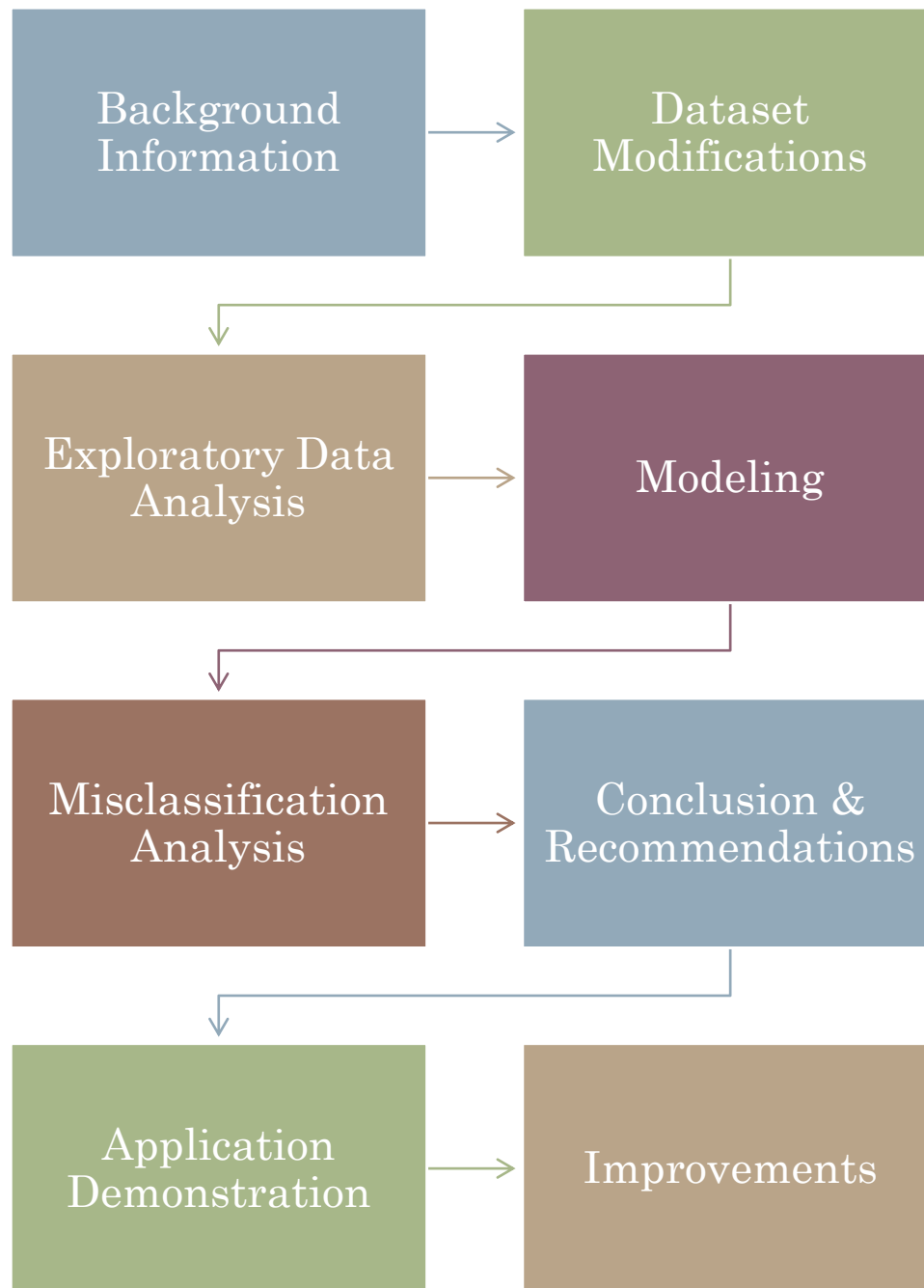


United States Sentencing Commission - Sentencing Evaluation

Project 5: Group Project

Carlos B. Rivera
Claire Bhalla
Brenton Van Arnam



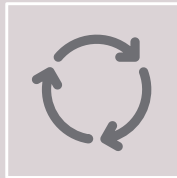


Presentation Outline

Background Information



Problem Statement



Process



Evaluation Metrics

Data

United States Sentencing Commission –
Individual Offender Datafiles



```
graph TD; A[United States Sentencing Commission – Individual Offender Datafiles] --> B[Feature Selection]; B --> C[ETL: Extract-Transform-Load]; C --> D[Imputing];
```

Feature Selection

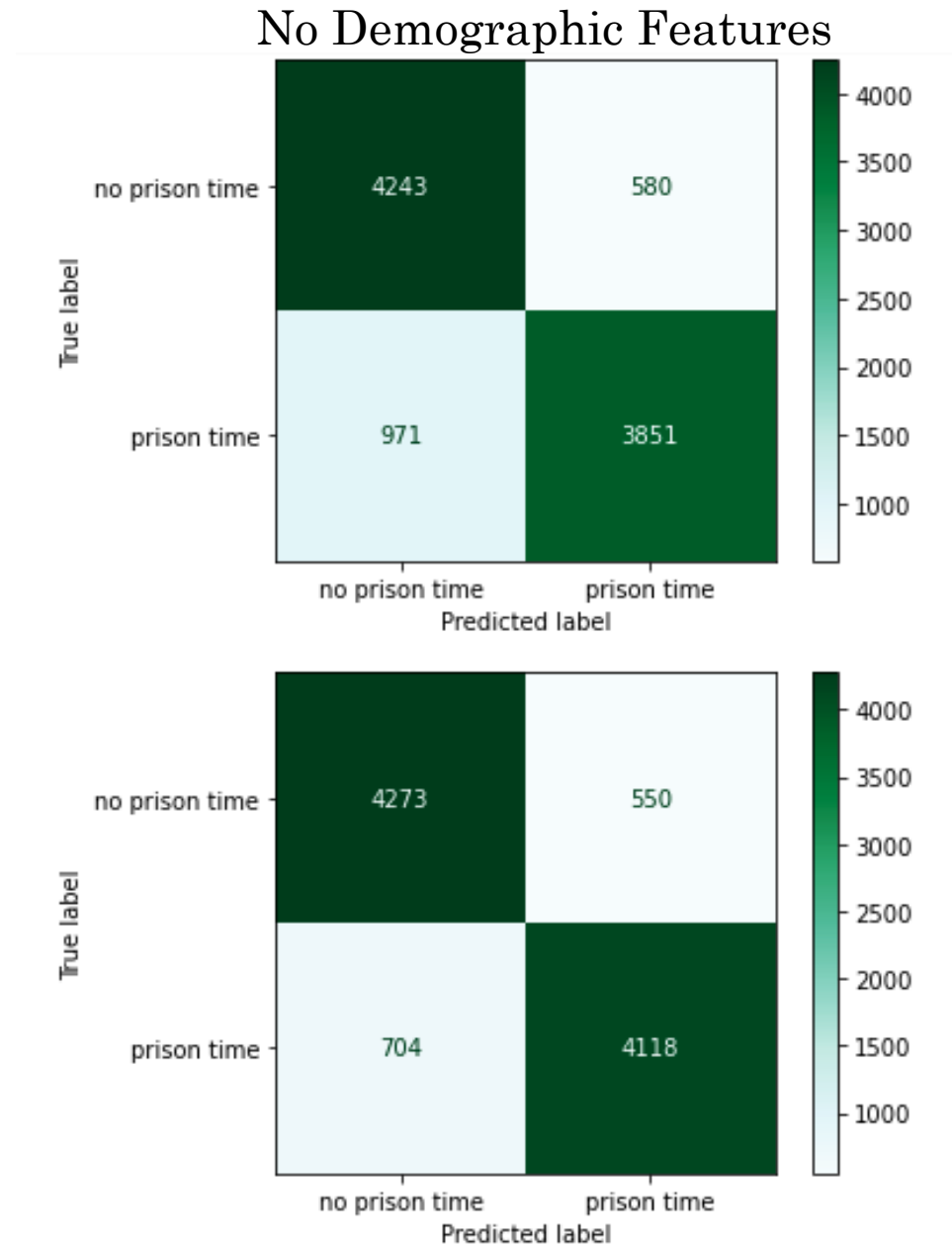
ETL: Extract-Transform-Load

Imputing

Exploratory Data Analysis Through Modeling: Individual Offenders

Most Important Removed Features:

1. Statmin
2. Suprdum
3. Senscap
4. Sentimp



Modeling

Voters (Judges) :

1. KNearestNeighbors
2. Decision Trees
3. Bagged Decision Trees
4. Random Forest
5. Extra Trees

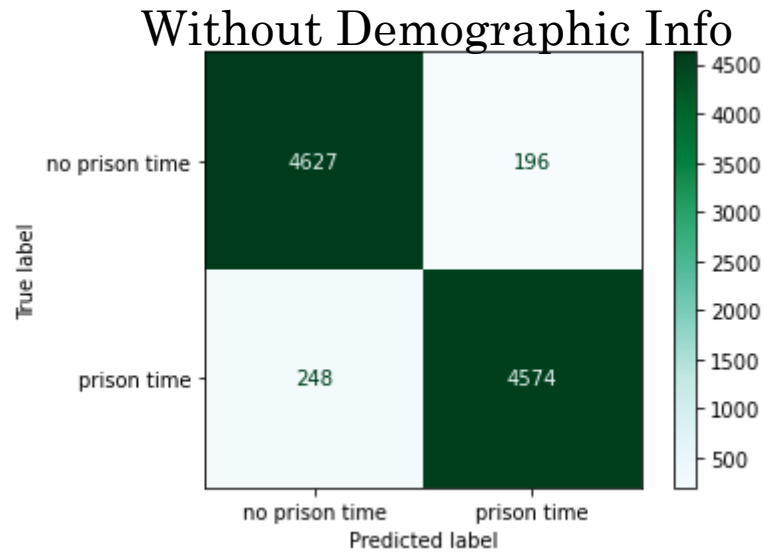
	Train Acc	Test Acc	Acc-diff	Train-F1	Test-F1	F1-diff	Train-Pres	Test-Pres	Pres-diff	Train_Recall	Test-Recall	Recall_diff
knn	0.942857	0.911457	0.031400	0.941889	0.909572	0.032317	0.958169	0.929251	0.028917	0.926153	0.890709	0.035444
logreg	0.821995	0.824054	0.002059	0.810250	0.812838	0.002588	0.867532	0.868080	0.000548	0.760064	0.764206	0.004142
dt	0.998978	0.957076	0.041902	0.998977	0.956749	0.042228	0.999733	0.964000	0.035733	0.998223	0.949606	0.048617
bag	0.997023	0.966822	0.030201	0.997020	0.966562	0.030458	0.998130	0.974094	0.024035	0.995912	0.959146	0.036767
bag_knn	0.945123	0.913116	0.032008	0.944181	0.911097	0.033084	0.960725	0.932667	0.028058	0.928197	0.890502	0.037695
bag_log	0.821462	0.824054	0.002592	0.809592	0.812590	0.002998	0.867296	0.869124	0.001827	0.759086	0.762961	0.003875
rf	0.998978	0.978434	0.020544	0.998978	0.978446	0.020532	0.999200	0.977838	0.021362	0.998756	0.979054	0.019702
et	0.998978	0.975739	0.023239	0.998977	0.975615	0.023362	0.999733	0.980519	0.019214	0.998223	0.970759	0.027464
ada	0.934770	0.937377	0.002607	0.934417	0.937031	0.002613	0.939538	0.942138	0.002600	0.929352	0.931978	0.002626
gboost	0.956676	0.957802	0.001126	0.956684	0.957609	0.000925	0.956557	0.961917	0.005360	0.956812	0.953339	0.003473
svc	0.875628	0.874546	0.001081	0.869089	0.867731	0.001359	0.917358	0.917476	0.000118	0.825646	0.823102	0.002544

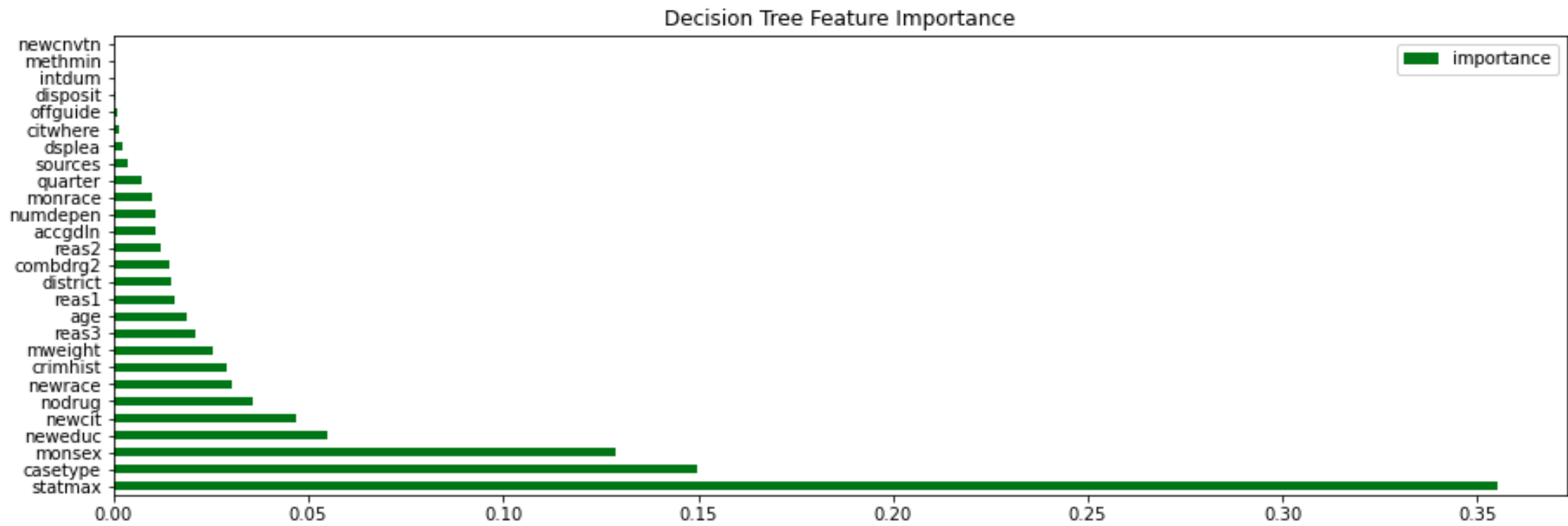
Model Performance

Model: Decision Tree Classifier

Train Acc: 0.99

Test Acc: 0.96





Model Performance

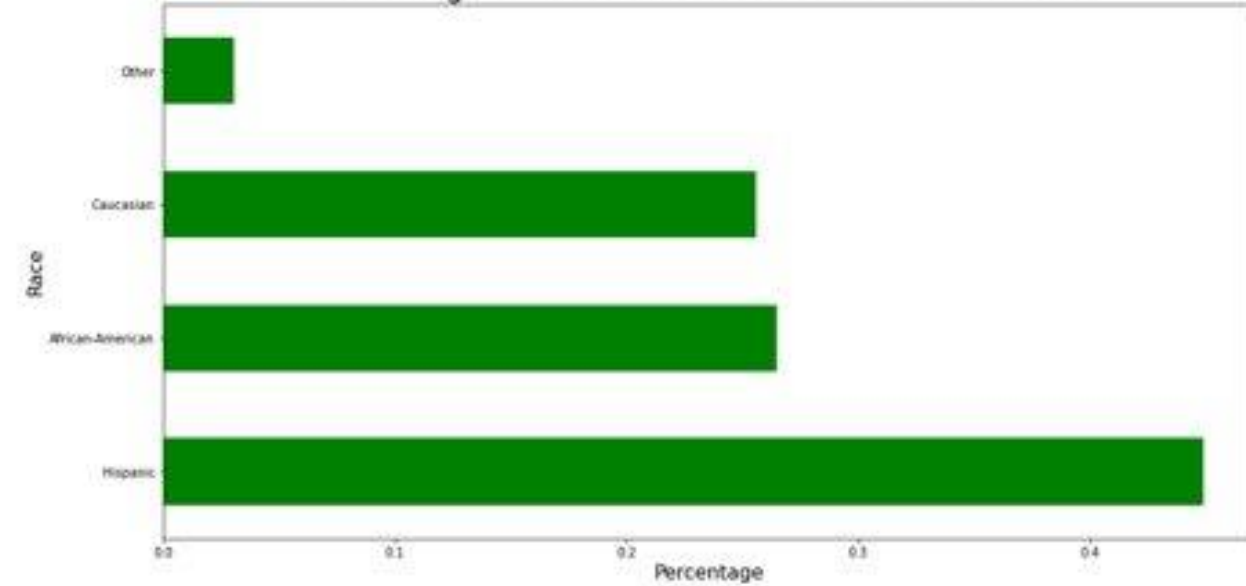
Model: Decision Tree Classifier

Train Acc: 0.99

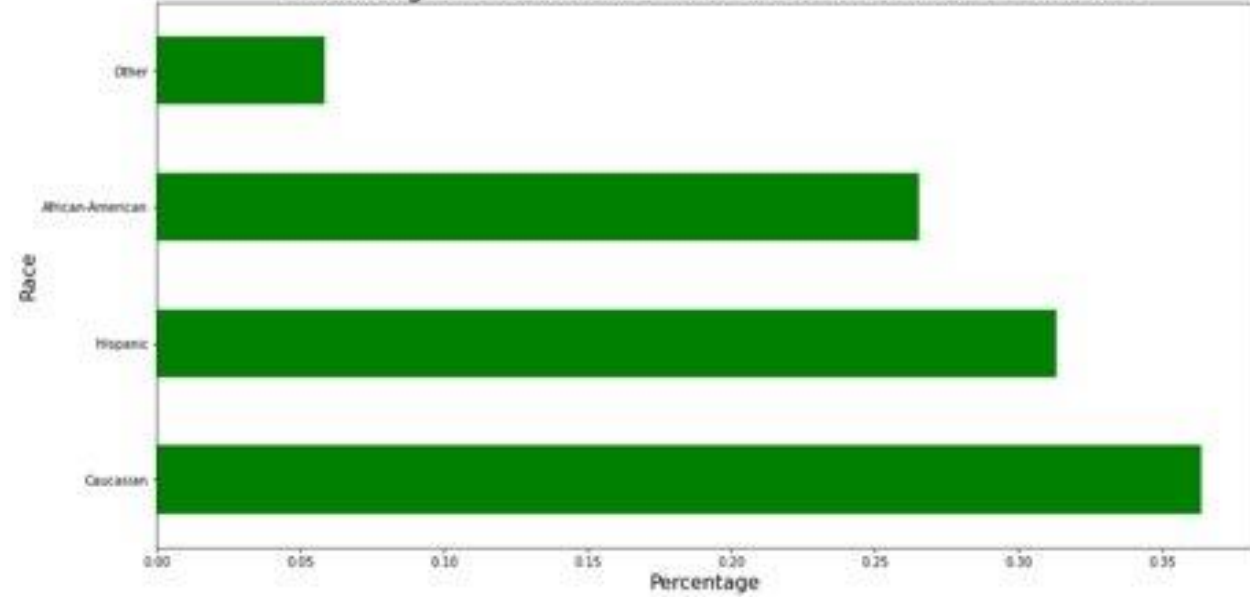
Test Acc: 0.96

Exploratory Data Analysis: Misclassification Dataset

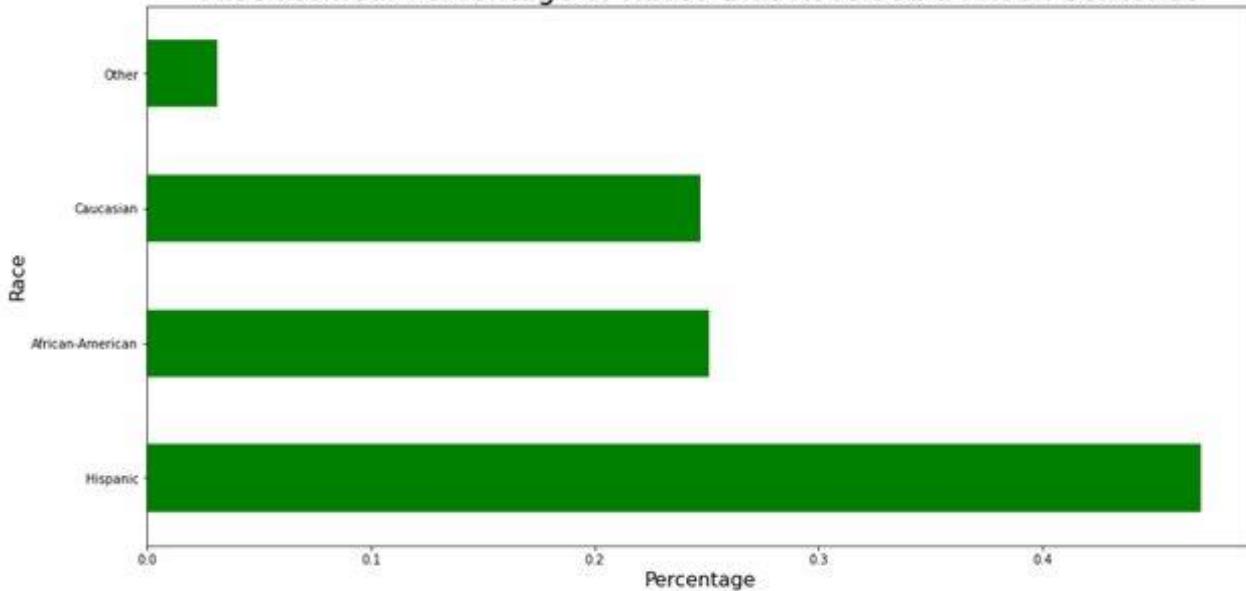
Percentage of Races that Received a Prison Sentence



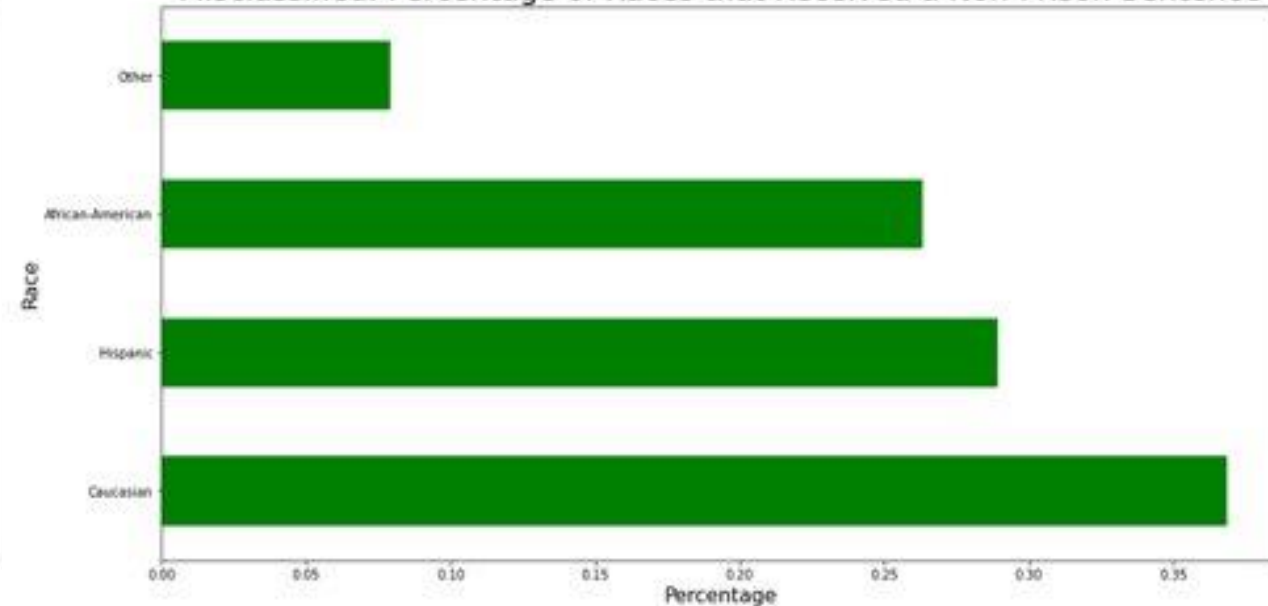
Percentage of Races that Received a Non-Prison Sentence



Misclassified: Percentage of Races that Received a Prison Sentence



Misclassified: Percentage of Races that Received a Non-Prison Sentence



Conclusions and Recommendations

There is evidence of demographic information affecting likelihood of a prison term.

We recommend pursuing the misclassified cases.

Application

Demo!

```
mirror_mod = modifier_ob.  
Set mirror object to mirror  
mirror_mod.mirror_object =  
operation == "MIRROR_X":  
mirror_mod.use_x = True  
mirror_mod.use_y = False  
mirror_mod.use_z = False  
operation == "MIRROR_Y":  
mirror_mod.use_x = False  
mirror_mod.use_y = True  
mirror_mod.use_z = False  
operation == "MIRROR_Z":  
mirror_mod.use_x = False  
mirror_mod.use_y = False  
mirror_mod.use_z = True  
  
selection at the end -add  
mirror_ob.select= 1  
modifier_ob.select=1  
context.scene.objects.active  
("Selected" + str(modifier_ob.  
mirror_ob.select = 0  
= bpy.context.selected_object  
data.objects[one.name].select  
  
print("please select exactly  
  
-- OPERATOR CLASSES -----  
  
types.Operator):  
X mirror to the selected  
object.mirror_mirror_x"  
mirror X"  
  
context):  
context.active_object is not None
```

Expanding upon
Dataset usage

Use Regression model to
predict sentence length

Expanding beyond drug
related offenders

Improvements
and Next Steps