ML – Assignment 1

Team Members:

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Language Used: Java

Logic:

- According to the training data there were 7 classes into which animals were classified.
- We used one vs all method as mentioned in the question. So, in the training data first we considered all the instances with classification as class 1 as positive and rest as negative.
- Now to generate the specific boundary we first considered only the positive examples and neglected the negative examples. Hence the specific boundary was generated using the Candidate Elimination Algorithm. Then we generated the general boundary considering the negative examples using the algorithm.
- The same logic was repeated for all the classes.

Output:

*****For Class = 1*****

Specific Boundary for Class 1

[all, 0, all, 1, all, all, all, all, 1, 1, 0, all, all, all, all, all]

Generic Boundary for Class 1

[all, all, all, 1, all, all, all, all, all, all, all, all, all, all, all, all]

*****For Class = 2*****

Specific Boundary for Class 2

[0, 1, 1, 0, all, all, all, 0, 1, 1, 0, 0, 2, 1, all, all]

Generic Boundary for Class 2

[all, 1, all, all, all, all, all, all, all, all, all, all, all, all, all, all]

[0, all, all, all, all, all, all, all, all, all, all, all, 2, all, all, all]

[all, all, 1, all, all, all, all, all, all, all, all, all, 2, all, all, all]

[all, all, all, all, all, all, all, 0, all, all, all, all, 2, all, all, all]

[all, all, all, 0, all, all, all, all, all, all, all, all, 2, all, all, all]

*****For Class = 3*****

Current Specific Boundary: [0, 0, all, 0, 0, all, all, all, 1, all, all, 0, all, 1, 0, all]

INCONSISTENT DATA: [0, 0, 1, 0, 0, 1, 1, 1, 1, 1, 0, 0, 4, 1, 0, 0, 5]

Concept cannot be learned

*****For Class = 4*****

Specific Boundary for Class 4

[0, 0, 1, 0, 0, 1, all, 1, 1, 0, all, 1, 0, 1, all, all]

Generic Boundary for Class 4

[all, all, 1, all, all, all, all, all, all, all, all, 1, all, all, all, all]

[all, all, all, 0, all, all, all, all, all, all, all, 1, all, all, all, all]

[all, all, all, all, all, all, all, all, all, 0, all, 1, all, all, all, all]

[all, all, 1, all, all, all, all, 1, all, 0, all, all, all, all, all, all]

[all, all, 1, all, all, all, all, all, 1, 0, all, all, all, all, all, all]

[all, all, 1, all, all, all, all, all, all, 0, all, all, all, 1, all, all]

[all, all, 1, all, all, 1, all, 1, all, all, all, all, 0, all, all, all]

[all, all, 1, all, all, 1, all, all, 1, all, all, all, 0, all, all, all]

[all, all, 1, all, all, 1, all, all, all, all, all, all, 0, 1, all, all]

*****For Class = 5*****

Specific Boundary for Class 5

[0, 0, 1, 0, 0, 1, all, 1, 1, 1, all, 0, 4, all, 0, 0]

Generic Boundary for Class 5

[all, all, 1, all, all, 1, all, 1, all, all, all, 0, all, all, all, all]

[all, all, all, all, 0, 1, all, all, all, 1, all, all, all, all, all, 0]

[all, 0, all, 0, all, 1, all, all, all, 1, all, all, all, all, all, all]

[all, 0, all, all, all, 1, all, all, all, 1, all, all, all, all, all, 0]

[all, all, 1, all, all, 1, all, 1, all, 1, all, all, all, all, all, all]

[all, all, all, 0, all, 1, all, 1, all, 1, all, all, all, all, all, all]

[all, all, all, all, all, 1, all, 1, all, 1, all, all, all, all, all, 0]

[0, 0, 1, all, all, 1, all, all, all, 1, all, all, all, all, all, all]

[0, 0, all, all, all, 1, all, all, all, 1, all, 0, all, all, all, all]

[0, all, all, all, all, 1, all, 1, all, 1, all, 0, all, all, all, all]

[all, all, 1, all, all, 1, all, 1, all, all, all, all, 4, all, all, all]

[all, all, 1, all, 0, 1, all, all, 1, all, all, 0, all, all, all, 0]

[0, all, all, all, all, 1, all, 1, all, all, all, all, 4, all, all, all]

[0, all, all, all, all, 1, all, all, 1, all, all, all, 4, all, all, all]

[0, all, all, all, all, 1, all, all, all, 1, all, all, 4, all, all, all]

[all, all, all, 0, all, 1, all, 1, all, all, all, all, 4, all, all, all]

[all, all, all, 0, all, 1, all, all, 1, all, all, all, 4, all, all, all]

[all, all, all, 0, all, 1, all, all, all, 1, all, all, 4, all, all, all]

[all, all, all, all, all, 1, all, 1, all, all, all, all, 4, all, all, 0]

[all, all, all, all, all, 1, all, all, 1, all, all, all, 4, all, all, 0]

[all, all, all, all, all, 1, all, all, all, 1, all, all, 4, all, all, 0]

[0, 0, 1, all, all, 1, all, all, 1, all, all, 0, all, all, all, all]

[all, 0, 1, 0, all, 1, all, all, 1, all, all, 0, all, all, all, all]

[all, 0, 1, all, all, 1, all, all, 1, all, all, 0, all, all, all, 0]

*****For Class = 6*****

Specific Boundary for Class 6

[all, 0, 1, 0, all, 0, all, 0, 0, 1, all, 0, 6, 0, all, 0]

Generic Boundary for Class 6

[all, all, all, all, all, 0, all, all, all, all, all, all, 6, all, all, all]

[all, all, all, all, all, all, all, all, all, 1, all, all, 6, all, all, all]

*****For Class = 7*****

Current Specific Boundary: [0, 0, all, 0, 0, all, all, 0, 0, all, all, 0, all, all, 0, all]

INCONSISTENT DATA: [0, 0, 1, 0, 0, 0, 0, 0, 0, 1, 0, 0, 6, 0, 0, 0, 6]

Concept cannot be learned

Conclusion:

- Hence we were able to get specific and general boundaries for classes 1,2,4,5,6. Whereas for classes 3 and 7 concept learning was not possible.
- Candidate Elimination Algorithm was applied to the (training) data given and now given an animal (test data) we can predict as to which class(1-7) it belongs.