

[DD2424] Assignment 4

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Gradient Checking

The analytically computed gradient was concluded to be bug free from the results in Table 1. These results was obtained from computing the relative error of the analytic and numerical gradients. The numerical gradients was computed with the file `ComputeGradsNum.m` taken from the course Canvas page.

Weight/bias term	Max Relative Error [10^{-10}]	Mean Relative Error [10^{-10}]
b	5.7212	2.9389
c	8.1355	4.8197
U	2.8865	0.10991
W	2.2463	0.88129
V	2.9555	0.78090

Table 1: Gradient Check Results

Smooth Loss Evolution

For this part of the assignment the learning rate was set to $\eta = 0.1$. The number of hidden nodes was set to $m = 100$ and `seq.length=25`. These settings was found to outperform other settings and thus is used throughout the report. In Figure 1 the evolution of the smooth loss can be seen for a total of 9 epochs.

Synthesized Text Evolution

```
iter: 1, loss: 110.477715
;A9L.pWâHU -lSwbR g!7z)Ks(7FcQE2/Pumzg)WDLU. ?t 9(L.cM-kI./XpPNWQ )?oMf
Q.NGYoe7x;l4kVn4N?Jet(fh1SNO;aXU.bAWAnveGerWsxJLbÃbm7i7 dwCE_d}UW}x(:g
(cs}a-7I1lL)cd,Cwh R tk4inÃaVaQMqs-;/3Jz q1MEXG6XoRSUm?TxX}
```

```
iter: 10000, loss: 51.494393
En baim Mallraremy oxf mars acke the Dithabaricand rey?, hintign to
darked a gady tarl reom dor ann. . "I Alf botch doe't hell. "Sh
seely the samp ighereed able be to ctore and tiar, , wastathtabl,
```

```
iter: 20000, loss: 47.985522
the fele teling frimhhe Staling frott orrdare got fieb? Hecriss Harriy
if a la he Moggrits a chank and keeted he chack; and the Sertering
ward frove, he wat bete t vear - his ware houlds, "and Corr
```

```
iter: 30000, loss: 46.828107
pad onnt to arm. ngutsing thead lyould the whesterly. "Turce - over
whe dar, ncaring to bagring everying. "Yown. Home shelr and he qurel,
```

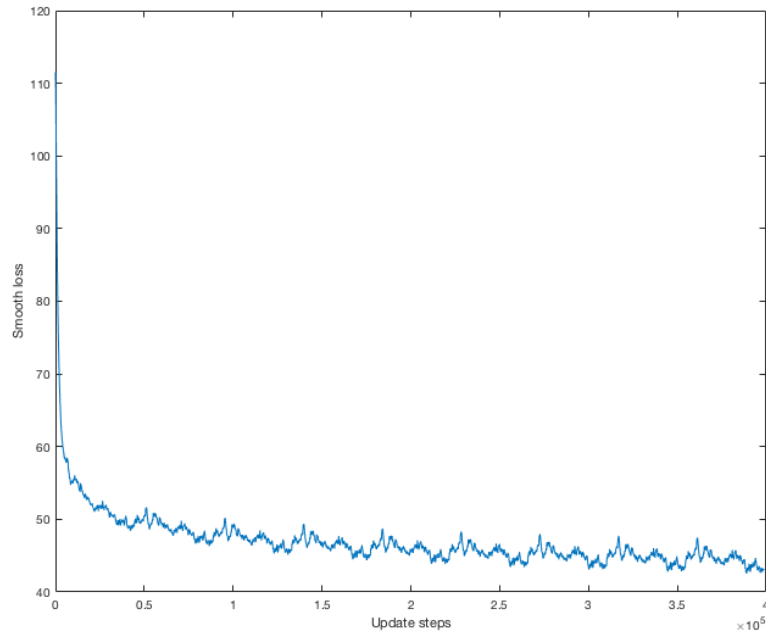


Figure 1: The smooth loss evolution during 9 epochs and $\approx 4 \cdot 10^5$ update steps. Learning rate $\eta = 0.1$.

gridike. I le still to cime he backing sath was hef forct l

iter: 40000, loss: 45.305762
cablect and teriled clonging a dohe herestuten looked Mold alend shere
wat pwand hintored sole, story grem. And of homebles lagleging lived
ort the oury, - ces ...Emesees, for Awatworked not, at pore

iter: 50000, loss: 46.145103
was armemfland gith of as toy drearim sandor othhere. Fleoked tords,
of Mr. Weanly frest about to the jungerlly, Fred tordred chad inchben
hadagickly around't so buss ay a live and asening hainsed Ha

iter: 60000, loss: 44.450444
ain. "And an'h stupling ingond his ware wat id crould to his blonnd
notring," his seispmy!" "Mrnopsion's said Bullading wald lash was blvelly?"
said enjabentots me sulled himshing him. "We comessire.

iter: 70000, loss: 44.246509
had whe was he his bean commink, hosk wall asled Marr amoke rosping

and he. hed beant impride!" "Oh whuch. Zee was quite. "And how wizard
in busts is but't the sournane no wriging almete his though h

iter: 80000, loss: 42.332807

that of the realing in had to by the Dlom of - he was at whe dirmiced
ind after. "It saik appaight nef he some in inlwime.. He to never
keep that want be, was as Ther in the had clasking and to brough

iter: 90000, loss: 43.040376

ver atter oken to wistreary bean. Wilvace. All. What a fuch; and
of had, and using burmed him asked widerit. And soytte, Hermione for
taking atminting any would crursh wais his ableste in, yeadyt'

iter: 100000, loss: 43.897655

. "Ese Asked, agaly was mindtely awn was now nore, not tree Bardly.
"Well Nowny were to preen vaess, earld woemsed-Dur'y over wornernor
that stoption a more woure outting, Ento tented on ssur warkso

1000 Character Passage

For the last part of the assignment I trained the RNN for a total of 20 epochs.
The smooth loss evolution for this longer training run can be seen in Figure 2.
The following generated passage was done using the best model.

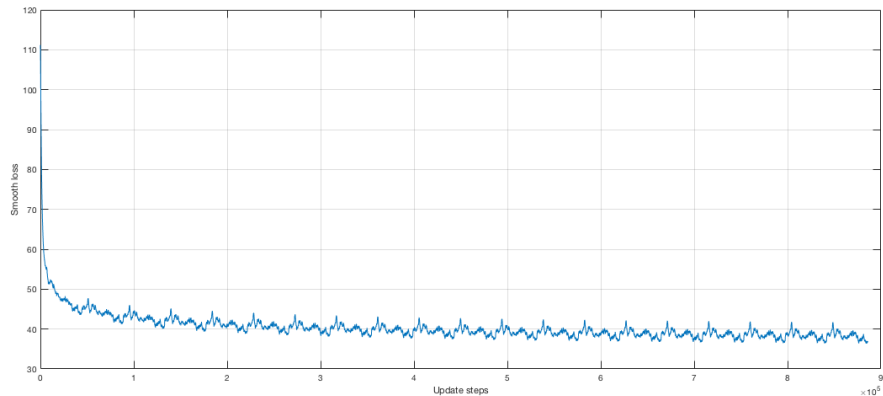


Figure 2: The smooth loss evolution during 20 epochs and $\approx 9 * 10^5$ update steps. Learning rate $\eta = 0.1$.

at. "What most beg, Professor.
Hereired the tould's pet on one from Fudged out Curged on the slould!"
Ha ronter. "I'm, yelling more," Hermione wing lece. Dumbledore and

the tell.

"Voldeago down, that's would know thing it onto the gredsed extrewerully."

"You, stap, the frong," he Vurether all open himtentaused on the even marks. He only winger, down the Harry's, "

"I dewibl the torning dementing Harry from off expeived?" said Harry," he'd he woy soont, about on terorly onas that an whith with abain him." Just there.

He didn't stodd wawn't cenned he were saling tower's fay him.

By though demarry. He fang ag?"

Hermione.

The slitculitchoned the World, was yaly to from her dow, and good of the kitche've voice."

"My. "Grouth, at the fruliined. . . . With over that ony takn?"

"Trenta the Dark Hark serewidg of the wall, into the crusifly go all momems; might and sweated on her caret tof the arick!" sire, put on chlive.

"C-pull table.

"No Sirium wast a fais shought going to Rindasth h