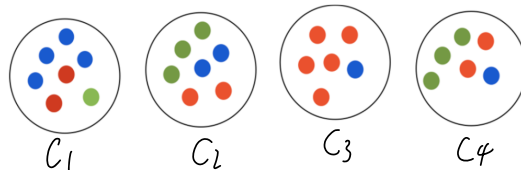


Q6



Assume : P = Precision , F_1 = F_1 -Score , R = Recall

① C_1 :

$$P(\text{blue}) = \frac{4}{7}$$

$$R(\text{blue}) = \frac{1}{2}$$

$$F_1(\text{blue}) = 2 \times \frac{\frac{4}{7} \times \frac{1}{2}}{\frac{4}{7} + \frac{1}{2}} = \frac{8}{15}$$

$$P(\text{green}) = \frac{1}{7}$$

$$R(\text{green}) = \frac{1}{7}$$

$$F_1(\text{green}) = 2 \times \frac{\frac{1}{7} \times \frac{1}{7}}{\frac{1}{7} + \frac{1}{7}} = \frac{1}{7}$$

$$P(\text{red}) = \frac{2}{7}$$

$$R(\text{red}) = \frac{2}{11}$$

$$F_1(\text{red}) = 2 \times \frac{\frac{2}{7} \times \frac{2}{11}}{\frac{2}{7} + \frac{2}{11}} = \frac{2}{9}$$

② C_2 :

$$P(\text{blue}) = \frac{2}{7}$$

$$R(\text{blue}) = \frac{1}{4}$$

$$F_1(\text{blue}) = 2 \times \frac{\frac{2}{7} \times \frac{1}{4}}{\frac{2}{7} + \frac{1}{4}} = \frac{4}{15}$$

$$P(\text{green}) = \frac{3}{7}$$

$$R(\text{green}) = \frac{3}{7}$$

$$F_1(\text{green}) = 2 \times \frac{\frac{3}{7} \times \frac{3}{7}}{\frac{3}{7} + \frac{3}{7}} = \frac{3}{7}$$

$$P(\text{red}) = \frac{2}{7}$$

$$R(\text{red}) = \frac{2}{11}$$

$$F_1(\text{red}) = 2 \times \frac{\frac{2}{7} \times \frac{2}{11}}{\frac{2}{7} + \frac{2}{11}} = \frac{2}{9}$$

③ C_3 :

$$P(\text{blue}) = \frac{1}{6}$$

$$R(\text{blue}) = \frac{1}{8}$$

$$F_1(\text{blue}) = 2 \times \frac{\frac{1}{6} \times \frac{1}{8}}{\frac{1}{6} + \frac{1}{8}} = \frac{1}{7}$$

$$P(\text{red}) = \frac{5}{6}$$

$$R(\text{red}) = \frac{5}{11}$$

$$F_1(\text{red}) = 2 \times \frac{\frac{5}{6} \times \frac{5}{11}}{\frac{5}{6} + \frac{5}{11}} = \frac{10}{17}$$

④ C_4 :

$$P(\text{blue}) = \frac{1}{6}$$

$$R(\text{blue}) = \frac{1}{8}$$

$$F_1(\text{blue}) = 2 \times \frac{\frac{1}{6} \times \frac{1}{8}}{\frac{1}{6} + \frac{1}{8}} = \frac{1}{7}$$

$$P(\text{green}) = \frac{1}{2}$$

$$R(\text{green}) = \frac{3}{7}$$

$$F_1(\text{green}) = 2 \times \frac{\frac{1}{2} \times \frac{3}{7}}{\frac{1}{2} + \frac{3}{7}} = \frac{6}{13}$$

$$P(\text{red}) = \frac{2}{3}$$

$$R(\text{red}) = \frac{2}{11}$$

$$F_1(\text{red}) = 2 \times \frac{\frac{2}{3} \times \frac{2}{11}}{\frac{2}{3} + \frac{2}{11}} = \frac{4}{7}$$

$N=26$

$$\begin{aligned} B-CUBED \quad P &= \frac{1}{26} \times \left(\frac{4}{7} \times 4 + \frac{1}{7} + \frac{2}{7} \times 2 + \frac{2}{7} \times 2 + \frac{3}{7} \times 3 + \frac{2}{7} \times 2 + \frac{1}{6} + \frac{5}{6} \times 5 + \frac{1}{6} + \frac{1}{2} \times 3 + \frac{1}{3} \times 2 \right) \\ &= \frac{127}{273} \approx 0.4652 \end{aligned}$$

$$\text{B-CUBED } R = \frac{1}{26} \times \left(\frac{1}{2} \times 4 + \frac{1}{7} \times 1 + \frac{2}{11} \times 2 + \frac{1}{4} \times 2 + \frac{2}{7} \times 3 + \frac{2}{11} \times 2 \right. \\ \left. + \frac{1}{8} \times 1 + \frac{5}{11} \times 5 + \frac{1}{8} \times 1 + \frac{2}{7} \times 3 + \frac{2}{11} \times 2 \right) \approx 0.3395$$

$$\text{B-CUBED } F = \frac{1}{26} \times \left(\frac{8}{17} \times 4 + \frac{1}{7} \times 1 + \frac{2}{9} \times 2 + \frac{4}{15} \times 2 + \frac{3}{7} \times 3 \right. \\ \left. + \frac{2}{9} \times 2 + \frac{1}{7} \times 1 + \frac{6}{13} \times 3 + \frac{4}{17} \times 2 \right) \approx 0.3871$$

Hence. B-CUBED Precision is : 0.465

B-CUBED Recall is : 0.340

B-CUBED F1-Score is : 0.387