

Cross Feature Early Fusion

$$X_F(S^L, E(M^S, M^L))$$

$$\begin{matrix} w_1 \\ w_2 \\ w_3 \end{matrix} \begin{matrix} f_{S1} & f_{S2} & f_{S3} \\ \left[M^S \right] \end{matrix} \parallel \begin{matrix} w_1 \\ w_2 \\ w_3 \end{matrix} \begin{matrix} f_{L1} & f_{L2} & f_{L3} \\ \left[M^L \right] \end{matrix} = \begin{matrix} w_1 \\ w_2 \\ w_3 \end{matrix} \begin{matrix} f_{S1} & f_{S2} & f_{S3} & f_{L1} & f_{L2} & f_{L3} \\ \left[E(M^S, M^L) \right] \end{matrix}$$

$$\begin{matrix} w_1 \\ w_2 \\ w_3 \end{matrix} \begin{matrix} w_1 & w_2 & w_3 \\ \left[S^L \right] \end{matrix} \times \begin{matrix} w_1 \\ w_2 \\ w_3 \end{matrix} \begin{matrix} f_{S1} & f_{S2} & f_{S3} & f_{L1} & f_{L2} & f_{L3} \\ \left[E(M^S, M^L) \right] \end{matrix} = \begin{matrix} w_1 \\ w_2 \\ w_3 \end{matrix} \begin{matrix} f_{S1} & f_{S2} & f_{S3} & f_{L1} & f_{L2} & f_{L3} \\ \left[X_F(S^L, E(M^S, M^L)) \right] \end{matrix}$$