# Ordinal Logistic Regression: Rating Prediction

$$p(r \geq j \mid X) \geq 0.5 \Leftrightarrow \frac{e^{\alpha_j + score(X)}}{e^{\alpha_j + score(X)} + 1} \geq 0.5 \Leftrightarrow score(X) \geq -\alpha_j$$

$$score(X) = \sum_{i=1}^{M} \beta_i x_i$$

**Rating**

k

Classifier 1

k-1

Classifier 2

k-2

…

2

Classifier k-1

1

$-\alpha_k$

$-\alpha_{k-1}$

$-\alpha_2$

r=k

r=k-1

r=2

r=1

**r=j $\Leftrightarrow$ score $\in [-\alpha_j, -\alpha_{j+1})$,  define $\alpha_1 = \infty$, $\alpha_{k+1} = -\infty$**

8