For testing this exercise LR= 0.001,0.0001,0.01;

1. Adam’s method considered as a method of Stochastic Optimization is a technique implementing adaptive learning rate. Whereas in normal SGD the learning rate has an equivalent type of effect for all the weights/parameters of the model.
2. Figure below shows the loss per epoch curve for different learning rates. Two different optimizers, SGD and ADM are compared over the different learning rates.

Graphical user interface, chart, line chart

Description automatically generated

Fig a: Loss and accuracy when the model is using different learning rates (SGD).

1. Also, Fig a- for sgd optimizer graph shows that at higher learning rate accuracy is higher and risk is low.
2. When we compare both optimizer for same learning rate we can see that adam is performing really well over sgd.
3. When lr=0.001, optimizer=SGD we get accuracy from 25 percent to 82 percent whereas risk is decreasing slowly.
4. When lr=0.0001, optimizer=SGD we get accuracy from 20 percent to 82 percent whereas risk is almost constant (0.25).
5. When lr=0.01, optimizer=SGD we get accuracy from 20 percent to 85 percent whereas risk is decreasing slowly (0.08 at the end).

Chart, line chart

Description automatically generated

Fig b: Loss and accuracy when the model is using different learning rates (ADM).

1. Fig b- for Adam optimizer graph shows that at higher learning rate accuracy is higher and risk is low.
2. When lr=0.001, optimizer=ADM we get accuracy from 20 percent to 96 percent whereas risk is decreasing slowly.
3. When lr=0.0001, optimizer=ADM we get accuracy from 20 percent to 86 percent whereas risk is decreasing slowly (from0.25 to 0.08).
4. When lr=0.1, optimizer=ADM we get accuracy from 20 percent to 98 percent percent whereas risk is decreasing slowly (0.05 at the end).

From above explanation, by looking at number of accuracy and risk: as learning rate is increasing accuracy is increasing. Also ADM optimizer is performing well, giving more accuracy and less risk than SGD.