1. Dataset

I have chosen this dataset because it closely matches my project's specifications: it has thousands of images of different weapons, categorized into folders and preprocessed into training and testing sets. I also do not need to resize the images, as they are already all in the same compact format. The presence of many categories will give me the possibility to expand the kind of weapons that can be classified if needed.

2. Methodology

i. Data Preprocessing

The dataset is feasible, as I have more than enough data to work with (around 700-2000 pictures per category). I plan on extracting the color values of every picture and storing them in matrices, either in grayscale or RGB values. I prefer using RGB, as the detection system will be more accurate, but if training time is unbearable, I will use grayscale instead.

ii. Machine learning model

I want to detect (estimate) the presence of dangerous weapons either in videos or pictures (if video is too hard). I plan on using a supervised deep learning algorithm because I have plenty of data and therefore can scale the performance of the model. I will first try out built-in models in tensorflow and derive my own if I have enough time.

iii. Final conceptualization

I plan on either creating a mobile app or a web app if its too complicated. I want to create a simple UI that has access to either the phone's camera or a PC's webcam to record/take pictures. Once a weapon has been detected, there will be a colored box surrounding its area and an alert stating the type of the weapon