**Lembar Jawaban Kalkulasi Neural Network**

**Pada lembar jawaban ini, kamu dapat menuliskan cara mengkalkulasikan nilai-nilai yang diminta pada arsitektur neural network sesuai soal, ya, semangat!😄**

Pertama, masukkan dulu nilai initial value dan randomnya ya …

**Initial Value**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **x1** | **x2** | **x3** | **α** | **Threshold** | **Yd,6** |
| 0,7 | 0,8 | 0,9 | 0,1 | -1 | 0 |

**Initial Random**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **W14** | **W15** | **W24** | **W25** | **W34** | **W35** | **W46** | **W56** | **θ4** | **θ5** | **θ6** |
| 0,5 | 0,6 | 0,3 | 1,1 | -1,0 | 0,1 | -1,1 | -0,7 | 0,2 | 0,3 | 0,4 |

Jika sudah selesai, kita akan masuk ke langkah-langkah kalkulasi, sebagai berikut:

**Forward Pass**

Forward Pass merupakan hasil dari langkah 1 pada proses kalkulasi di challenge deck. Oleh karena itu kamu tuliskan langkah kalkulasi yang kamu lakukan untuk mencari nilai-nilai di bawah ini, ya🙌

**Langkah 1: Menghitung output Neuron 4 (y4), Neuron 5 (y5), Neuron 6 (y6), dan Error menggunakan sigmoid function**

|  |  |
| --- | --- |
| Y4 | = =(0.7\*0.5+0.8\*0.3+0.9\*-1-0.2) = -0.51 |
|  | = =1 / (1 + EXP(-(-0.51))) = 0.3752 |
|  | = |
| Y5 | = =(0.7\*0.6+0.8\*1.1+0.9\*0.1-0.3) = 1.09 |
|  | = =1 / (1 + EXP(-1.09)) = 0.7484 |
|  | = |
| Y6 | = =(0.3752\*-1.1+0.7484\*-0.7-0.4) = -1.3366 |
|  | = =1 / (1 + EXP(-(-1.3366))) = 0.2081 |
|  | = |
| e | = =0-(0.7484) = -0.7484 |
|  | = |
|  | = |

Lalu isi rangkuman hasilnya di tabel ini ya …

|  |  |  |  |
| --- | --- | --- | --- |
| **Y4** | **Y5** | **Y6** | **e** |
| 0.3752 | 0.7484 | 0.2081 | -0.7484 |

**Backward Pass**

Sementara itu, nilai-nilai dari backward pass didapatkan dengan menjalankan langkah 2, 3, dan 4. Jangan lupa tuliskan proses dan hasil kalkulasinya pada tempat yang telah disediakan di bawah, ya👍

**Langkah 2: Hitung error gradient untuk Neuron 6 di Output Layer dan weight corrections**

|  |  |
| --- | --- |
| δ6 | = =0.2081\*(1-0.2081)\*(-0.7484) = -0.1233321215 |
|  | = |
|  | = |
| ∇46 | = =0.1\*(0.3752)\*(-0.1233321215) = -0.004627421199 |
|  | = |
|  | = |
| ∇56 | = =0.1\*(0.7484)\*(-0.1233321215) = -0.009230175973 |
|  | = |
|  | = |
| ∇θ6 | = =0.1\*(-1)\*(-0.1233321215) = 0.01233321215 |
|  | = |
|  | = |

Lalu isi rangkuman hasilnya di tabel ini ya …

|  |  |  |  |
| --- | --- | --- | --- |
| **δ6** | **∇46** | **∇56** | **∇θ6** |
| -0.1233321215 | -0.004627421199 | -0.009230175973 | 0.01233321215 |

**Langkah 3: Hitung error gradients untuk Neuron 4 dan Neuron 5 di Middle Layer/Hidden Layer**

|  |  |
| --- | --- |
| δ4 | ==0.3752\*(1-0.3752)\*(-0.1233321215)\*(-1.1) = 0.03180334041 |
|  | = |
|  | = |
| δ5 | ==0.7484\*(1-0.7484)\*(-0.1233321215)\*(-0.7) = 0.01625618592 |
|  | = |
|  | = |

Lalu isi rangkuman hasilnya di tabel ini ya …

|  |  |
| --- | --- |
| **δ4** | **δ5** |
| 0.03180334041 | 0.01625618592 |

**Langkah 4: Hitung weight corrections**

|  |  |
| --- | --- |
| ∇w14 | ==(0.1)\*(0.7)\*(0.03180334041) = 0.002226233829 |
|  | = |
|  | = |
| ∇w24 | ==(0.1)\*(0.8)\*(0.03180334041) = 0.002544267233 |
|  | = |
|  | = |
| ∇w34 | ==(0.1)\*(0.9)\*(0.03180334041) = 0.002862300637 |
|  | = |
|  | = |
| ∇θ4 | ==(0.1)\*(-1)\*(0.03180334041) = -0.003180334041 |
|  | = |
|  | = |
| ∇w15 | ==(0.1)\*(0.7)\*(0.01625618592) = 0.001137933014 |
|  | = |
|  | = |
| ∇w25 | ==(0.1)\*(0.8)\*(0.01625618592) = 0.001300494874 |
|  | = |
|  | = |
| ∇w35 | ==(0.1)\*(0.9)\*(0.01625618592) = 0.001463056733 |
|  | = |
|  | = |
| ∇θ5 | ==(0.1)\*(-1)\*(0.01625618592) = -0.001625618592 |
|  | = |
|  | = |

Lalu isi rangkuman hasilnya di tabel ini ya …

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **∇w14** | **∇w24** | **∇w34** | **∇θ4** | **∇w15** | **∇w25** | **∇w35** | **∇θ5** |
| 0.002226233829 | 0.002544267233 | 0.002862300637 | -0.003180334041 | 0.001137933014 | 0.001300494874 | 0.001463056733 | -0.001625618592 |

**Backward Pass**

Last but not least, adalah nilai-nilai dari updated weight didapatkan dengan menjalankan langkah nomor 5. Seperti biasa, tuliskan proses dan hasil kalkulasinya pada tempat yang telah disediakan di bawah, ya👌

**Langkah 5: Hitung semua weights dan theta pada arsitektur yang telah diperbarui**

|  |  |
| --- | --- |
| w14 | ==(0.5)+(0.002226233829) = 0.5022262338 |
|  | = |
|  | = |
| w15 | ==(0.6)+(0.001137933014) = 0.601137933 |
|  | = |
|  | = |
| w24 | ==(0.3)+(0.002544267233) = 0.3025442672 |
|  | = |
|  | = |
| w25 | ==(1.1)+(0.001300494874) = 1.101300495 |
|  | = |
|  | = |
| w34 | ==(-1)+(0.002862300637) = -0.9971376994 |
|  | = |
|  | = |
| w35 | ==(0.1)+(0.001463056733) = 0.1014630567 |
|  | = |
|  | = |
| θ4 | ==(0.2)+(-0.003180334041) = 0.196819666 |
|  | = |
|  | = |
| θ5 | ==(0.3)+(-0.001625618592) = 0.2983743814 |
|  | = |
|  | = |
| θ6 | ==(0.4)+(0.01233321215) = 0.4123332122 |
|  | = |
|  | = |

Lalu isi rangkuman hasilnya di tabel ini ya …

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **w14** | **w15** | **w24** | **w25** | **w34** | **w35** | **θ4** | **θ5** | **θ6** |
| 0.5022262338 | 0.601137933 | 0.3025442672 | 1.101300495 | -0.9971376994 | 0.1014630567 | 0.196819666 | 0.2983743814 | 0.4123332122 |

**Hore, kamu sudah menyelesaikan satu dari tiga proyek challenge, semoga mendapatkan hasil yang maksimal dan selamat bersenang-senang~**