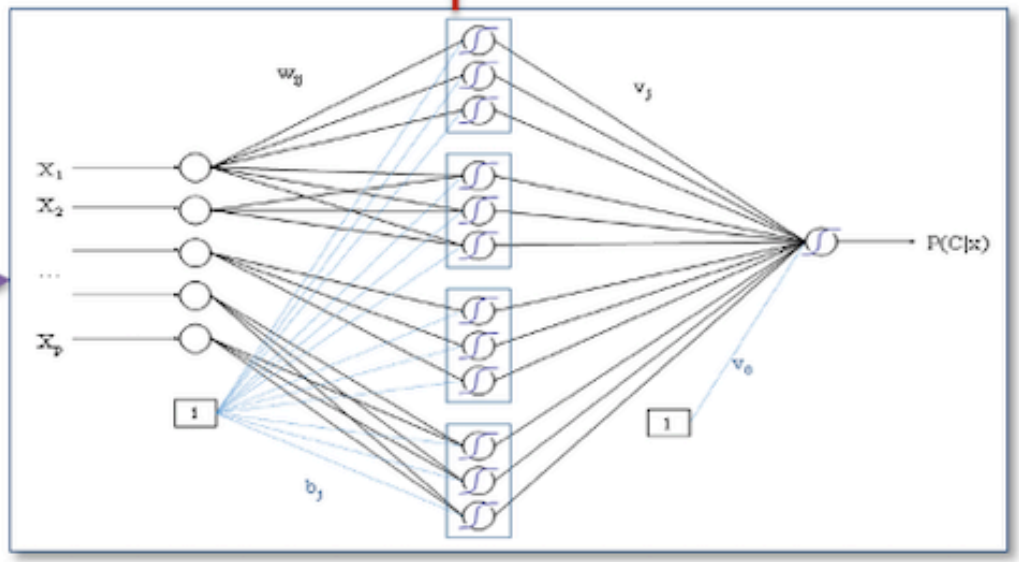
# Prediction of P(C|x)

$$logit\left(P(C|x_i,x_j)\right) = \beta_{x_i}.\varphi(x_i) + \beta_{x_j}.\varphi(x_j) + \\ + \beta_{x_i,x_j}.\varphi(x_i,x_j) + \beta_0 .$$

$$logit(P(C|x)) \\ = \varphi(0) + \sum_i \varphi_i(x_i) \\ + \sum_{i\neq j} \varphi_{ij}(x_i,x_j) + \cdots + \sum_{i_1\neq\cdots\neq i_d} \varphi_{i_1\ldots i_d}(x_{i_1},\ldots,x_{i_d})$$