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STREAMLINING THE UNITED STATES IMMIGRATION COURT SYSTEM: USING SIMULATION AND DATA SCIENCE TO EFFECTIVELY DEPLOY CAPACITY

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ABSTRACT

There is a significant and growing backlog in the United States immigration court system, with over a million cases waiting to be heard. The backlog is particularly challenging to manage due to large influxes of migrants in recent years, coupled with antiquated design and resource limitations. This influx is causing delays that unnecessarily tax government and community resources while putting many lives on hold. We explore modeling the intricacies of the immigration court system, reconstructing its various elements and their respective complexity through discrete event simulation and machine learning. We study possible improvements to the simulated system affecting capacity, such as the number of judges, queueing discipline, and alternative ways to distribute available capacity.

1 INTRODUCTION

There are currently over 1.3 million cases seeking relief through the United States immigration court system, a number which grows rapidly with historic influxes of migrants at the southern border (TRAC 2020). Government agencies and the media have stressed the need to address this backlog (Harris 2016; The Miami Herald 2017) and it is a well-documented area of interest for the current administration (The White House 2021). Despite this attention, research to develop and evaluate solutions to the backlog appears limited (Rubio-Herrero 2015). This creates an opportunity to employ analytics to improve the immigration court system.

The immigration court is a complex system with arrival rates, service rates and scheduling rules that vary day to day and case to case. An individual's journey through the system depends on the unique characteristics of their case as well as system idiosyncrasies. Discrete event simulation (DES) is an established method across various domains such as healthcare, manufacturing, and transportation, that provides flexibility in modeling complex decision logic, system structures, and rules. We explore expanding the use of DES to immigration court systems, and focus on the United States.

2 MODELING ELEMENTS

One of the most intricate modeling elements of the immigration court process is the scheduling of cases. While some aspects of the scheduling process are publicly documented (Immigration Court Practice Manual 2020), the guidelines are generally ambiguous, change over time, and are often left to the discretion of judges and court staff. Two main elements appear to dictate how cases are scheduled: service capacity and scheduling rules. The service capacity is the number of cases each court can process on a given day (service rate). The scheduling rules (queueing discipline) determine the order in which cases should be served; that is, the relative priority of cases. In the immigration court context, these rules are complex and dependent on case characteristics and service capacity constraints. We investigate analytical approaches to improve

the immigration court system in two ways: determining service capacities over time and characterizing complex scheduling rules within the DES model.

3 METHODS

We establish a baseline DES model across multiple judges within the New York City immigration court. We calibrate our baseline model over 10 years of data. We simulate applicant arrivals, use data analytics to determine daily service capacities, and train a machine learning (ML) model to capture the complex scheduling rules (see Figure 1). We first use data analytics to identify existing service rates, which we then use as capacities in our DES model. We subsequently train a ML model using applicant profiles to determine judge processing order for the initial hearings. When an additional hearing is required, the applicant profiles are updated to include new data, such as type of previous hearing, adjournment code and detainment status. Updated profiles are fed into another ML model which predicts the processing order for their subsequent hearings. This process continues until the applicant exits the system.

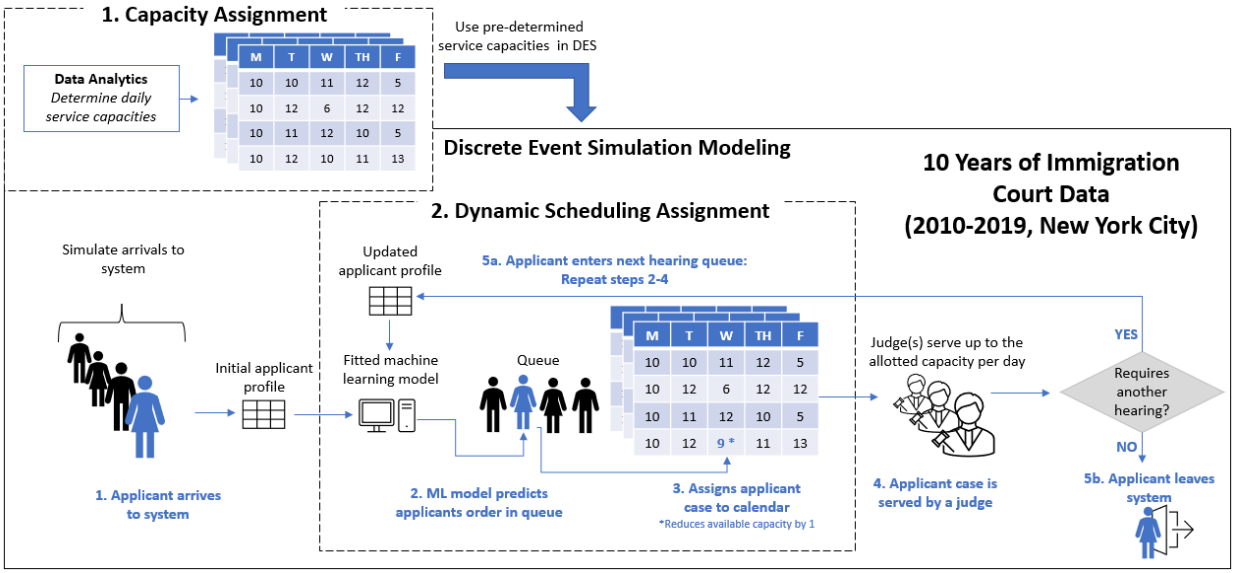

Figure 1: Infrastructure for Modeling US Immigration Court System.

4 CONCLUSION

This study seeks to alleviate the backlog in the US immigration court system. We use DES and analytics to model the system and explore ways to improve its throughput. Our results have the potential to evaluate, inform and improve immigration court policies. We acknowledge NSF grant CMMI-1825348.

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