Robust Scaler

Note

Robustly Scaled Value = $\frac{X_i - X_{med}}{IQR}$

For 110: $\frac{110-115}{25} = -0.2$, For 105 = $\frac{105-115}{25} = -0.4$,

For 115: $\frac{115-115}{25} = 0.0$, For 120 = $\frac{120-115}{25} = 0.2$, For 110 = -0.2

For 130: $\frac{130-115}{25} = 0.6$, For 150 = $\frac{150-115}{25} = 1.4$, For 100 = $\frac{100-115}{25} = -0.6$

For 105 = -0.4

Here, Median = 115

IQR = 75th percentile − 25th percentile

= 130 − 105

= 25

Max Abs Scaler

$X_{scaled} = \frac{X}{\text{Absolute}(\max(X))}$

Max (x) Absolute = max(|110|, |115|, |120|, |110|, |130|, |150|, |100|, |105|)

= 150

$X_{110} = \frac{110}{150} = 0.7333$

$X_{105} = \frac{105}{150} = 0.7$

$X_{115} = \frac{115}{150} = 0.7667$

$X_{120} = \frac{120}{150} = 0.8$

$X_{110} = \frac{110}{150} = 0.7333$

$X_{130} = \frac{130}{150} = 0.8667$

$X_{150} = \frac{150}{150} = 1$

$X_{100} = \frac{100}{150} = 0.6667$

$X_{105} = \frac{105}{150} = 0.7$

Name & Address — Phone

Price	Normalization	Standardization	Office :	Log Transform	Robust Scaler	Max Abs Scaler
110	0.2	−0.4332	Res. :	2.04139	−0.2	−0.7333
105	0.1	−0.7883	Mob. :	2.0211	−0.4	0.7
115	0.3	−0.0781	Fax :	2.0607	0.0	0.7667
120	0.4	0.26567	Email :	2.0792	0.2	0.8
110	0.2	−0.4332	Website :	2.0414	−0.2	−0.7333
130	0.6	0.9872		2.1139	0.6	0.8667
150	1	2.2905	Office :	2.1761	1.4	1
100	0	−1.08784	Res. :	2.0	−0.2	0.6667
105	0.1	−0.7883	Mob. :	2.0211	−0.4	0.7
			Fax :			
			Email :			
			Website :			

Normalization

$X_{new} = \frac{X_i - \min(X)}{\max(X) - \min(X)}$

$X_{110} = \frac{110-100}{150-100} = \frac{10}{50} = 0.2$

$X_{105} = \frac{105-100}{150-100} = \frac{5}{50} = 0.1$

$X_{115} = \frac{115-100}{150-100} = \frac{15}{50} = 0.3$

$X_{120} = \frac{120-100}{150-100} = \frac{20}{50} = 0.4$

$X_{110} = \frac{110-100}{150-100} = \frac{10}{50} = 0.2$

$X_{130} = \frac{130-100}{150-100} = \frac{30}{50} = 0.6$

$X_{150} = \frac{150-100}{150-100} = \frac{50}{50} = 1$

$X_{100} = \frac{100-100}{150-100} = \frac{0}{50} = 0$

Standardization

$X_{new} = \frac{X_i - X_{mean}}{SD}$

Standard Deviation (SD)

$SD\ \sigma = \sqrt{\frac{\Sigma(X_i - \mu)^2}{N}}$

$M = \frac{110+105+115+120+110+130+150+100+105}{9}$

$= 116.1$

$\sigma = \sqrt{(110-116.1)^2 + (105-116.1)^2 + (115-116.1)^2 + (120-116.1)^2 + (110-116.1)^2 + (130-116.1)^2 + (150-116.1)^2 + (100-116.1)^2 + (105-116.1)^2}$

$\sigma = \sqrt{(-6.1)^2 + (-11.1)^2 + (-1.1)^2 + (3.9)^2 + (-6.1)^2 + (13.9)^2 + (33.9)^2 + (-16.1)^2 + (-11.1)^2} / 9$

$\sigma = 37.21 + 123.21 + 1.21 + 15.21 + 37.21 + 193.21 + 1149.21 + 259.21 + 123.21 / 9$

$= 1938.89 / 9$

$\sigma = 215.432$ $\sigma = \sqrt{215.432} = 14.68$

$X_{new} = \frac{X_i - X_{mean}}{SD}$

$X_{110} = \frac{(110-116.1)}{14.68} = -0.4332$ $X_{115} = \frac{115-116.1}{14.68} = -0.0781$

$X_{105} = \frac{105-116.1}{14.08} = -0.7883$

$X_{120} = \frac{120-116.1}{14.68} = 0.26567$ $X_{110} = -0.4332$, $X_{130} = \frac{130-116.1}{14.08} = 0.9872$

$X_{150} = \frac{150-116.1}{14.68} = 2.2905$ $X_{100} = \frac{100-116.1}{14.68} = -1.08784$ $X_{105} = -0.7883$