One of the largest draw backs of neural networks is the black box effect, you just do not know exactly why or how it came up with its output. Neural networks are hard to understand by nature and therefore make debugging and training harder. Creating the algorithms can be tedious work that subject level experts may struggle with. Development can take a long time and onboarding a new developer/maintainer could take a lot of time and effort to get them up to speed. Another disadvantage is the amount of data you need, the more data that you feed into a neural network the more it will be trained and tuned. While these all can be disadvantages, when using a neural network for a task that requires it, it usually is far superior to other ways of processing the data. For instance, image recognition can be majorly enhanced with using a trained and seasoned neural network over a static image recognition library that relies on similar pictures.