



链滴

# BP 神经网络算法

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<p><strong>神经网络算法</strong></p>

<p><strong>M-P 神经元模型</strong><br>

模拟神经元，通过函数将输入的向量转化为输出。<br>

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<strong>多层前馈网络</strong><br>

单层神经元学习能力非常有限，故而添加多个神经元，将神经元分为多层，它们不存在跨层连接，也有同层连接，每层神经元和下一级神经元完全互连，这样的神经网络被称为“多层前馈网络”。其中输入层神经元只负责输入，隐层神经元和输出层神经元都包含功能神经元，即包含激活函数。学习的程即根据训练数据来调节神经元之间的“连接权”，以及功能神经元的阈值。<br>

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<p><strong>误差逆传播算法（BP 神经网络算法）</strong><br>

调节参数的过程可以看做误差通过函数作用于神经网络逆着传输回去。<br>

通过 sk-learn 实现 BP 算法</p>

```
<pre><code class="highlight-chroma"><span class="highlight-line"><span class="highlight-cl">import os
</span></span><span class="highlight-line"><span class="highlight-cl">import pandas as
d
</span></span><span class="highlight-line"><span class="highlight-cl">from sklearn impo
t svm
</span></span><span class="highlight-line"><span class="highlight-cl">
</span></span><span class="highlight-line"><span class="highlight-cl">from sklearn.neura
_network import MLPClassifier
</span></span><span class="highlight-line"><span class="highlight-cl">
</span></span><span class="highlight-line"><span class="highlight-cl">base_dir = os.get
wd()
</span></span><span class="highlight-line"><span class="highlight-cl">data = pd.read_cs
(base_dir + r"\read\bupa.csv")
</span></span><span class="highlight-line"><span class="highlight-cl">dataLen, dataWid
= data.shape
</span></span><span class="highlight-line"><span class="highlight-cl"># 训练数据集
</span></span><span class="highlight-line"><span class="highlight-cl">xList = []
</span></span><span class="highlight-line"><span class="highlight-cl"># 标签数据集
</span></span><span class="highlight-line"><span class="highlight-cl">lables = []
</span></span><span class="highlight-line"><span class="highlight-cl"># 读取数据
</span></span><span class="highlight-line"><span class="highlight-cl">cnt = 0
</span></span><span class="highlight-line"><span class="highlight-cl">print(dataLen)
</span></span><span class="highlight-line"><span class="highlight-cl">for i in range(data
en):
</span></span><span class="highlight-line"><span class="highlight-cl">    row = data.valu
s[i]
</span></span><span class="highlight-line"><span class="highlight-cl">    xList.append(r
w[0:dataWid - 1])
</span></span><span class="highlight-line"><span class="highlight-cl">    lables.append(c
t)
</span></span><span class="highlight-line"><span class="highlight-cl">    cnt += 1
</span></span><span class="highlight-line"><span class="highlight-cl">    cnt %= 8
</span></span><span class="highlight-line"><span class="highlight-cl"># 设置训练函数
</span></span><span class="highlight-line"><span class="highlight-cl">clf = MLPClassifier
solver='lbfgs', alpha=1e-5,
</span></span><span class="highlight-line"><span class="highlight-cl">                                hidde
```

```
_layer_sizes=(10, 7, 7, 7, 13), random_state=1, max_iter=1000)
</span> </span> <span class="highlight-line"> <span class="highlight-cl"> # 开始训练数据clf.fi
(xList, lables)
</span> </span> <span class="highlight-line"> <span class="highlight-cl"> print(lables)
</span> </span> <span class="highlight-line"> <span class="highlight-cl"> y_pred = clf.fit(xLi
t, lables)
</span> </span> <span class="highlight-line"> <span class="highlight-cl"> m_p = clf.predict([
2, 0, 0, 0, 0, 0.3]])
</span> </span> <span class="highlight-line"> <span class="highlight-cl"> print(m_p)
</span> </span> </code> </pre>
<p> <a href="https://ld246.com/forward?goto=https%3A%2F%2Fsklearn.apachecn.org%2F" t
rget="_blank" rel="nofollow ugc">sk-learn 官方文档</a> <br>
![525bfb1a92fae34be7c9f5b4626417e.jpg]<br>
 </p>
```