Report
Assignment on Artificial Neural Network

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IPYNB LINK

Problem 1

1- Accuracy Table with single hidden layer

Learning Rate	Accuracy
0.1	100%
0.2	100%
0.3	100%
0.4	100%
0.5	100%

2- Accuracy Table with double hidden layers

Learning Rate	Accuracy
0.1	55%
0.2	80%
0.3	80%
0.4	100%
0.5	100%

3- Weights matrix for first 3 iterations for single hidden layer

- Iteration 1

Layer 1-2

```
[[[0.689, 0.356, 0.347, 0.111, 0.471, 0.677, 0.374], [0.131, 0.433, 0.038,
0.633, 0.861, 0.545, 0.011], [0.185, 0.965, 0.958, 0.099, 0.658, 0.337,
0.976], [0.28, 0.349, 0.642, 0.036, 0.066, 0.985, 0.013], [0.116, 0.366,
0.848, 0.982, 0.477, 0.951, 0.863], [0.17, 0.306, 0.571, 0.354, 0.739,
0.669, 0.373], [0.992, 0.984, 0.801, 0.458, 0.924, 0.298, 0.656]],
```

Layer 2-3

```
[[0.143, 0.538, 0.131, 0.217, 0.873, 0.979, 0.059, 0.501], [0.122, 0.926,
0.805, 0.712, 0.909, 0.369, 0.101, 0.414]]]
```

- Iteration 2

Layer 1-2

```
[[[0.689, 0.356, 0.348, 0.117, 0.475, 0.675, 0.383], [0.109, 0.433,
-0.001, 0.619, 0.855, 0.545, -0.058], [0.185, 0.965, 0.954, 0.1, 0.658,
0.333, 0.976], [0.274, 0.345, 0.618, 0.033, 0.062, 0.982, -0.017], [0.099,
0.366, 0.823, 0.967, 0.471, 0.951, 0.805], [0.134, 0.308, 0.548, 0.32,
0.715, 0.667, 0.287], [0.998, 0.984, 0.804, 0.463, 0.924, 0.298, 0.67]],
```

Layer 2-3

```
[[-0.106, 0.311, -0.171, 0.027, 0.562, 0.728, -0.254, 0.109], [-0.035,
0.802, 0.626, 0.567, 0.735, 0.212, -0.08, 0.211]]]
```

- Iteration 3

Layer 1-2

```
[[[0.695, 0.355, 0.365, 0.118, 0.475, 0.675, 0.408], [0.072, 0.439,
-0.062, 0.609, 0.861, 0.527, -0.137], [0.179, 0.965, 0.942, 0.1, 0.66,
0.321, 0.976], [0.254, 0.341, 0.581, 0.034, 0.06, 0.969, -0.048], [0.087,
0.366, 0.794, 0.967, 0.471, 0.951, 0.761], [0.14, 0.319, 0.539, 0.321,
0.714, 0.668, 0.254], [1.004, 0.984, 0.821, 0.465, 0.924, 0.298, 0.696]],
```

Layer 2-3

```
[[-0.133, 0.294, -0.228, 0.022, 0.507, 0.705, -0.31, -0.001], [-0.343,
0.597, 0.282, 0.283, 0.402, -0.073, -0.428, -0.189]]]
```

4- Weights matrix for first 3 iterations for double hidden layer

- Iteration 1

Layer 1-2

```
[[[0.631, 0.97, 0.8, 0.766, 0.983, 0.376, 0.991], [0.403, 0.602, 0.068,
0.965, 0.495, 0.78, 0.887], [0.152, 0.999, 0.942, 0.142, 0.795, 0.197,
0.466], [0.193, 0.298, 0.254, 0.465, 0.849, 0.633, 0.399], [0.578, 0.469,
0.226, 0.437, 0.55, 0.303, 0.565]],
```

Layer 2-3

```
[[0.884, 0.933, 0.458, 0.509, 0.45, 0.518], [0.553, 0.083, 0.459, 0.005,
0.04, 0.517], [0.334, 0.602, 0.777, 0.917, 0.892, 0.916], [0.885, 0.278,
0.844, 0.644, 0.487, 0.971], [0.086, 0.675, 0.276, 0.04, 0.69, 0.769],
[0.507, 0.933, 0.309, 0.356, 0.393, 0.481], [0.346, 0.217, 0.089, 0.895,
0.868, 0.76], [0.624, 0.608, 0.538, 0.122, 0.131, 0.995], [0.476, 0.262,
0.362, 0.448, 0.182, 0.374], [0.051, 0.368, 0.793, 0.099, 0.704, 0.962]],
```

Layer 3-4

```
[[0.621, 0.801, 0.932, 0.59, 0.62, 0.458, 0.982, 0.043, 0.678, 0.622,
0.491], [0.616, 0.709, 0.535, 0.208, 0.661, 0.604, 0.894, 0.444, 0.353,
0.294, 0.42]]]
```

- Iteration 2

Layer 1-2

```
[[[0.631, 0.97, 0.8, 0.766, 0.983, 0.376, 0.99], [0.402, 0.602, 0.068,
0.965, 0.495, 0.78, 0.886], [0.15, 0.999, 0.942, 0.142, 0.795, 0.197,
0.463], [0.192, 0.298, 0.254, 0.465, 0.849, 0.633, 0.397], [0.577, 0.469,
0.226, 0.437, 0.55, 0.303, 0.563]],
```

Layer 2-3

```
[[0.884, 0.933, 0.458, 0.509, 0.45, 0.517], [0.521, 0.057, 0.434, -0.018,
0.016, 0.478], [0.334, 0.602, 0.777, 0.917, 0.892, 0.916], [0.885, 0.278,
0.844, 0.644, 0.487, 0.971], [0.077, 0.666, 0.268, 0.032, 0.681, 0.757],
[0.501, 0.928, 0.305, 0.352, 0.388, 0.475], [0.337, 0.209, 0.082, 0.887,
0.859, 0.748], [0.624, 0.608, 0.538, 0.122, 0.131, 0.995], [0.474, 0.262,
0.362, 0.448, 0.182, 0.37], [0.051, 0.368, 0.793, 0.099, 0.704, 0.962]],
```

Layer 3-4

```
[[0.549, 0.729, 0.86, 0.518, 0.548, 0.386, 0.91, -0.029, 0.606, 0.55,
0.419], [0.23, 0.385, 0.145, -0.179, 0.296, 0.226, 0.515, 0.064, 0.004,
-0.083, 0.023]]]
```

- Iteration 3

Layer 1-2

```
[[[0.626, 0.97, 0.79, 0.766, 0.983, 0.376, 0.974], [0.399, 0.602, 0.053,
0.965, 0.495, 0.78, 0.867], [0.145, 0.999, 0.933, 0.141, 0.795, 0.197,
```

0.447], [0.185, 0.298, 0.239, 0.464, 0.849, 0.633, 0.375], [0.57, 0.469, 0.207, 0.436, 0.55, 0.303, 0.537]],

Layer 2-3

[[0.864, 0.917, 0.44, 0.499, 0.437, 0.496], [0.464, 0.012, 0.387, -0.053, -0.023, 0.402], [0.326, 0.594, 0.773, 0.913, 0.885, 0.907], [0.874, 0.263, 0.833, 0.633, 0.476, 0.965], [0.047, 0.642, 0.237, 0.012, 0.654, 0.721], [0.475, 0.903, 0.281, 0.33, 0.364, 0.449], [0.3, 0.176, 0.053, 0.859, 0.825, 0.696], [0.622, 0.604, 0.534, 0.118, 0.127, 0.997], [0.454, 0.241, 0.345, 0.429, 0.162, 0.344], [0.041, 0.357, 0.786, 0.089, 0.692, 0.952]],

Layer 3-4

[[0.174, 0.424, 0.479, 0.136, 0.192, 0.024, 0.546, -0.398, 0.274, 0.184, 0.024], [0.091, 0.278, -0.008, -0.33, 0.182, 0.115, 0.396, -0.078, -0.089, -0.217, -0.157]]]