**Lembar Jawaban Kalkulasi Neural Network**

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

Pertama, masukkan dulu nilai initial value dan initial 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** | **θθ4** | **θθ5** | **θθ6** |
| **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 | =sigmoid(X1W14 + X2W24 +X3W34 – θ4) |
|  | =1/ [1+ e-(0.7x0.5 + 0.8x0.3 + 0.9x(-1.0) - 1x0.2)] |
|  | = **0.375194** |
| Y5 | = sigmoid(X1W15 + X2W25 +X3W35 – θ5) |
|  | = 1/ [1+ e-(0.7x0.6 + 0.8x1.1 + 0.9x0.1 – 1x0.3)] |
|  | = **0.74838** |
| Y6 | = sigmoid(Y4W46 + Y5W56 – θ6) |
|  | = 1/ [1+ e-((0.375194x(-1.1) + 0.74838x(-0.7) – 1x 0.4)] |
|  | = **0.20807** |
| e | = Yd,6 – Y6 |
|  | = 0 – 0.20807 |
|  | = **- 0.20807** |

Lalu isi rangkuman hasilnya di tabel ini ya …

|  |  |  |  |
| --- | --- | --- | --- |
| **Y4** | **Y5** | **Y6** | **e** |
| **0.375194** | **0.74838** | **0.20807** | **- 0.20807** |

**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**

|  |  |
| --- | --- |
| 6 | = Y6(1-Y6)e |
|  | = 0.20807x (1-0.20807) x (- 0.20807) |
|  | = **-0.0343** |
|  | = α x Y4 x 6 |
|  | = 0.1 x 0.375194 x (-0.0343) |
|  | = **-0.00129** |
|  | = α x Y5 x 6 |
|  | = 0.1 x 0.74838 x (-0.0343) |
|  | = **-0.00255** |
|  | = α x (-1) x 6 |
|  | = 0.1 x (-1) x (-0.0343) |
|  | = **0.00343** |

Lalu isi rangkuman hasilnya di tabel ini ya …

|  |  |  |  |
| --- | --- | --- | --- |
| 6 |  |  |  |
| **-0.0343** | **-0.00129** | **-0.00255** | **0.00343** |

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

|  |  |
| --- | --- |
| 4 | = Y4(1-Y4) x 6 x W46 |
|  | = 0.375194 x (1 - 0.375194) x (-0.0343) x (-1.1) |
|  | = **0.008845** |
| 5 | = Y5(1-Y5) x 6 x W56 |
|  | = 0.74838 x (1 - 0.74838) x (-0.0343) x (-0.7) |
|  | = **0.00452** |

Lalu isi rangkuman hasilnya di tabel ini ya …

|  |  |
| --- | --- |
| **4** | **5** |
| **0.008845** | **0.00452** |

**Langkah 4: Hitung weight corrections**

|  |  |
| --- | --- |
|  | = α x X1 x 4 |
|  | = 0.1 x 0.7 x 0.008845 |
|  | = **0.000619** |
|  | = α x X2 x 4 |
|  | = 0.1 x 0.8 x 0.008845 |
|  | = **0.000708** |
|  | = α x X3 x 4 |
|  | = 0.1 x 0.9 x 0.008845 |
|  | = **0.000796** |
|  | = α x (-1) x 4 |
|  | = 0.1 x (-1) x (0.008845) |
|  | = **-0.00088** |
|  | = α x X1 x 5 |
|  | = 0.1 x 0.7 x 0.00452 |
|  | = **0.000316** |
|  | = α x X2 x 5 |
|  | = 0.1 x 0.8 x 0.00452 |
|  | = **0.000362** |
|  | = α x X3 x 5 |
|  | = 0.1 x 0.9 x 0.00452 |
|  | = **0.000407** |
|  | = α x (-1) x 5 |
|  | = 0.1 x (-1) x (0.00452) |
|  | = **-0.00045** |

Lalu isi rangkuman hasilnya di tabel ini ya …

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |
| **0.000619** | **0.000708** | **0.000796** | **-0.00088** | **0.000316** | **0.000362** | **0.000407** | **-0.00045** |

**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**

|  |  |
| --- | --- |
|  | = |
|  | = 0.5 + 0.000619 |
|  | = **0.500619** |
|  | = |
|  | = 0.6 + 0.000316 |
|  | = **0.600316** |
|  | = |
|  | = 0.3 + 0.000708 |
|  | = **0.300708** |
|  | = |
|  | = 1.1 + 0.000362 |
|  | = **1.100362** |
|  | = |
|  | = -1.0 + 0.000796 |
|  | = **-0.999204** |
|  | = |
|  | = 0.1 + 0.000407 |
|  | = **0.100407** |
|  | = |
|  | = -1.1 + (-0.00129) |
|  | = **-1.10129** |
|  | = |
|  | = -0.7 + (-0.00255) |
|  | = **-0.70255** |
|  | = |
|  | = 0.2 + (-0.00088) |
|  | = **0.19912** |
|  | = |
|  | = 0.3 + (-0.00045) |
|  | = **0.29955** |
|  | = |
|  | **=** 0.4 + 0.00343 |
|  | = **0.40343** |

Lalu isi rangkuman hasilnya di tabel ini ya …

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |
| **0.500619** | **0.600316** | **0.300708** | **1.100362** | **-0.999204** | **0.100407** | **-1.10129** | **-0.70255** | **0.19912** | **0.29955** | **0.40343** |

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