Artificial Intelligence Memory P3

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Exercise 1: slice/4

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slice([X|_],1,1,[X]).
slice([X|Xs],1,K,[X|Ys]) :- K > 1,
   K1 is K - 1, slice(Xs,1,K1,Ys).
slice([_|Xs],I,K,Ys) :- I > 1,
   I1 is I - 1, K1 is K - 1, slice(Xs,I1,K1,Ys).

```

Code of the slice/4 predicate.

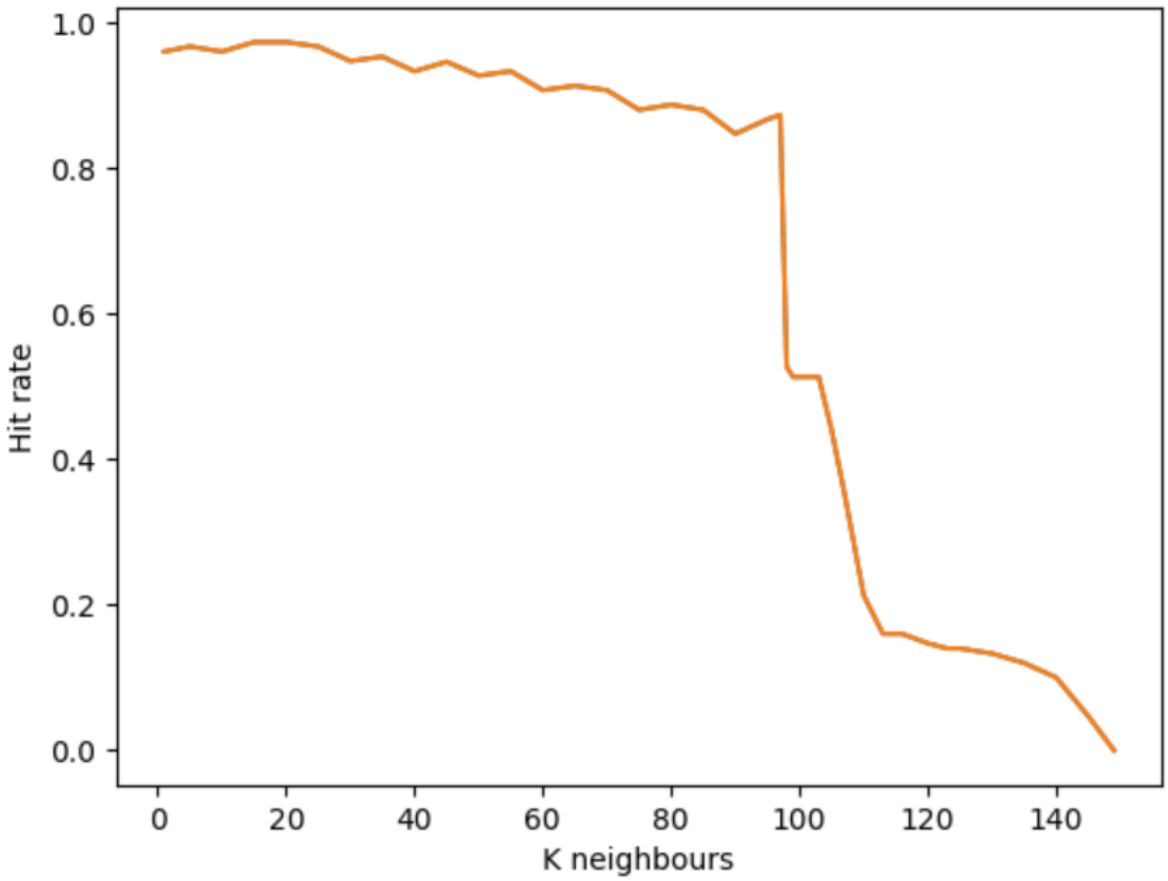
Declarative:

- For indexes 1, 1, the slice of a list requested is its first element.
- (K > 1) If the slice for Xs and indexes 1, K-1, is Ys, then the slice for [X|Xs] and indexes 1, K, is [X|Ys].
- (I > 1, K > 1) If the slice for Xs and indexes I-1, K-1, is Ys, then the slice for [_|Xs] and indexes I, K, is Ys.

Procedural (for the query slice([1, 2, 3 ,4], 2, 3, L2)), Xs=[1, 2, 3, 4], I=2, K=3, Ys=L2:

- First clause? No, I and K are greater than 1.
- Second clause? No, I is greater than 1.
- Third clause? Yes, we reach another slice predicate, with Xs'=[2, 3, 4], I'=1, K'=2, Ys=Ys'. Let us evaluate this clause.
- First clause? No, K' is greater than 1.
- Second clause? Yes, we reach another slice predicate, with Xs''=[3,4], X=2, I''=1, K''=1, Ys'=[X|Ys'']. Let us evaluate this clause.
- First clause? Yes, we have reached the base case. Ys''=[3] (first element of Xs''). Ys'=[2,3]. Ys=[2,3].
- Tracing back we get our final solution, L2=[2,3].

Exercise 9.5: clasifica_patrones/4



Above we generated a graph corresponding to the hit rate for each result of k_vecinos_proximos, varying the K. The hit rate is calculated over 150 leave-one-out tests for each K. Thus, the maximum valid K is 149.

It can be seen that the hit rate stays more less constant, around 0.9, until exactly K=98, where it dips close to 0.5. Between 105 and 110 it dips again, to 0.2. After that it decreases until it hits 0 (it is 0 for K=149).

Results obtained are more less expected: the lower the K, the higher fidelity of testing. However, we did not come up with any explanation for the dramatic dip in the specific points mentioned above.