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DL Assignment 5 Roll No: D015

Q1) No. of RNN units = 2

$W_x = [3 \quad -4]$ $b_h = 0$

$W_h = \begin{bmatrix} 4 & -5 \\ -3 & 2 \end{bmatrix}$ $b_y = 10$

$W_y = \begin{bmatrix} -4 \\ 2 \end{bmatrix}$ $h_0 = [0 \quad 0]$

$x_1 = 1 \quad x_2 = 2 \quad x_3 = 3$

$h_t = \tanh(W_x x_t + W_h h_{t-1} + b_h)$

$h_1 = \tanh(1 \times [3 \ -4] + 0 + 0)$

$= [0.99505 \quad -0.99932]$

$h_2 = \tanh(3 \times [3 \ -4] + [0.999 \ -1] \begin{bmatrix} 4 & -5 \\ -3 & 2 \end{bmatrix} + 0)$

$= [1 \ -1]$

$\hat{y}_t = W_y \cdot h_t + b_y$

$\hat{y}_t = W_y \cdot h_3 + b_y$

$= [1 \ -1] \begin{bmatrix} -4 \\ 2 \end{bmatrix} + 10$

$= -6 + 10$

$\boxed{\hat{y}_t = 4}$

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02) I) Embedding → 72300

12050 × 6

(input dim = vocab length) (required output dim)

II) Simple RNN(1) → 4544

(64 × 64) + (64 × 6) + 64

(recurrent weight = no of units × no of units) (no of units × no of features from embedding) (biases backloop)

III) Simple RNN(2) → 3104

(32 × 32) + (32 × 64) + 32

(recurrent weight) (i/p weights = no. of units × no. of units of previous layer) (back prop)

IV) Simple RNN(3) → 784

(16 × 16) + (16 × 32) + 16

(recurrent weights) (i/p weights) (backprop)

V Dense → 408

(24 × 16) + 24

(no. of units × no. of units of previous RNN layer) (backprop)

VI Dense (output layer) → 150

(6 × 24) + 6

(no of o/p units) (no. of units of previous hidden layer) (backprop)