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Candidate Elimination Algorithm

steps:

i) Init. specific hypo. (S)

S → init. to most specific hypo. in H

G → init to most general hypo. in H

$\therefore S = \{\phi, \phi, \phi \cdots\}$

$G = \{?, ?, ? \cdots\}$

ii) For every example in the dataset (Similar words)

if +ve → generalise the specific hypo. (S)

else if -ve

→ specialise the general hypo. (G)

Example

Example	Sky	AirTemp	Humidity	Wind	Water	Forecast	EnjoySport	
1	Sunny	Warm	Normal	Strong	Warm	Same	Yes	← +ve
2	Sunny	Warm	High	Strong	Warm	Same	Yes	← +ve
3	Rainy	Cold	High	Strong	Warm	Change	No	← -ve
4	Sunny	Warm	High	Strong	Cool	Change	Yes	← +ve

$\therefore S = \langle \phi, \phi, \phi, \phi, \phi, \phi \rangle \quad G = \langle ?, ?, ?, ?, ?, ? \rangle$

1.) S = <Sunny, Warm, Normal, Strong, Warm, Same> G = <?, ?, ?, ?, ?, ?>

1.) $S_1 = \langle Sunny, Warm, Normal, Strong, Warm, Same \rangle$ $G_1 = \langle ?, ?, ?, ?, ?, ? \rangle$

2.) $S_2 = \langle Sunny, Warm, ?, Strong, Warm, Same \rangle$ $G_2 = \langle ?, ?, ?, ?, ?, ? \rangle$

↳ generalise

3.) This is new -ve ex.

$S_2 = \langle Sunny, Warm, ?, Strong, Warm, Same \rangle$

"Compare S with -ve example" → If there's a mismatch make a separate set of hypo. for +ve result.

$G_3 = \{ \langle Sunny, ?, ?, ?, ?, ? \rangle$ (for +ve)

$\langle ?, Warm, ?, ?, ?, ? \rangle$,

$\langle ?, ?, ?, ?, ?, Same \rangle \}$

4.) $S_4 = \langle Sunny, Warm, ?, Strong, ?, ? \rangle$

~~$G_3 = \{ \langle Sunny, ?, ?, ?, ?, ? \rangle \langle ?, Warm, ?, ?, ?, ? \rangle$~~

~~$\langle ?, ?, ?, ?, ?, Same \rangle \}$~~

"Now check if G_3 matches without examples" — i.e. G_3 matches modified S

$G_4 = \{ \langle Sunny, ?, ?, ?, ?, ? \rangle$, $\langle ?, Warm, ?, ?, ?, ? \rangle \}$ excluded here

"All hypo. b/w S_4 & G_4 are in Version Space"

$S_5 = \langle Sunny, Warm, ?, Strong, ?, ? \rangle$ — identical

$S_4 = \langle Sunny, Warm, ?, strong, ?, ? \rangle$ — identical — $\langle Sunny, Warm, ?, ?, ?, ? \rangle$

VS

① $\langle Sunny, warm, ?, ?, ?, ? \rangle$

② $\langle Sunny, ?, ?, strong, ?, ? \rangle$

③ $\langle ?, warm, ?, strong, ?, ? \rangle$

$G_4 = \{ \langle Sunny, ?, ?, ?, ?, ? \rangle, \langle ?, warm, ?, ?, ?, ? \rangle \}$

Example 2

article	*Crime*	*Academic*	*Local*	*Music*	*Reads*
a_1	*true*	*false*	*false*	*true*	*true*
a_2	*true*	*false*	*false*	*false*	*true*
a_3	*false*	*true*	*false*	*false*	*false*
a_4	*false*	*false*	*true*	*false*	*false*
a_5	*true*	*true*	*false*	*false*	*true*

$S = \langle \phi, \phi, \phi, \phi \rangle$ $G = \langle ?, ?, ?, ? \rangle$

① $S_1 = \langle T, F, F, T \rangle$ $G_1 = \{ \langle ?, ?, ?, ? \rangle \}$

② $S_2 = \langle T, R, F, ? \rangle$ $G_2 = \langle ?, ?, ?, ? \rangle$

③ $S_3 = \langle T, F, F, ? \rangle$ $G_3 = \{ \langle T, ?, ?, ? \rangle, \langle ?, F, ?, ? \rangle \}$

④ $S_4 = \langle T, F, F, ? \rangle$ $G_4 = \{ \langle T, ?, ?, ? \rangle \}$ Removed in ④ ??

(7) [illegible] removal [illegible] !!

Revise

(8) $S_5 = \langle T, ?, F, ? \rangle \quad G_5 = \langle T, ?, ?, ? \rangle$

$\therefore \quad S = (\text{Crime} \wedge \sim \text{Local})$

$G = (\text{Crime})$