and then classifies by sending the data through all trees to use majority vote. We achieve 77% prediction accuracy here. The importance of each variable across all trees used is as follows:



We see that UN interventions are the least important variable in this random forest model.

The model developed in this paper aims to predict whether a civil conflict with certain parameters will lead to peacebuilding success two years after the war. This does not mean that a UN Intervention causally lead to this success, simply that based on prior experiences this is how likely success is. As there is high variation in how civil conflicts happen and the circumstances and interferences, models like this one cannot accurately predict an outcome, especially if some parameters fall far outside of the range of previously observed parameters. It has highest utility and ability as a guide when making decisions regarding a conflict that appears similar to known conflicts in many aspects, any other decisions will require too many assumptions about the form of the model. Our Analysis has shown that predictions with about 75% accuracy are a possibility,

based on the data we are looking at and they work across different methods. This will be helpful for UN decision makers in evaluating the threat from certain conflicts. Our predictive analysis does not let us determine a significant difference between outcome when UN intervention is present or when not. This can have many different reasons though, perhaps the UN has been using heuristics to decide where to intervene that are heavily correlated with one of our predictors and different forms of intervention might have very different effects. As this is not a causal analysis we cannot discuss these questions at this moment.

Some questions for further research could be: Can we use Matching algorithms such as Genetic Matching to achieve a high enough balance across all covariates to see if there is an overall increased likelihood of democratization when UN interventions are present. This would be addressing a causal rather a predictive question. If we had monthly data on the progress of several civil wars, including data such as soldiers are factions involved at any point of time, we might be able to use Synthetic Control to determine if the UN intervention at some point during the war altered the future progression of the war and perhaps lead to a faster resolution.

Code can be found here:

https://github.com/adriangoe/CS112/blob/master/UN_peacekeeping_success.Rmd (with annotations)

https://github.com/adriangoe/CS112/blob/master/UN_peacekeeping_success.R (without annotations)

https://adriangoe.github.io/CS112/UN_peacekeeping_success (with output)

References

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King, G., & Zeng, L. (2007). When can history be our guide? the pitfalls of counterfactual inference1. *International Studies Quarterly*, *51*(1), 183-210.