Early Predictability of Asylum Court Decisions

Matthew Dunn[1], Rafael Garcia Cano Da Costa[1], Benjamin Jakubowski[1], Dr. Daniel Chen [2]
[1]New York University Center for Data Science,[2]Toulouse School of Economics

> Introduction

Problem

In the United States, foreign nationals who fear persecution in their home country can apply for asylum under the Refugee Act of 1980 (as shown in figure 1). Unfortunately, over the past decade, legal scholarship has uncovered significant disparities in asylum adjudication by region and by judge [1]. This is problematic, since our justice system is premised on the consistent application of the law across cases.

Objective

This project sought to build a predictive model to assist legal professionals in advising asylum applicants. Specifically, we sought to develop a model to predict the probability of asylum being granted, using only information available to applicants and their representatives at the time they received notice to appear (NTA) before an immigration judge. In the process, we also aimed to identify significant predictors of asylum court decisions.

Use Case

University and pro-bono asylum law clinics have limited resources and a large number of prospective clients. A predictive model could potentially assist these organizations by allowing them to estimate the probability of an applicant being awarded asylum prior to any case assistance. This could inform their selection of cases, and potentially allow them to suggest interventions that improve the odds of the client receiving asylum (ex: if the predicted probability of asylum was low, the clinic could advise an applicant to move to another region with a more generous immigration court).

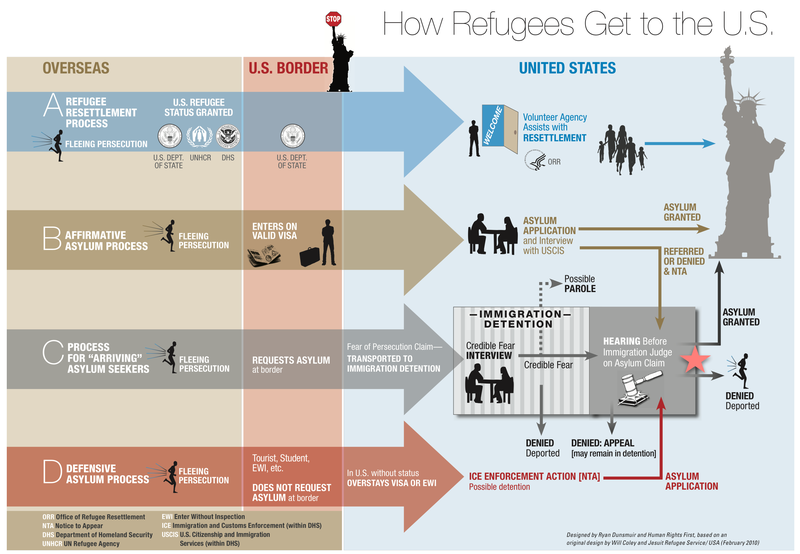

Figure 1: The asylum application process illustrated [2]. Note our model attempts to predict the the immigration judge's decision (the starred branch in the process diagram).

> Methods

Data Source

Our model is built on Executive Office for Immigration Review (EOIR) data initially obtained by Dr. Sue Long. Dr. Long is the co-founder and co-director of the Transactional Records Access Clearinghouse (TRAC), which specializes in using the Freedom of Information Act (FOIA) to obtain federal government administrative records. We built our model on (i) EOIR courts data obtained by Dr. Long through a FOIA request, and (ii) initially processed by Dr. Chen for exploration of the Gambler's Fallacy in immigration courts [4].

Data Engineering

Our objective was to build a predictive model that could predict whether an applicant would be granted asylum at the time they were notified of their initial hearing time, location, and judge. In order to avoid data leakage, we first constructed a data dictionary defining each feature and indicating whether it would be available at the time of deployment. We based our data dictionary on information from *Refugee Roullete* [1], as well as conversations with Dr. Chen and interviews with practicing immigration attorneys.

After reducing the number of features to the subset available at the time of model deployment, new lag features were engineered to track how temporal changes would impact an applicant. Specifically, features were constructed to measure grant and deny rates over the past 1- and 5-years

- At the assigned base court, for other applicants of the same nationality.
- At the assigned base court, for other applicants of the same nationality with the same application type (defensive or affirmative).
- At the assigned base court, for other applicants of the same nationality, speaking the same language, with the same application type (defensive or affirmative).

Model Fitting

Training was executed using sklearn's GridSearchCV to tune hyper-parameters for various model types[a]. Trained models were evaluated using average ROC AUC on 5-fold cross-validation (CV) [3]. ROC AUC was maximized by a random forest, which achieved a cross-validation average ROC AUC of 0.8892. The 5-fold cross validation AUCs for all trained and optimized models are shown in table 1:

[a]Note feature set 1 was the original feature set; feature set 2 was the feature set with all interactions with the attorney variable

Model Evaluation using 5-fold Cross Validation

Model	Hyperparameter Grid	Optimal Hyperparameters	AUC ($\bar{x} \pm$ sd)
Random Forests	Number Estimators: [100, 300, 600, 900]	900	$.8892 \pm 0.0011$
AdaBoost	Number Estimators: [100, 200, 400, 800]	100	$.8089 \pm 0.0089$
SVC	$C = [10^{-5}, 10^{-4}, \cdots, 10^{2}]$ Feature sets = [1, 2]	$C = 1$ Feature set = 1	$.8143 \pm 0.0024$
Logistic Regression	Regularization: ℓ_1, ℓ_2 $C = [10^{-5}, 10^{-4}, \cdots, 10^{2}, 200, 300, \cdots, 1000]$ Feature sets = [1,2]	Regularization: ℓ_2 $C = 10^{-4}$ Feature sets = 1	0.7899 ± 0.0124

Table 1: Comparing the performance of different classifiers

> Results

Based on CV results, we chose the best-performing model for evaluation against a held-out test set. A training set learning curve (CV performance vs. number of estimators) and the test-set ROC plot for this model are presented in figure 2. For additional validation, note feature importance scores from our model [a] agree with expert intuition; practicing asylum lawyers shared their belief that judge and location assignment were significant factors in asylum application success.

[a]See full report for feature importance plot

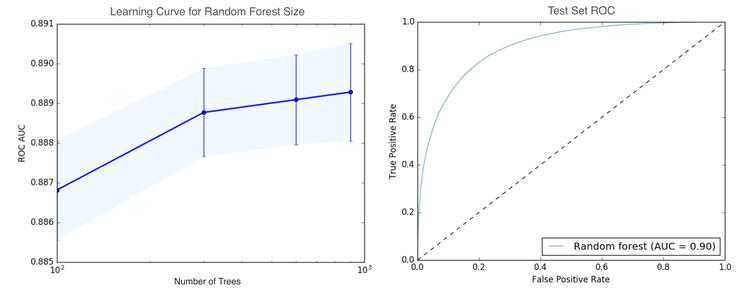

Figure 2: 5-fold cross validation AUC, and test set ROC curve for the final model

> Conclusion

- While asylum law may be applied inconsistently applied across courts and judges, its application is still highly predictable (even at a very early stage in the asylum process).
- The application of asylum law is highly dependent upon an applicant's nationality and their hearing location. This is apparent in our model, since the most important features are nationality- and location-specific historic grant rates.
- Given the high test set AUC, we would next validate our model against a recent test set (since the available test set was a random sample of decisions from the year 2000 onward).
- To increase the utility of the predictive model, an additional area of work would be to develop another (simplified) model to determine which asylum court offers an asylum seeker the highest estimated probability of receiving asylum.

> Bibliography

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