

WEIGHTED-MAJORITY (E, T, n, γ)

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1  for  $i = 1$  to  $n$ 
2       $w_i^{(1)} = 1$                                 // trust each expert equally
3  for  $t = 1$  to  $T$ 
4      each expert  $E_i \in E$  makes a prediction  $q_i^{(t)}$ 
5       $U = \{E_i : q_i^{(t)} = 1\}$                     // experts who predicted 1
6       $upweight^{(t)} = \sum_{i:E_i \in U} w_i^{(t)}$     // sum of weights of who predicted 1
7       $D = \{E_i : q_i^{(t)} = 0\}$                     // experts who predicted 0
8       $downweight^{(t)} = \sum_{i:E_i \in D} w_i^{(t)}$  // sum of weights of who predicted 0
9      if  $upweight^{(t)} \geq downweight^{(t)}$ 
10          $p^{(t)} = 1$                                 // algorithm predicts 1
11     else  $p^{(t)} = 0$                                 // algorithm predicts 0
12     outcome  $o^{(t)}$  is revealed
13     // If  $p^{(t)} \neq o^{(t)}$ , the algorithm made a mistake.
14     for  $i = 1$  to  $n$ 
15         if  $q_i^{(t)} \neq o^{(t)}$                     // if expert  $E^{(i)}$  made a mistake ...
16              $w_i^{(t+1)} = (1 - \gamma)w_i^{(t)}$  // ... then decrease that expert's weight
17         else  $w_i^{(t+1)} = w_i^{(t)}$ 
18     return  $p^{(t)}$ 
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