

Algorithm 1: HYPERBAND algorithm for hyperparameter optimization.

input : R, η (default $\eta = 3$)

initialization : $s_{\max} = \lfloor \log_{\eta}(R) \rfloor, B = (s_{\max} + 1)R$

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1 for  $s \in \{s_{\max}, s_{\max} - 1, \dots, 0\}$  do
2    $n = \lceil \frac{B}{R} \frac{\eta^s}{(s+1)} \rceil, \quad r = R\eta^{-s}$ 
   // begin SUCCESSIVEHALVING with  $(n, r)$  inner loop
3    $T = \text{get\_hyperparameter\_configuration}(n)$ 
4   for  $i \in \{0, \dots, s\}$  do
5      $n_i = \lfloor n\eta^{-i} \rfloor$ 
6      $r_i = r\eta^i$ 
7      $L = \{\text{run\_then\_return\_val\_loss}(t, r_i) : t \in T\}$ 
8      $T = \text{top\_k}(T, L, \lfloor n_i/\eta \rfloor)$ 
9   end
10 end
11 return Configuration with the smallest intermediate loss seen so far.
```

Outer loop
or hyperband loop
Inner loop
or bracket