ML LAB 1 | Find S Algorithm

Find S Algorithm

- Find-S algorithm is a basic concept learning algorithm in machine learning
- Find-S algorithm finds the most specific hypothesis that fits all the positive examples
- We have to note here that the algorithm considers only those positive training example.
- Find-S algorithm starts with the most specific hypothesis and generalizes this hypothesis each time it fails to classify an observed positive training data.
- Hence, Find-S algorithm moves from the most specific hypothesis to the most general hypothesis.

Important Representation :

- **?** indicates that any value is acceptable for the attribute.

- **0** indicates that no value is acceptable.

- The most general hypothesis is represented by: **{?, ?, ?, ?, ?, ?}**

- The most specific hypothesis is represented by : **{0, 0, 0, 0, 0, 0}**

- Explicitly specify the attributes or the extract the attributes from the datasets.

Steps involved in Find-S :

- Start with the most specific hypothesis.

    h = {0, 0, 0, 0, 0, 0}

- Take the next example and if it is negative, then no changes occur to the hypothesis.

- If the example is positive and we find that our initial hypothesis is too specific then we update our current hypothesis to general condition.

- Keep repeating the above steps till all the training examples are complete.

- After we have completed all the training examples we will have the final hypothesis when can used to classify the new examples.

	A	B	C	D	E	F	G
1	sunny	warm	normal	strong	warm	same	Yes
2	sunny	warm	high	strong	warm	same	Yes
3	rainy	cold	high	strong	warm	change	No
4	sunny	warm	high	strong	cool	change	Yes
5							

Dataset

Steps for our dataset

Step 1: Initial hypothesis

   h = {0,0,0,0,0,0}

Step 2: We see that our initial hypothesis is more specific and we have to generalize it for this example. Hence, the hypothesis becomes   h = {sunny, warm, normal, strong, warm, same}

Step 3: Consider the next sample we will compare each attribute with the initial data and if any mismatch is found we replace that particular attribute with general case (" **?** "). After doing the process the hypothesis becomes :

h = {sunny, warm, '?', strong, warm, same}

Step 4: Ignore next sample because it has negative outcome

Step 5: In the next sample we will take it has a example because it has positive value **h = {sunny, warm, '?', strong, '?', '?'}**

Find S Algorithm

1. Load Data set

2. Initialize **h** to the most specific hypothesis in **H**

3. For each positive training instance **x** For each attribute constraint **a** in **h**

   If the constraint **a** in **h** is satisfied by **x** then do nothing else replace **a** in **h** by the next more general constraint that is satisfied by **x**

4. Output hypothesis **h**