|  |  |  |  |
| --- | --- | --- | --- |
| learning rates | RMSProp | AdaGrad | SGD |
| 0.01 | 0.0777 | 0.0571 | 0.0510 |
| 0.02 | 0.1581 | 0.0410 | 0.0410 |
| 0.03 | 0.2075 | 0.0396 | 0.0367 |
| 0.04 | 2.3035 | 0.0426 | 0.0338 |
| 0.05 | 0.4765 | 0.0540 | 0.0383 |

Test loss

|  |  |  |  |
| --- | --- | --- | --- |
| learning rates | RMSProp | AdaGrad | SGD |
| 0.01 | 124.4358720779419 | 136.5499711036682 | 134.809672832489 |
| 0.02 | 131.91999292373657 | 176.07710576057434 | 128.08544898033142 |
| 0.03 | 125.31782793998718 | 225.0645980834961 | 129.88648295402527 |
| 0.04 | 144.53284883499146 | 290.6422200202942 | 124.5013279914856 |
| 0.05 | 125.99141097068787 | 241.92013788223267 | 124.566565990448 |

Time (Training+testing)

|  |  |  |  |
| --- | --- | --- | --- |
| learning rates | RMSProp | AdaGrad | SGD |
| 0.01 | 9774/10000 | 9815/10000 | 9840/10000 |
| 0.02 | 9598/10000 | 9861/10000 | 9861/10000 |
| 0.03 | 9471/10000 | 9870/10000 | 9876/10000 |
| 0.04 | 1010/10000 | 9871/10000 | 9884/10000 |
| 0.05 | 8728/10000 | 9831/10000 | 9882/10000 |

Accuracy

RMS at 0.005 is Average loss: 0.0561, Accuracy: 9853/10000 (99%)

Training and Testing total excution time is: 130.7267463207245 seconds