**Day 18**

**What to do?**

Learn about RMSProp optimizer.

**RMSProp (Root mean square propagation):**

It is evident that the neural networks’ best model is chosen when they back propagate to update the weights and biases at their layers to reduce the loss. It optimizes the network. The algorithm that is used to change the weights and biases is called as optimization, and there are various optimization algorithms in neural network to choose from. Each optimizer is different. Some learn faster by taking larger steps, whereas some learn slower by taking smaller steps to reach local optima (place where loss is minimum). One of them being RMSProp optimizer.

This optimizer takes larger steps to converge faster. Since RMSProp is all about how fast it learns to reduce the loss, the equations to update the weights and biases are analogous to physics concepts of how velocity changes with acceleration and friction.

The equations below show how the weights (W) and biases (b) are updated in RMSProp optimizer. Here beta acts as friction (which is usually 0.9), v\_dw acts as velocity in which the gradients change with every step and dw acts as the acceleration which holds the gradient value. (The equations for v\_dw and v\_db are same as exponentially weighted average equations except the square!). The update equations W and b have epsilon (a ridiculously small value) added to their denominator because v\_dw could lead to zero sometimes.

