form a set with all of
these nodes

return this set as children

In the find_random_child
function, use make_move
to find a random set of trenet
paths & find a random
trenet path amongst them.

$$P = \frac{TP}{TP + FP}$$

$$R = \frac{TP}{TP + FN}$$

$$TP = \left(\binom{4}{2} + \binom{2}{2} \right) + \binom{4}{2} + \left(\binom{3}{2} + \binom{3}{2} \right)$$

com. 1   com 2   com. 3

$$= \left(\frac{4 \times 3}{1 \times 2} + \frac{2 \times 1}{1 \times 2} \right) + \left(\frac{4 \times 3}{1 \times 2} \right) + \left(3 + 3 \right)$$

$$= 7 + 6 + 6 = 19.$$

Com. 1

$$FP = (2 \times 4 + 4 \times 1 + 2 \times 1)$$

$$+ (4 \times 1) + (3 \times 3)$$

Com. 2   Com. 3.

$$= 27.$$

$$FN = (4 \times 1) + ((1 \times 4) + (4 \times 3) + (1 \times 3))$$

$$+ (2 \times 3).$$

$$= 4 + 4 + 12 + 3 + 6.$$

$$= 29$$

$$P = \frac{TP}{TP + FP} = \frac{19}{19 + 27}$$

$$= 0.413$$

$$R = \frac{TP}{TP + FN} = \frac{19}{19 + 29} = 0.395$$

) **F_measure :-**

$$F = 2 \frac{PR}{R+P}$$

$$= 2 \frac{(0.413)(0.395)}{(0.413)+(0.395)}$$

$$= 0.4037.$$

Purity :-

$$Purity = \frac{1}{N} \sum_{i=1}^{k} \max_{j} |C_i \cap L_j|$$
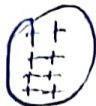
$$= \frac{1}{18} [4+4+3].$$

$$= 0.611$$

NMI :-

$$NMI = \frac{-2 \sum_{i=1}^{S} \sum_{j=1}^{R} C_{ij} \log \frac{C_{ij} N}{C_i C_j}}{\sum_{i=1}^{S} C_i \log \frac{C_i}{N} + \sum_{j=1}^{R} C_j \log \frac{C_j}{N}}$$

$C_{ij} =$

$N = 18.$ $S = 3$ $R = 3$

$$\sum_{i=1}^{S} C_i \log \frac{C_i}{N}$$

$$= 5 \log \frac{5}{18} + 8 \log \frac{8}{18} + 5 \log \frac{5}{18}$$

$$= -5.56302 - 2.8174$$

$$= -8.3804$$

$$\sum_{0=1}^{R} C_0 \log \frac{C_0}{N} \Big) \quad \text{Not Sure}$$

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$$C_0 = 5 \times 1 + 2 \times 1 + 1 \times 1$$

$$= 8 \quad \cancel{\text{+}\cancel{+}\cancel{+}}$$

$$\to = 8 \log \frac{8}{18} + 6 \log \frac{5}{18} + 6 \log \frac{6}{18}$$

$$\cancel{\text{+}\cancel{+}\cancel{+}}$$

$$= -8.4617.$$

$$\sum_{i=1}^{S} \sum_{j=1}^{R} C_{ij} \log\left(\frac{C_{ij} N}{C_i C_j}\right)$$

	A_1	A_2	A_3	$\leftarrow$ detected.
				C_i
B_1	4	1	0	5
B_2	1	4	3	8
B_3	2	0	3	5
C_j	8	5	6.	

↑ Ground truth

$\rightarrow \quad 4 \log \dfrac{(4)(18)}{(5)(18)} + 1 \log \dfrac{(1)(18)}{(5)(5)} + 0$

$+ \quad 1 \log \dfrac{(1)(18)}{(8)(8)} + 4 \log \dfrac{(4)(18)}{(8)(5)} + 3 \log \dfrac{(3)(18)}{(8)(6)}$

$+ \quad 2 \log \dfrac{(2)(18)}{(8)(5)} + 0 + 3 \log \dfrac{(3)(18)}{(5)(6)}.$

$= -0.096 - 0.1426 - 0.5509 + 1.0210 + 0.1534$

$\quad - 0.0915 + 0.7658. \quad = 1.0589.$

$$\Delta M1 = \frac{-2 \times 1.0589}{-8.3804 - 8.4617}$$

$$= 0.1257.$$