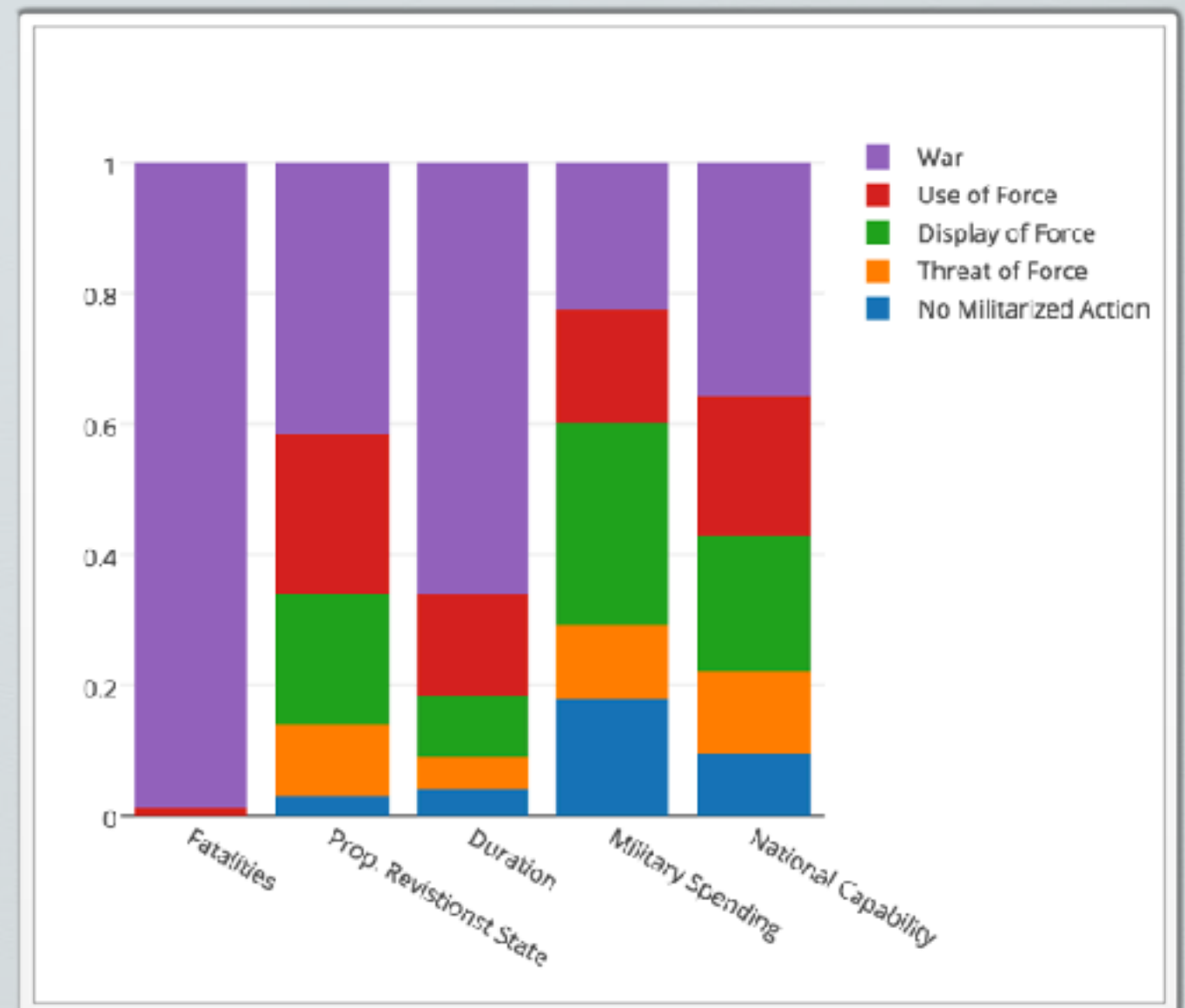


PREDICTING HOSTILITY

Correlates of War
Bauer McClave

Goal: Predict Hostility Level

- Predict Hostility Level
 - War
 - Use of Force
 - Display of Force
 - Threat of Force
 - No Militarized Action



Correlates of War Features

- **Militarized Interstate Disputes**

- Duration: days involved in a dispute of any hostility level
- Fatalities
- Revisionist State: Whether a state is working to change its position of power in the dispute

- **Alliances**

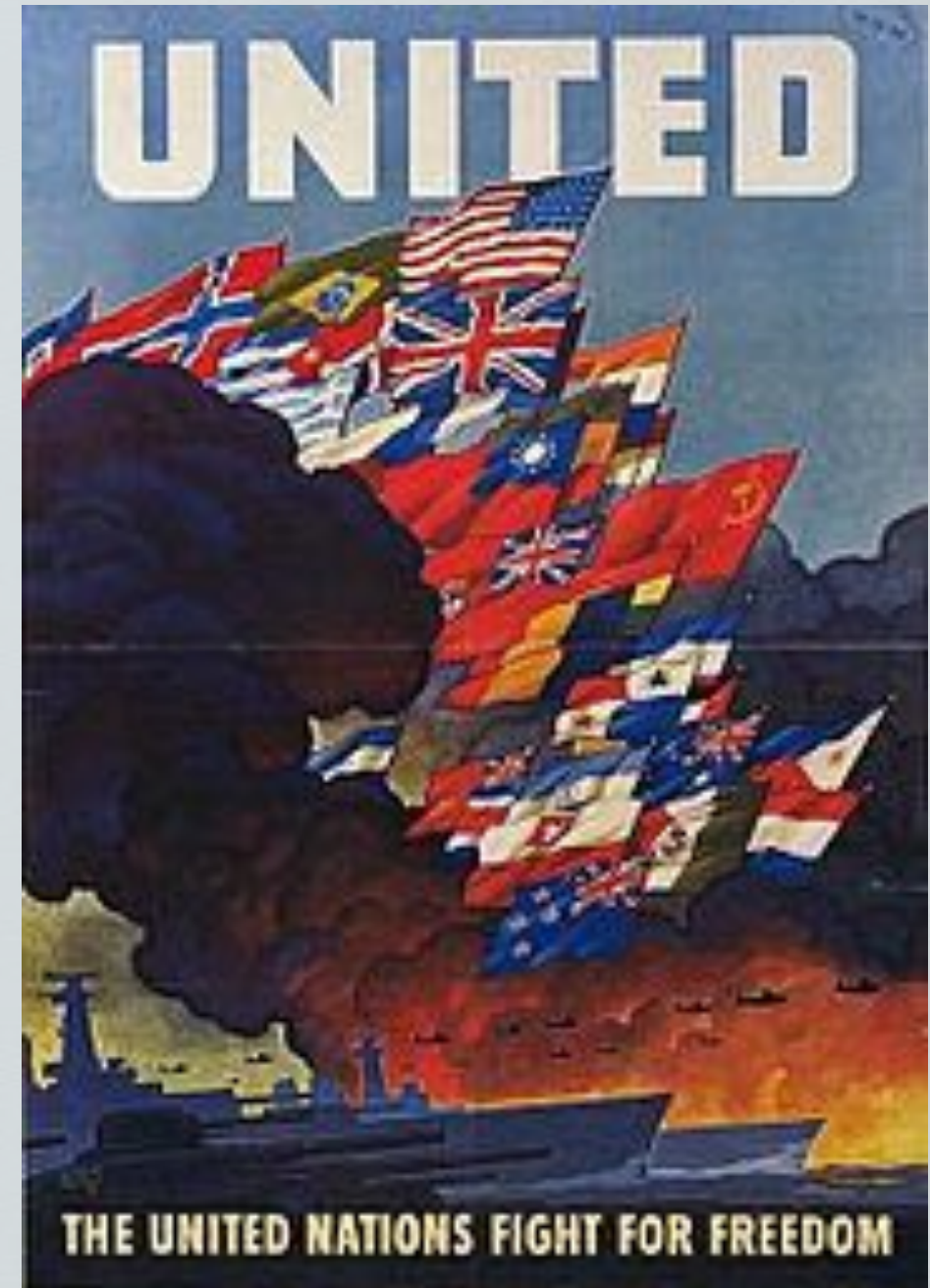
- **National Materials Capabilities**

- Composite Index of National Capability (CINC) score
- Military Spending
- Primary Energy Consumption (thousands of coal-ton equivalents)

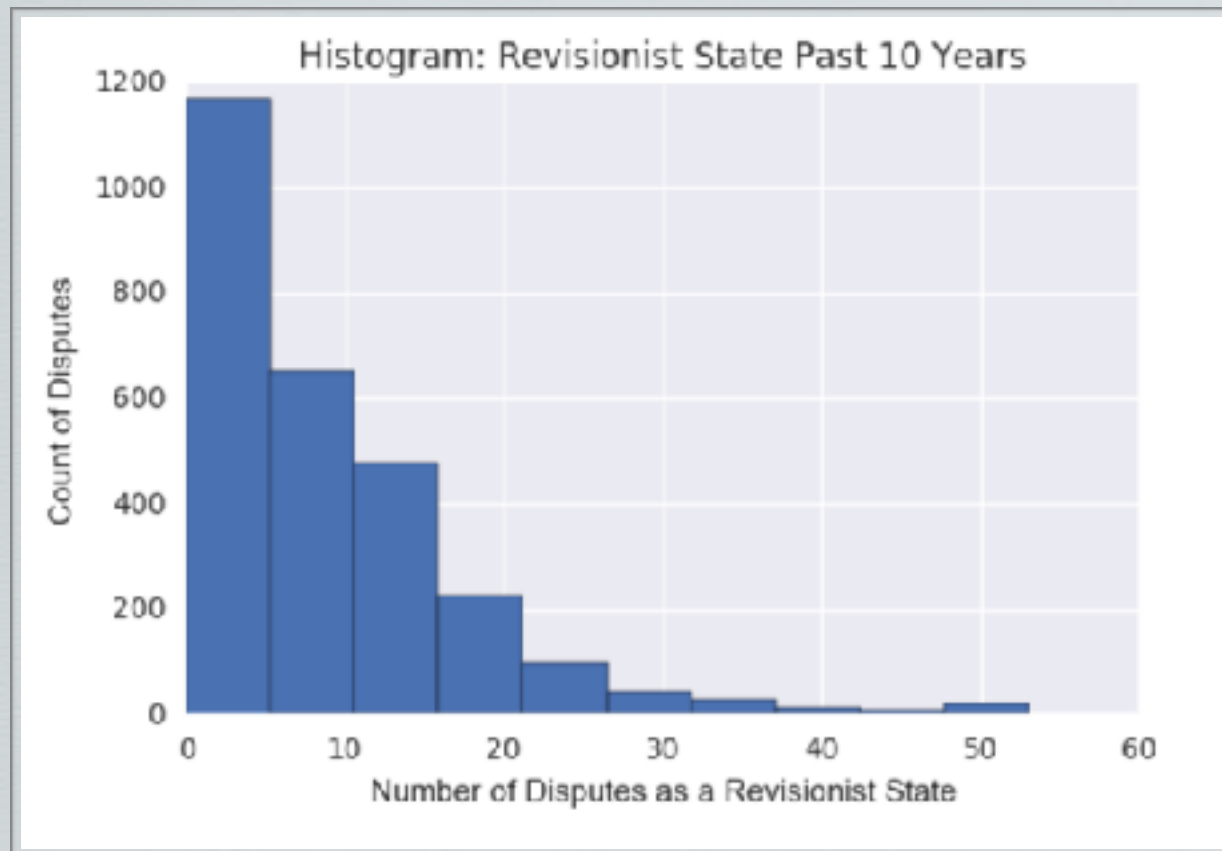


Engineered Features

- For past 1-10 years country's:
 - Sum of Dispute days
 - Sum of Disputes as a Revisionist State
 - Sum of Fatalities
 - Count of Disputes
 - Count of Alliances during disputes
- Self joins, select time, group by



Revisionist States



Time Series: Random Forest

- Model 1: No Militarized Action, Threat of Force, Display of Force, Use of Force, War
- Time Series Split 1

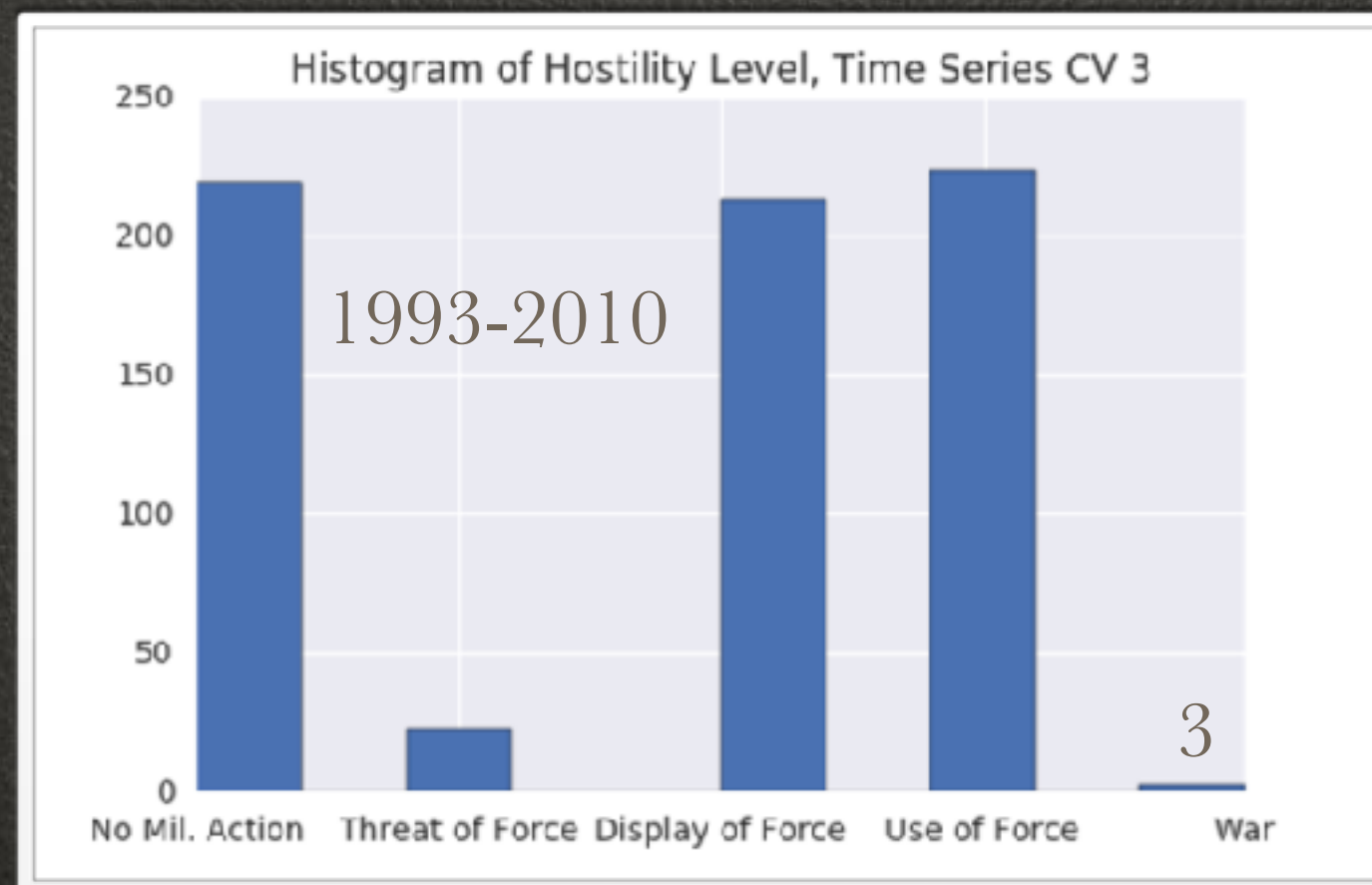
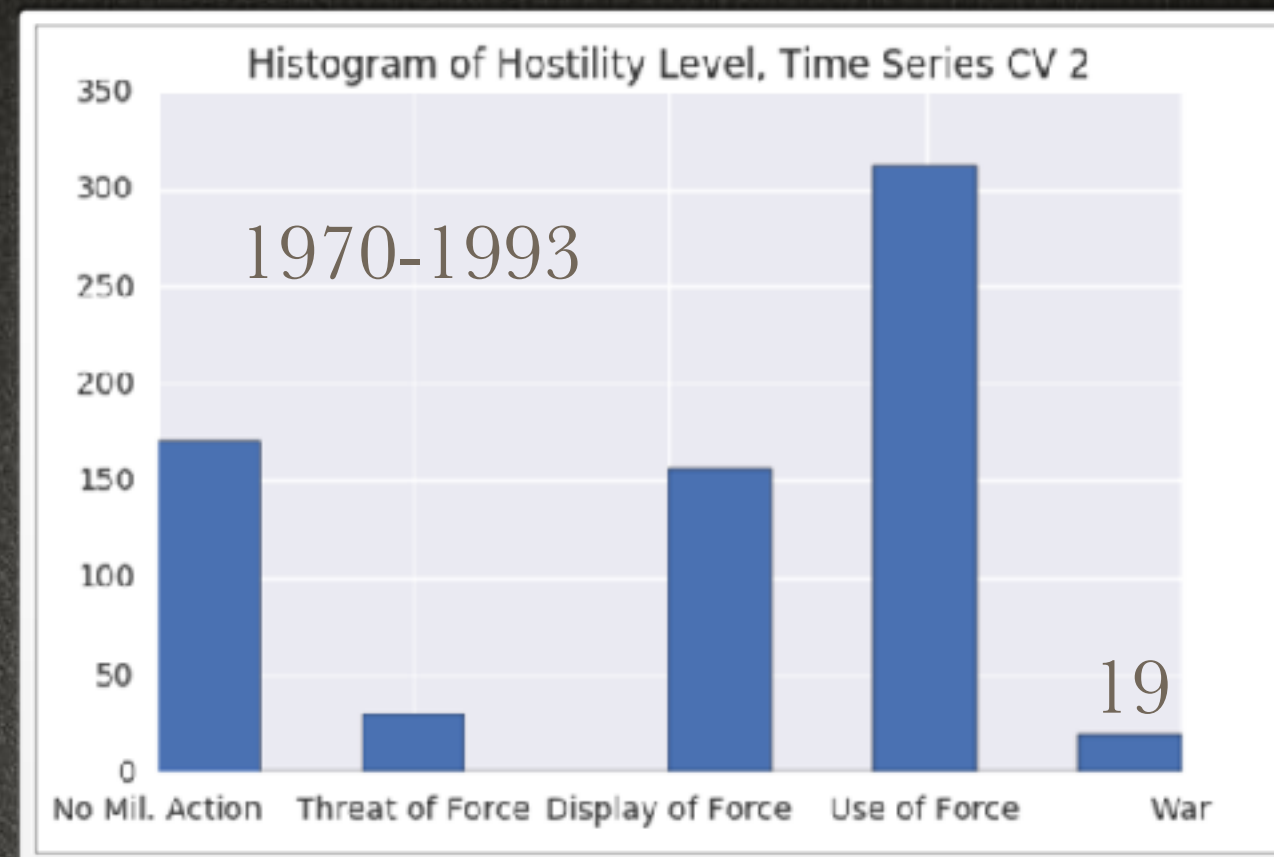
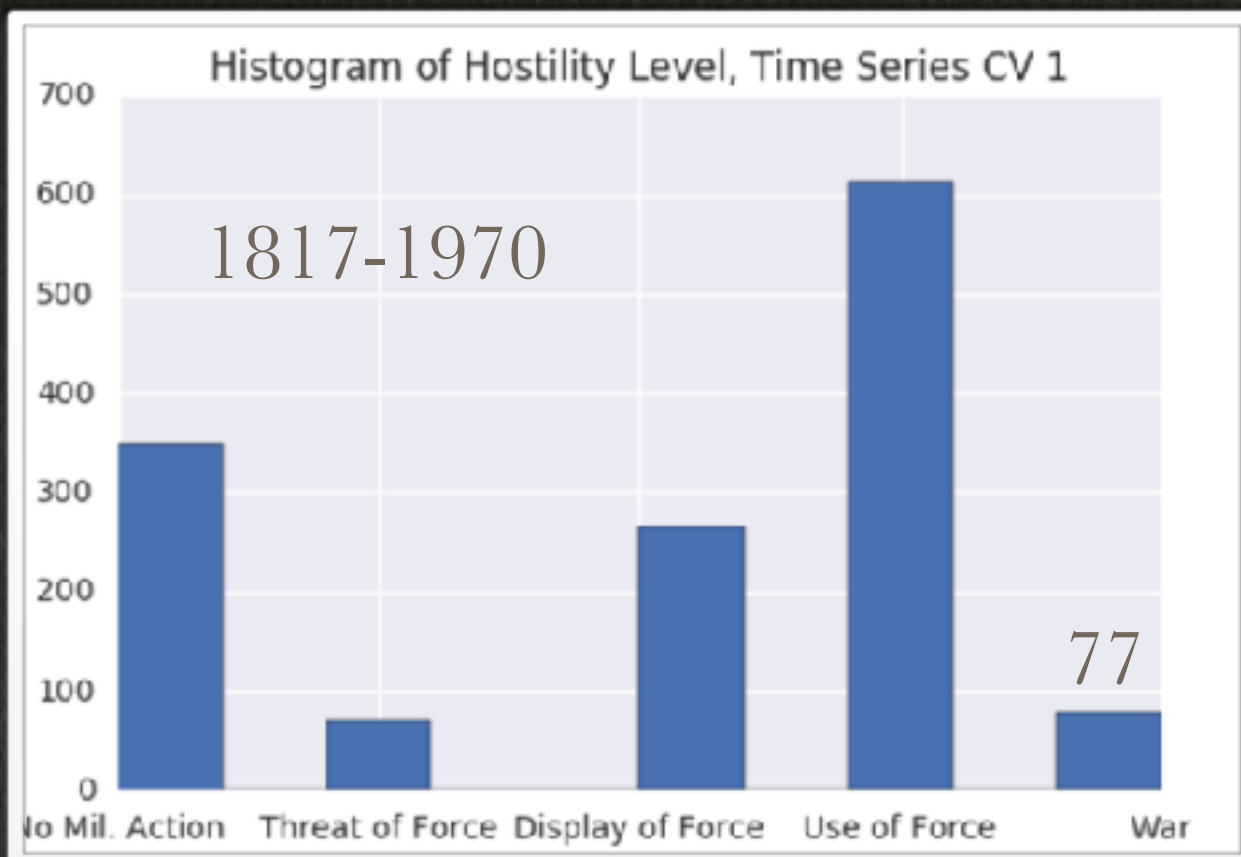
	No Militarized Action	Threat of Force	Display of Force	Use of Force	War
Precision (for each class):	[0.43609023	0.	0.19205298	0.5140665	0.]
Recall (for each class):	[0.36942675	0.	0.19594595	0.60725076	0.]
Accuracy Score:	0.419825072886				

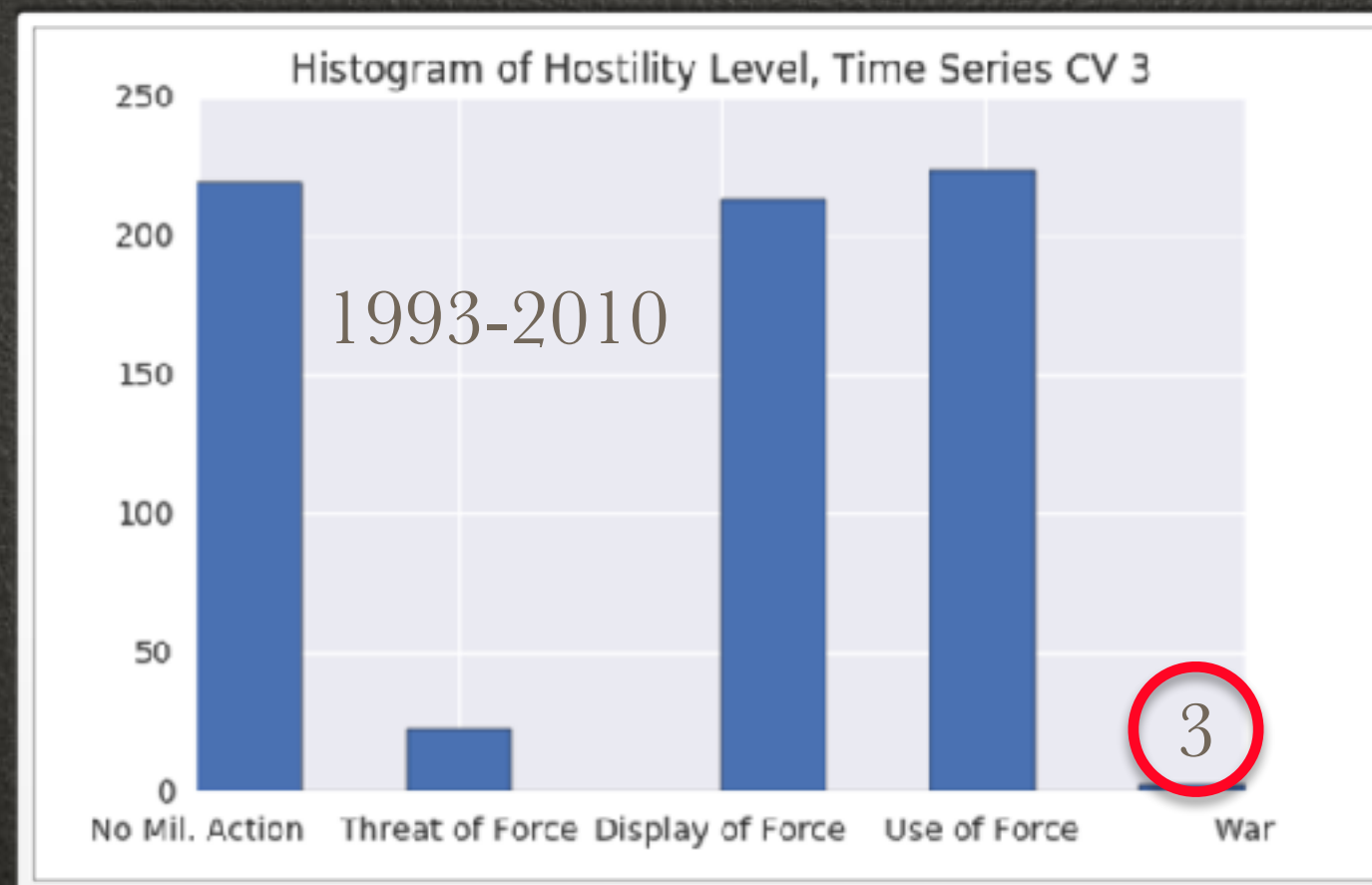
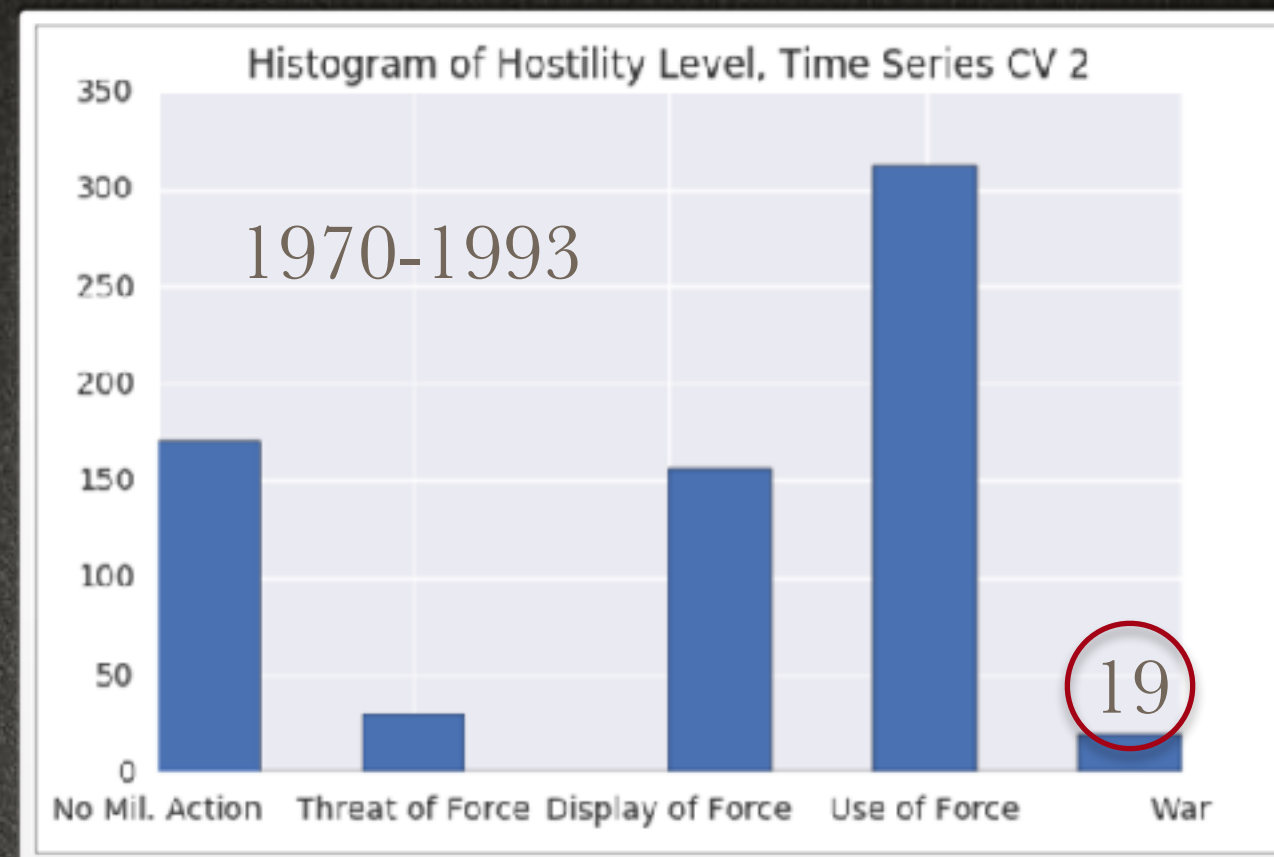
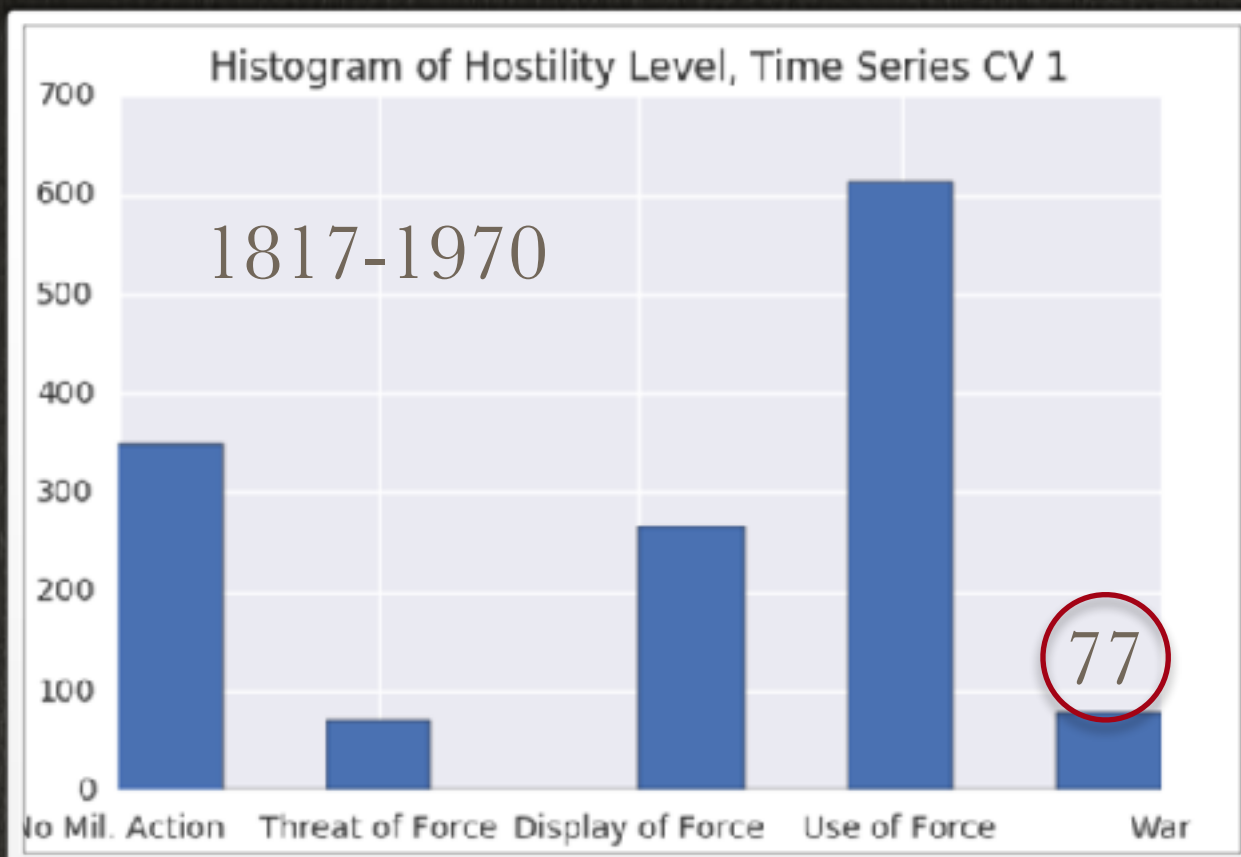
- Time Series Split 2

	No Militarized Action	Threat of Force	Display of Force	Use of Force	War
Precision (for each class):	[0.4619883	0.	0.28318584	0.54081633	0.]
Recall (for each class):	[0.46470588	0.	0.20512821	0.67948718	0.]
Accuracy Score:	0.47084548105				

- Time Series split 3

	No Militarized Action	Threat of Force	Display of Force	Use of Force	War
Precision (for each class):	[0.47560976	0.05882353	0.33536585	0.37910448	0.]
Recall (for each class):	[0.35616438	0.04347826	0.25821596	0.56696429	0.]
Accuracy Score:	0.382697947214				

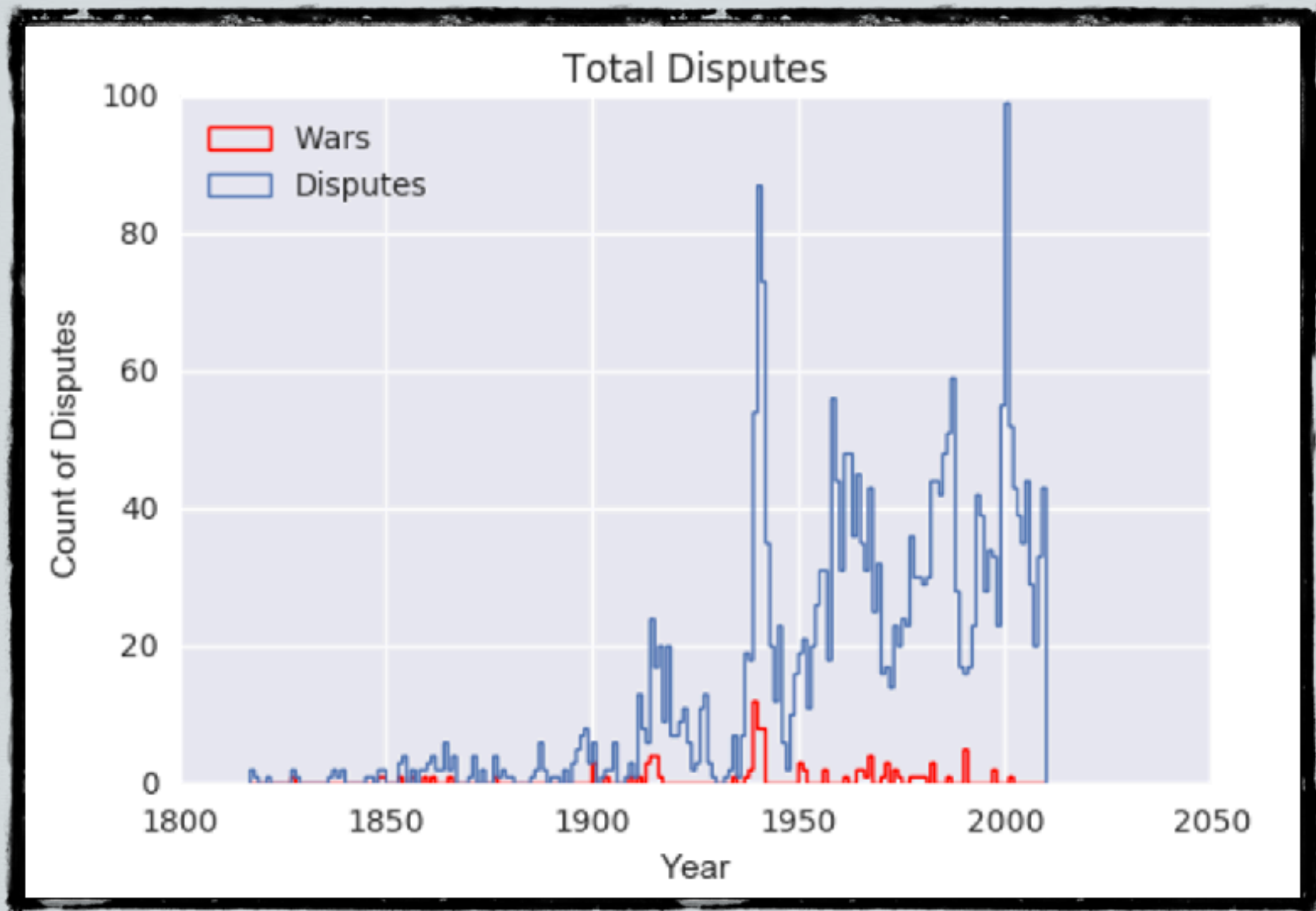




Distribution Interpretations

- Older disputes, more likely to be recorded when they were wars
- More recent disputes, can send troops without declaring war
- Nuances between uses of force and war may be changing over time



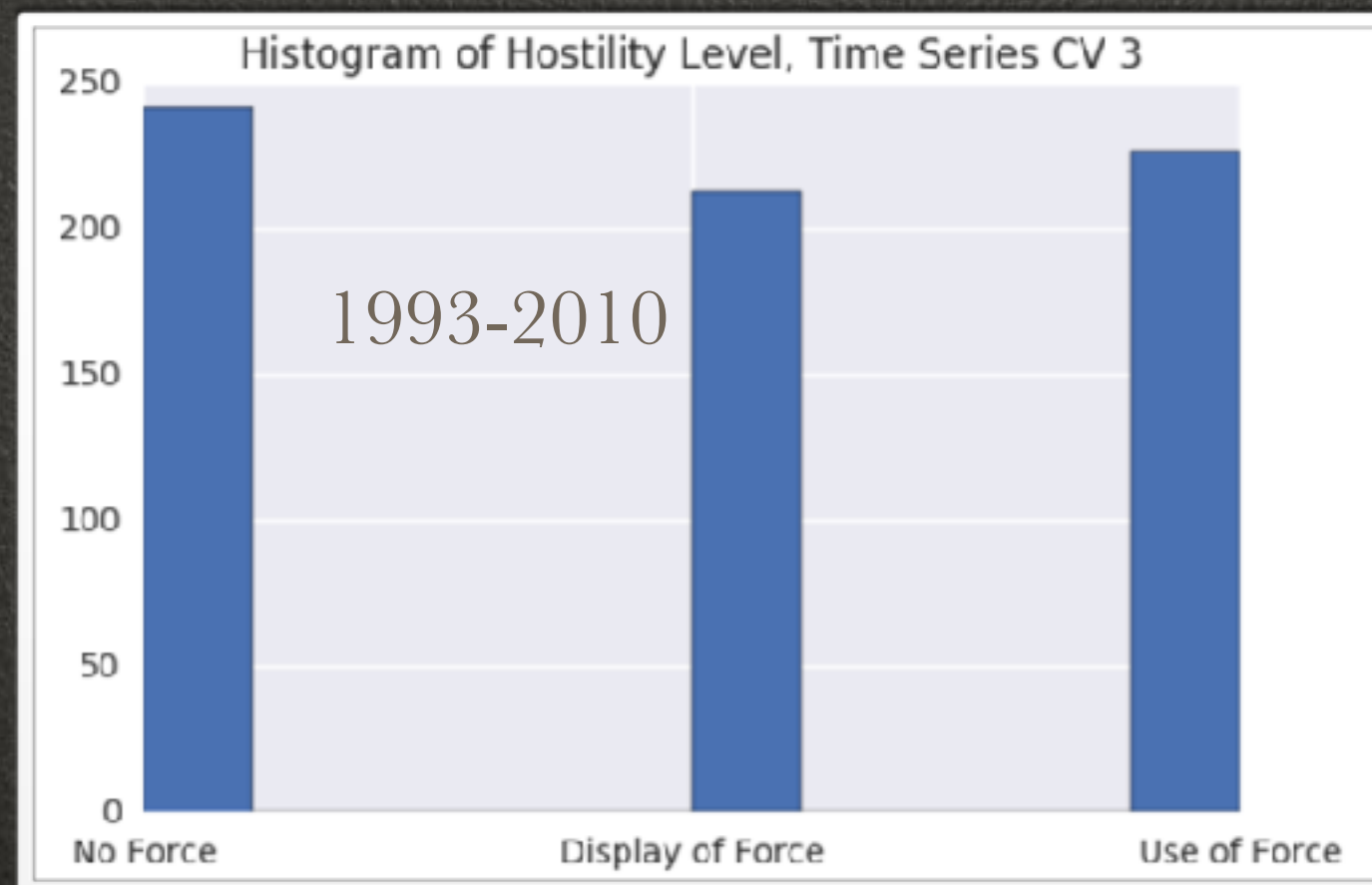
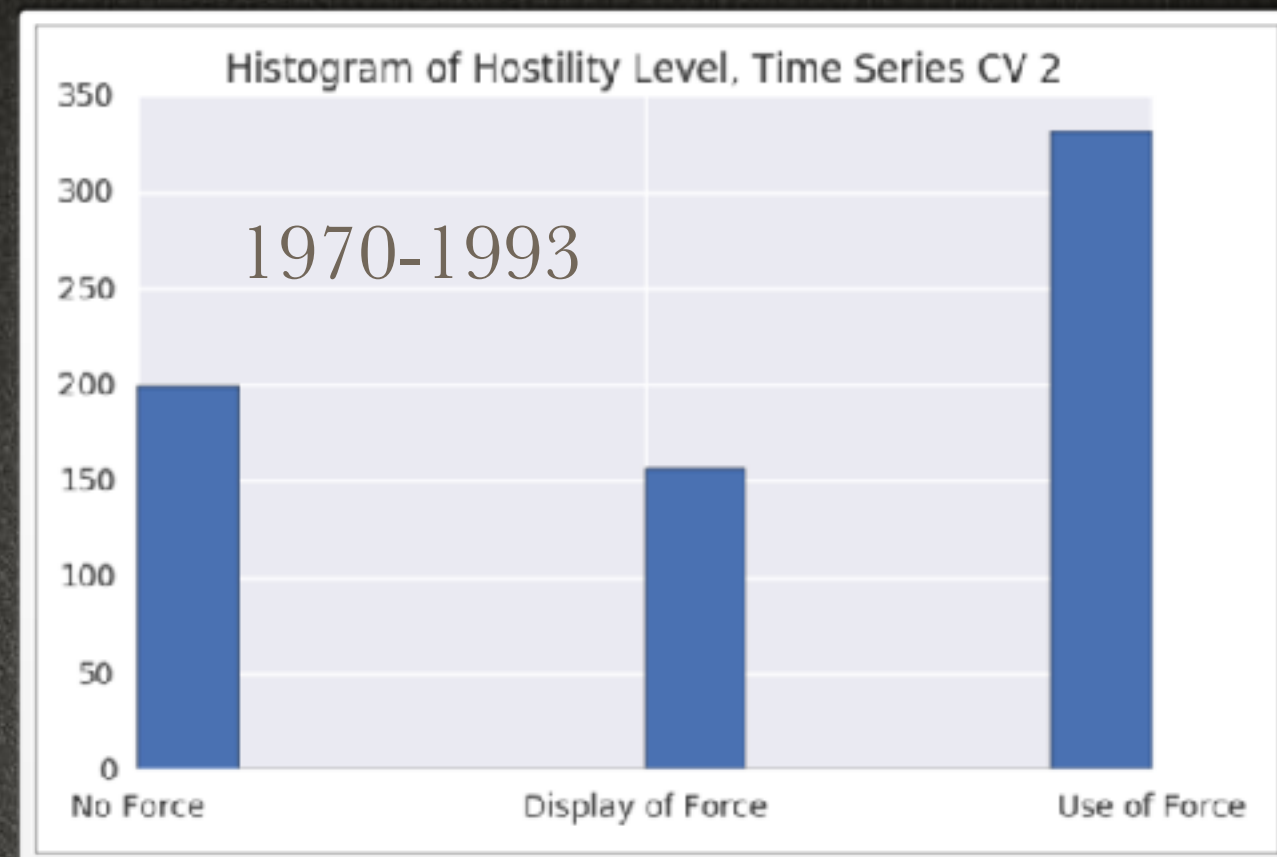
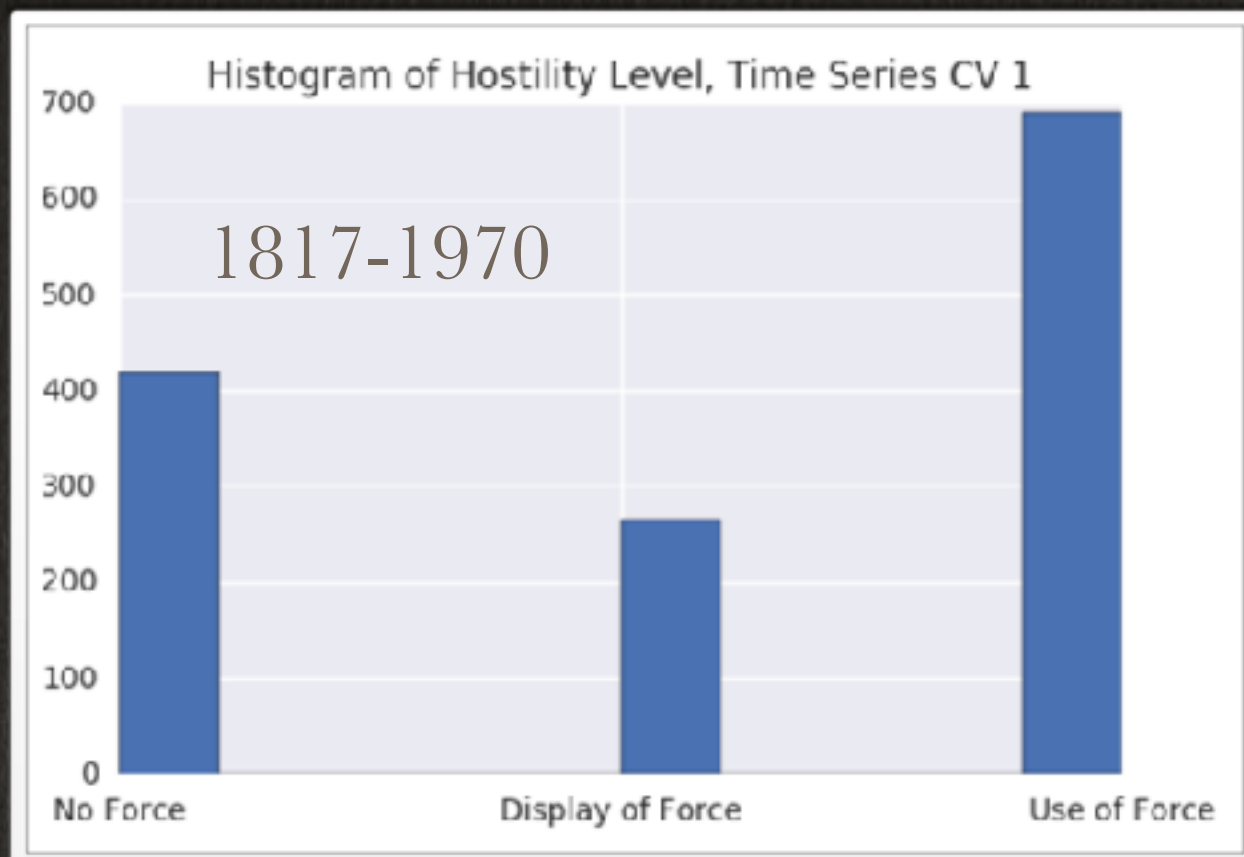


While Wars have decreased, total disputes have increased in recent history, indicating a change in what constitutes war.



GOAL IS TO PREDICT VIOLENCE

Focus on Use of Force
Focus on Recall



Time Series: Random Forest

- Model 2: No Force, Display of Force, Use of Force
- Time Series Split 1

	No Force	Display of Force	Use of Force
Precision (for each class):	[0.41176471	0.17283951	0.53588517]
Recall (for each class):	[0.40740741	0.09459459	0.64183381]
Accuracy Score:	0.459183673469		

- Time Series Split 2

	No Force	Display of Force	Use of Force
Precision (for each class):	[0.50248756	0.3	0.61728395]
Recall (for each class):	[0.50753769	0.15384615	0.75528701]
Accuracy Score:	0.546647230321		

- Time Series split 3

	No Force	Display of Force	Use of Force
Precision (for each class):	[0.44067797	0.43636364	0.4]
Recall (for each class):	[0.32231405	0.22535211	0.69603524]
Accuracy Score:	0.41642228739		

Time Series: Random Forest

- Model Comparisons
- 5 Class Model

	No Militarized Action	Threat of Force	Display of Force	Use of Force	War
Precision (for each class):	[0.47560976	0.05882353	0.33536585	0.37910448	0.]
Recall (for each class):	[0.35616438	0.04347826	0.25821596	0.56696429	0.]
Accuracy Score:	0.382697947214				

- 3 Class Model

	No Force	Display of Force	Use of Force
Precision (for each class):	[0.44067797	0.43636364	0.4]
Recall (for each class):	[0.32231405	0.22535211	0.69603524]
Accuracy Score:	0.41642228739		

Revisionist State (0.053) • Number of Alliances (0.027)
Primary Energy Consumption (0.026)
Composite Index of National Capability (0.026) score
Dispute Durations (1-10 year sums)

QUESTIONS?