फ़ा

Actual

	C_1 16	C_2 0	C_3 0
Se

Prediction Ve | C_4 0 | C_5 15 | C_6 2 |

Vi | C_7 0 | C_8 3 | C_9 12 |

Se   Ve   Vi

	Se	Ve	Vi
TP	$C_1=16$	$C_5=15$	$C_8=12$
FP	C_2+C_3 $0+0=0$	C_4+C_6 $0+2=2$	C_7+C_8 $0+3=3$
FN	C_4+C_7 $=0+0=0$	$C_2+C_8=$ $0+3=3$	$C_3+C_6=$ $0+2=2$
TN	$C_5+C_6+C_8$ $+C_9=32$	$C_1+C_3+C_7+C_9$ $=28$	$C_1+C_2+C_4+C_5$ $=31$

TP: where actual and Predicted are same
FP: For Prediction line, sum the others except TP.
FN: For actual line, sum the others except TP.

TN: For the class, Add everything except for that class row and column values.

For Se; Precision $= \dfrac{TP}{TP+FP} = \dfrac{16}{16+0} = 1$

Recall $= \dfrac{TP}{TP+FN} = \dfrac{16}{16+0} = 1$

$F1 = \dfrac{2 \times 1 \times 1}{1+1} = 1$

For n:

$$P = \frac{12}{12+3} = \frac{12}{15} = 0.8$$

$$R = \frac{12}{12+2} = \frac{12}{14} = 0.8571$$

$$F1 = \frac{2 \times \frac{2}{15} \times \frac{2}{14}}{\frac{2}{15} + \frac{2}{14}} = 0.8275$$

For Ve ;

$$P = \frac{15}{15+2} = \frac{15}{17} = 0.8823$$

$$R = \frac{15}{15+3} = \frac{15}{18} = 0.8333$$

$$F1 = \frac{2 \times \frac{15}{17} \times \frac{15}{18}}{\frac{15}{17} + \frac{15}{18}} = 0.8571$$

Macro-Averaging (Precision) $= \frac{Pre_{se} + Pre_{vi} + Pre_{ve}}{3}$

$$= \frac{1 + 0.8 + 0.8823}{3}$$

$$= 0.8941$$

(Recall) $= \frac{Re_{se} + Re_{vi} + R_{ve}}{3}$

$$= \frac{1 + 0.8571 + 0.8333}{3}$$

$$= 0.8968$$

Micro-Averaging (Precision) $= \frac{TP_{se} + TP_{vi} + TP_{ve}}{TP_{se} + FP_{se} + TP_{vi} + FP_{vi} + TP_{ve} + FP_{ve}}$

$$= \frac{16 + 15 + 12}{16 + 0 + 15 + 2 + 12 + 3} = 0.8958$$

(Recall) $= \frac{TP_{se} + TP_{vi} + TP_{ve}}{TP_{se} + FN_{se} + TP_{vi} + FN_{vi} + TP_{ve} + FN_{vi}}$

$$= \frac{16 + 12 + 15}{16 + 0 + 12 + 2 + 15 + 3} = 0.8958$$