## **Perceptron Learning Algorithm**

What does the perceptron learning algorithm look like?

1. Perceptron model: ŷ = ni=1 wixi >= b
   1. Can be rewritten as w1x1 + w2x2 - b >= 0
   2. Let w0 = b and x0 = 1
   3. Further rewritten as w1x1 + w2x2 - w0x0 >= 0
   4. ŷ = ni=0 wixi >= 0
   5. Can be written as wTx >= 0
   6. Where wTx = w.x
2. Perceptron Learning Algorithm
   1. P ⇒ Inputs with label 1
   2. N ⇒ Inputs with label 0
   3. Initialize w(w0...wn) randomly
   4. While !convergence do:
      1. Pick random x ∈ P ∪ N
      2. If x ∈ P and ni=0 wixi < 0 then, w = w + x; **end**
      3. If x ∈ N and ni=0 wixi >= 0 then, w = w - x; **end**
   5. **end**
   6. The algorithm converges when all the inputs are classified correctly