

Variable Learning Rate

- **Idea: speed up the convergence by increasing the learning rate on flat surfaces and decreasing it when the slope increases**
- **Update the weights**
- **Calculate the squared error (over the entire training set)**
- **If the error increases by more than a predefined % θ (1-5%):**
 - **Weight update is discarded**
 - **Learning rate is decreased by some factor ($1 > \alpha > 0$) [$\alpha=5\%$ typically]**
 - **Momentum is set to 0**
- **If the error increases by less than θ :**
 - **Weight update is accepted**
 - **Learning rate is unchanged**
 - **If momentum has been set to 0, it is reset to its original value**
- **If the error decreases:**
 - **Weight update is accepted**
 - **Learning rate is increased by some factor $\beta > 1$**
 - **If momentum has been set to 0, it is reset to its original value**

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1