$$\hat{f}(\mathbf{v}) = \begin{cases} \mathbf{q} = \arg\max_{\mathbf{p}} \hat{f}_{\mathbf{p}}(\mathbf{v}) & \text{if } \hat{f}_{\mathbf{q}}(\mathbf{v}) > 0, \\ \text{-1} & \text{otherwise.} \end{cases}$$