Simulation of Unemployment Insurance Claim Handling During the COVID-19 Pandemic

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Abstract

The onset of the pandemic in 2020 resulted in a sharp increase in unemployment rates across the United States. State agencies nationwide saw an unprecedented climb in filings for unemployment insurance (UI) by March of 2020. In addition, a variety of federal monetary responses were issued through existing state unemployment insurance programs throughout the United States. The massive increase of claimants and subsequent strain on organizational resources further attracted suspicious actors filing fraudulent claims. The US Department of Labor estimates that nearly 10% of UI payments disbursed in 2020 were fraudulent. This work aims to simulate the UI process in Montana to lay the groundwork to identify operational inefficiencies, evaluate new procedure to mitigate fraud, and decrease the amount of time in making a claim determination.

1 Background and Description

The Montana Department of Labor (MDLI) went from an average monthly initial claims amount of around 4,500 claims to approximately 45,000 claims in March 2020.[1] Prior to the pandemic, fraudulent payouts were estimated at 1-2% of the total disbursed amounts. The 2020 fraudulent estimate is approximately 2-4%. Fraudulent intent encompasses both identity theft and eligibility fraud. Identity theft cases can often be connected to sophisticated networks of criminals with stolen personally identifiable information (PII). Eligibility fraud is when a claimant lies about some facet of their income to claim benefits they are not entitled to. Fraudsters practice a variety of approaches/schemes and often disguise there intent in quite ingenious ways. A trend seen in fraudulent claims prior to an analysis may no longer be applicable upon review. A fraud prevention strategy must be equally dynamic. Simulation can help dissect the claims review process in this context. By establishing a certain modularity to procedures, one can experiment with resource allocation, thresholds, and all manner of *what-ifs*. Fundamentally simulation of the claims review process should provide insight on how to structure procedure, mitigate fraud, and reduce claimant waiting time.

This work will focus on simulating the cases of identity theft moving through the system and will not consider steps involved after a claim has been processed. From here on the term fraudulent will refer only to a claim being a case of identity theft. Payment amounts that are associated with identity theft are for the vast majority of cases, unrecoverable. This provides a huge incentive to stop them from ever entering the system. Additionally, claims are identified as fraudulent by a determination framework that will not be outlined in great detail, as to preserve the effectiveness of methods and procedures utilized by fraud researchers. Reference to procedures performed by investigators or resources from the MDLI will be generalized.

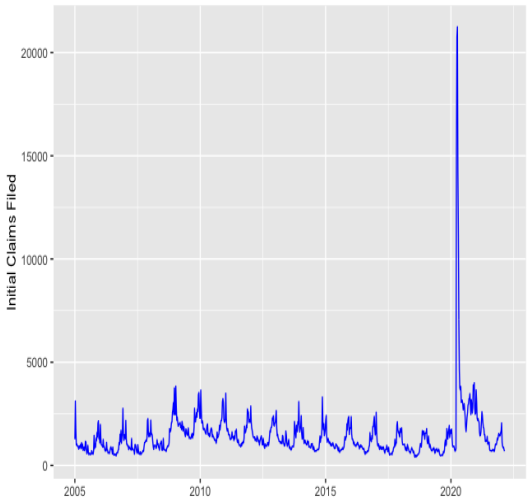


Figure 1: MT Initial Claims Filed

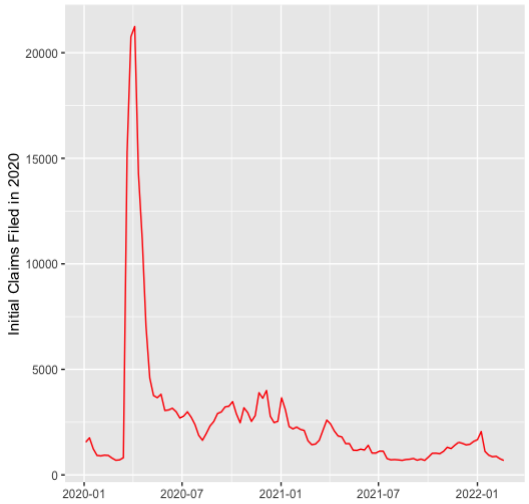
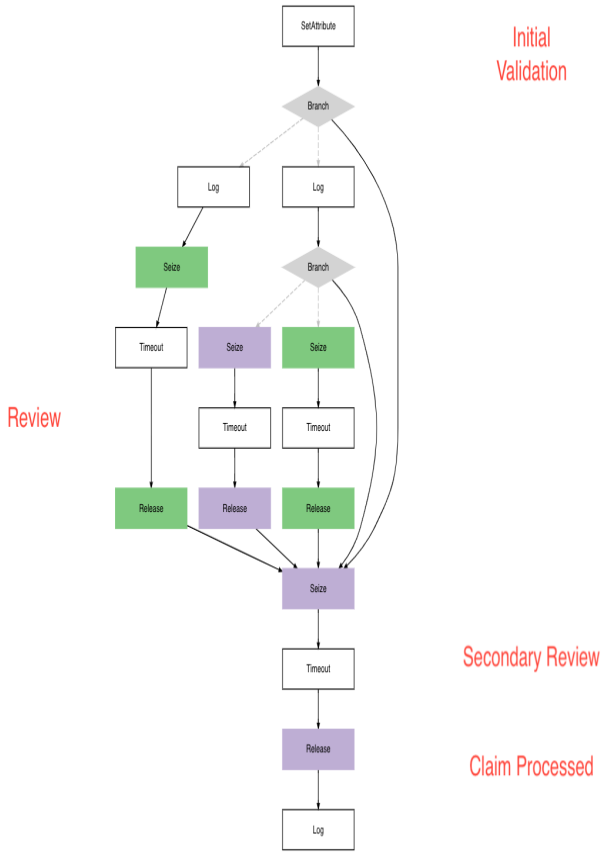


Figure 2: MT Initial Claims Filed in 2020

1.1 Pre-Pandemic Structure

Claims are initiated either through an online portal or by assisted means though a MDLI call center. The subsequent processing of a claim is subject to automated and or manual review and is the system of interest. Prior to the pandemic, evaluations of UI claims were subject to an almost entirely manual process. A claim entering the system was pushed through a semi-automated assessment where any claim encountering an obstacle was channeled to a review or appeal procedure. This procedure required the attention of an investigator or alternatively a MDLI employee depending on the suspicion level or problems with the claim. At this point, a determination could be made allowing the claims to either be dismissed from the system or pushed through for further processing. Outline:

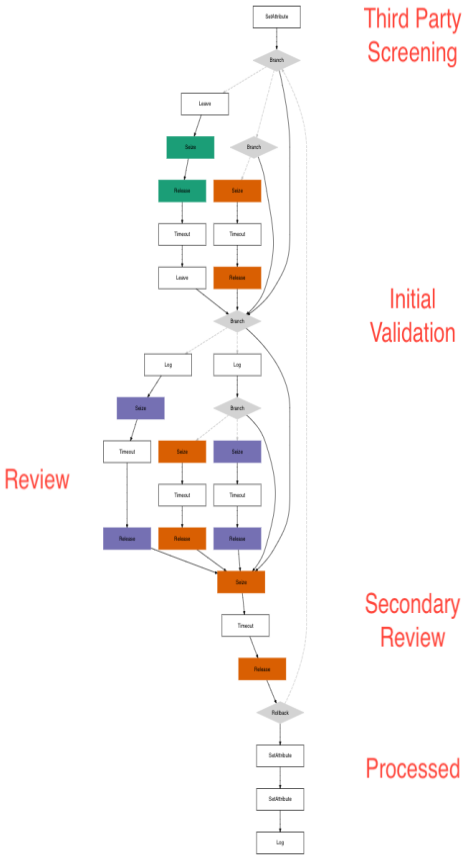
- **Initial Validation and Verification of Claims**
- **Manual Review of Suspicious or Problematic Claims**
- **Subsequent Review or Secondary Evaluation**
- **Claim Submitted for Processing**



1.2 Post-Pandemics Process

The approximately 10 fold increase in claims necessitated updates and introduced new resources, procedural standards, and levels of automation to the claims review process. Specifically the demand brought about the use of third-party identity validation vendors, a one week waiting period for processing, more investigators, and deployment of detection and prioritization algorithms in the review process. The Post-Pandemic claim trajectory can be summarized as follows:

- **Third-Party Screening**
- **Initial Validation and Verification of Claims**
- **Review utilizing Prioritization and Automation/Algorithms**
- **Subsequent Review or Secondary Evaluation**
- **Rollback**
- **Claim Submitted for Processing**



These changes were instituted during the pandemic but were not quite fully implemented by the end of quarter-one 2020, which saw the highest level of unemployment claims in history. One future ambition of this simulation study will be to present the effectiveness of procedural changes had they been implemented prior to the the start of 2020.

2 Method

The Post-Pandemic and Pre-Pandemic claims review processes have been modeled utilizing R and simmer [2], a trajectory-based Discrete-Event Simulation (DES) package. Within both processes, roughly 10% of claims are assigned a character attribute of fraudulent upon arrival. The remaining arrivals are considered legitimate claims. Investigators, MDLI employees, and the third-party validation are modeled as resources that can be seized-delay-released for a specified period of time. The delay time for these resources is randomly sampled from appropriate distributions. For the purposes of this project, it is assumed that investigator review time post pandemic is roughly half of the pre pandemic counterpart due to the implementation of prioritization algorithms in the review.

It was also discovered during the pandemic that fraudsters were capable of "hijacking" existing claims that were initially legitimate. The rollback feature of the trajectory in this case is representative of a fraudulent take-overs being discovered before funds are released. At this point, the claim is funneled back through the procedure.

2.1 Data

Both the pre-pandemic and post-pandemic simmer environments were provided with a dataset of claimant inter-arrival times. These inter-arrival times correspond to real claims being filed in Montana in 2020 and were not randomly sampled. Further, both the pre-pandemic and post-pandemic simulations were replicated 10 times to produce figures on the amount of claims processed and the amount of fraudulent claims that made it through the system. The resource delay times and probabilities for a fraudulent claim being rejected are described in the following table.

Trajectory Features	Pre	Post
Investigator Review, Fraud	1 h	30 min
Investigator Review, Legit	30 min	30 min
Third-Party-Validation	NA	80% to reject
Investigator Count	1	3
MDLI Employee Count	3	5

3 Main Findings

The simulation results for each of the 10 trials in the pre-pandemic trajectory and post pandemic trajectory are in the following tables. The Post-Pandemic trajectory saw an average total processed amount of approximately 156,391 claims by years end 2020. On average there were 1,136 fraudulent claims that made it through the system resulting in about 0.73% of claims being fraudulent from the Post-Pandemic trajectory. The Pre-Pandemic trajectory had 162156.9 claims processed by years end. Of these, 6925.5 on average were fraudulent. This equates to the Pre-Pandemic trajectory having about 4.27% of claims processed as fraudulent.

Simulation	Processed	Fraud
1	162,249	6885
2	162,176	6993
3	162,128	6982
4	162,126	6969
5	162,074	6909
6	162,242	6933
7	162,047	6858
8	162,029	6981
9	162,358	6894
10	162,140	6851

Simulation	Processed	Fraud
1	156,445	1125
2	156,345	1129
3	156,470	1166
4	156,496	1097
5	156,107	1126
6	156,257	1107
7	156,377	1164
8	156,297	1205
9	156,599	1140
10	156,523	1101

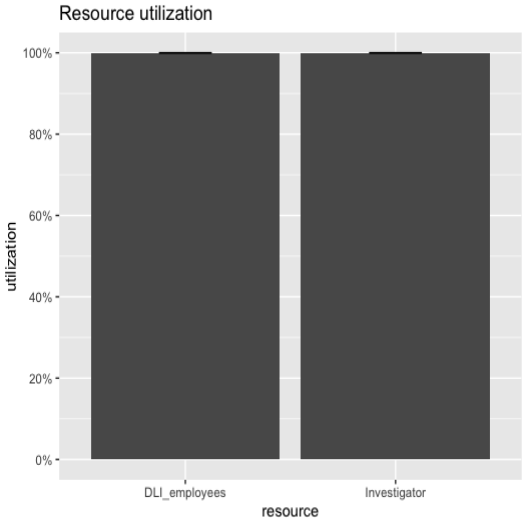


Figure 3: Pre-Pandemic Resource Utilization

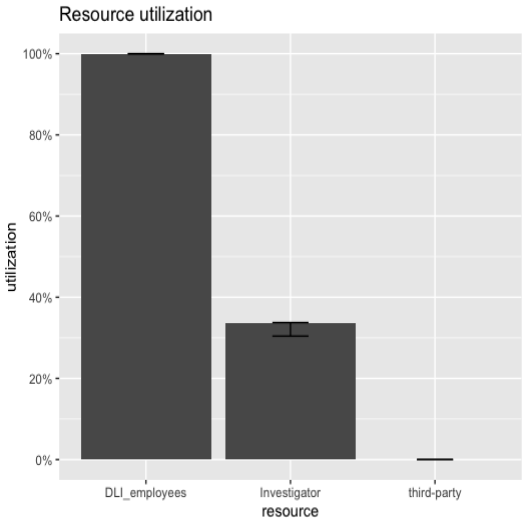


Figure 4: Post-Pandemic Resource Utilization

4 Conclusions

The changes as seen in the Post-Pandemic trajectory greatly restricted fraud efforts during the pandemic. In 2020, the actual estimated percent of fraudulent claims that made it through is estimate at 2-4%. This corresponds to about $20,000,000 of payment going to fraudsters. The changes present in the post pandemic trajectory were implemented at different times and were not all in place by the end of 2020. While the simulation outlined here is a crude characterization, it demonstrates the effectiveness of the measures taken to mitigate fraud. Had the changes been in effect prior to 2020, several million dollars of fraudulent payouts would have been prevented.

Future work with these simulations will entail fitting more appropriate distributions as necessary, experimentation with resource assignment, and altogether different trajectory architecture.

References

[1] Unemployment Insurance Weekly Claims. `https://oui.doleta.gov/unemploy/claims.asp`. Accessed: 2022-03-01.

[2] Iñaki Ucar, Bart Smeets, and Arturo Azcorra. simmer: Discrete-event simulation for R. *Journal of Statistical Software*, 90(2):1–30, 2019.