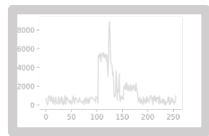
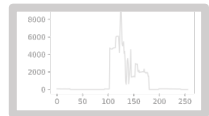


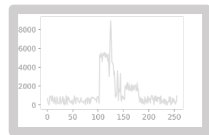
Aggregate Sequence X



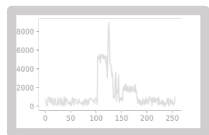
(+) & Lower Correlation with $j \neq m$



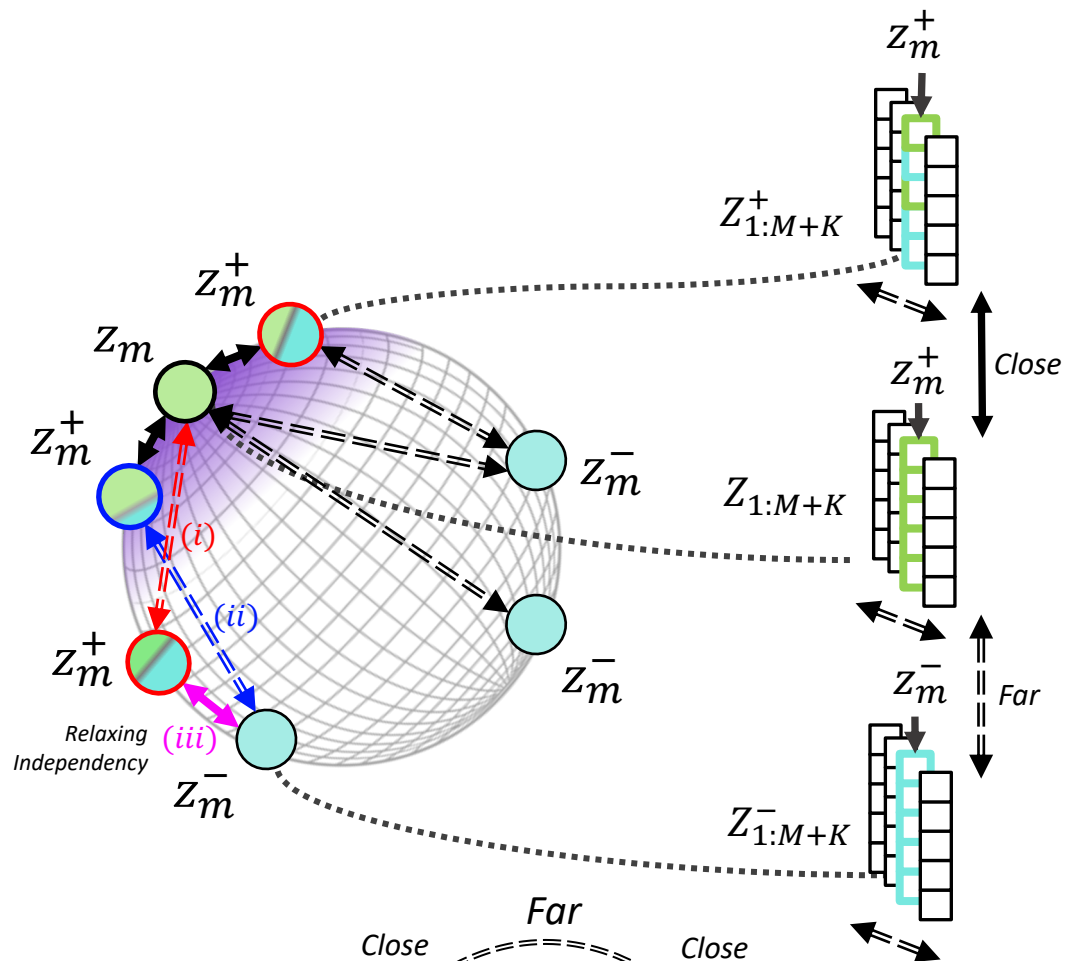
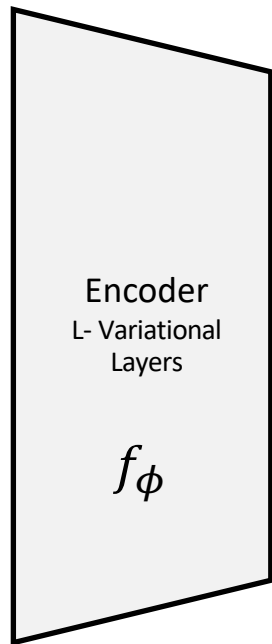
Anchor



(+) & Strong Correlation with $j \neq m$

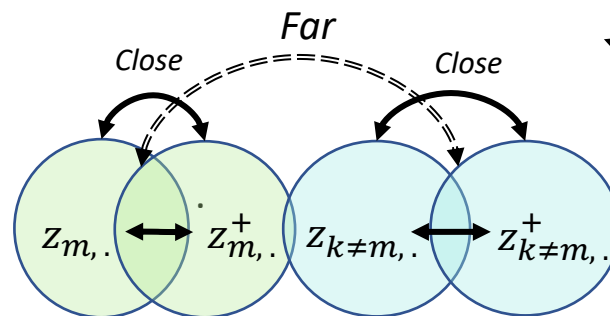


(-)

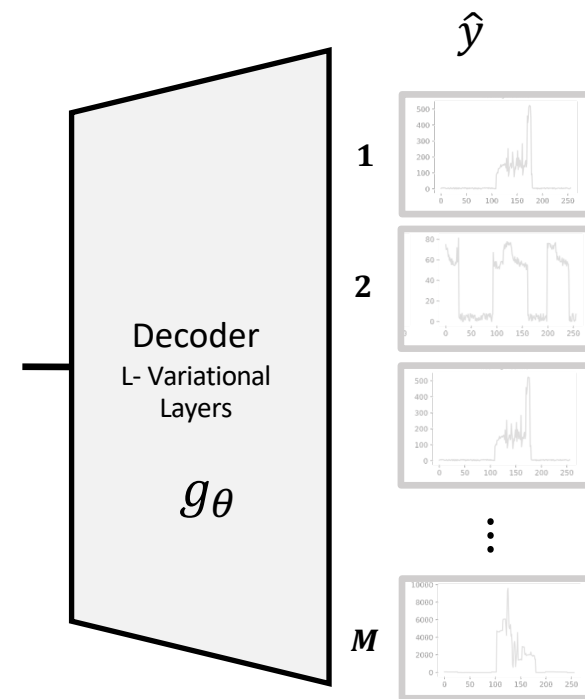


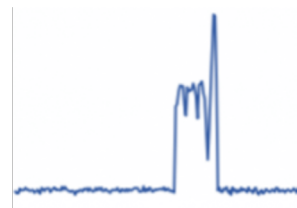
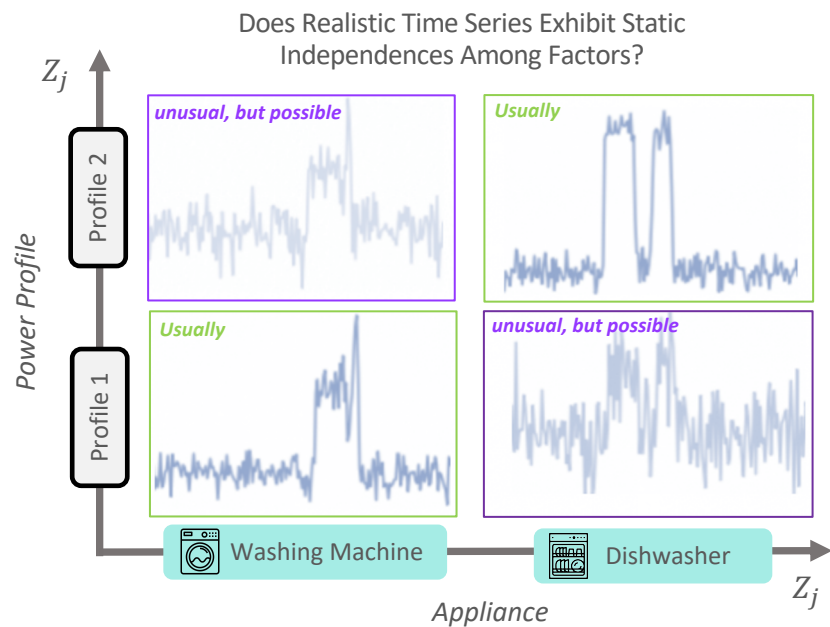
Close \longleftrightarrow (all colors)
Far \longleftrightarrow (all colors)

- Anchor Sequence, with appliance m
- With appliance m : (+) & **Lower Correlation** with $j \neq m$
- With appliance m : (+) & **Strong Correlation** with $j \neq m$
- Without appliance m : (-)



Weak Supervised Contrastive Disentanglement \rightarrow **Relaxing Independency**





- Anchor Sequence
- Augmented Sequence (Source 1)
- Augmented Sequence (Source 2)
- Negative Sequence

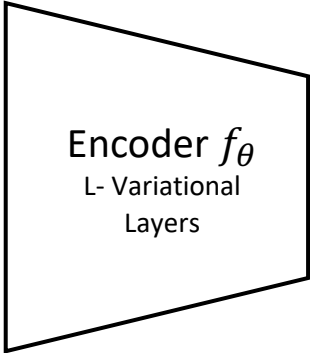
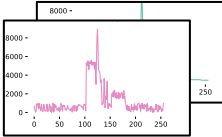
Positive pair { $X_{t:t+\tau}$ sequence with Appliance m
 $X_{t:t+\tau}^+$ sequence with Appliance m

Negative pair { $X_{t:t+\tau}$ sequence with device m
 $X_{t:t+\tau}^-$ sequence with Appliance m

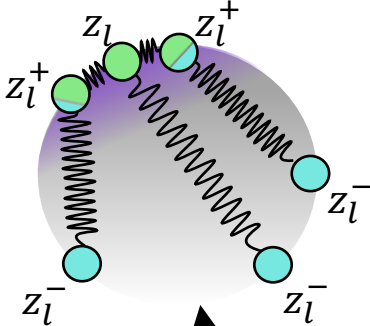
$$F = -k. \Delta L$$



$$F = k. \Delta L$$



$$\mathbf{Z} = [\mathbf{z}_{1:M}, \mathbf{z}_{1:v}]$$



Weak Supervised Contrastive
 Disentanglement “Relaxing Independency”

