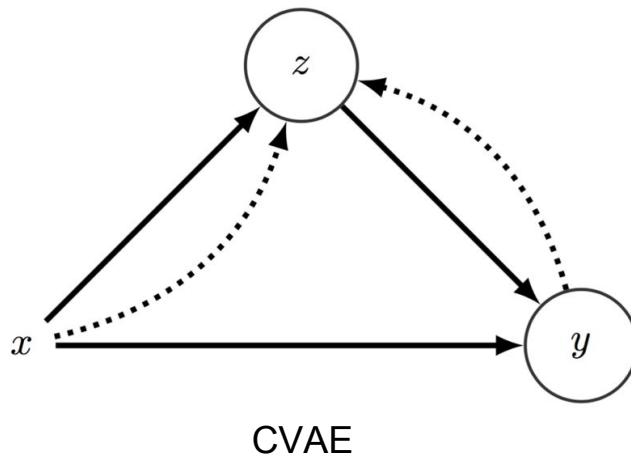
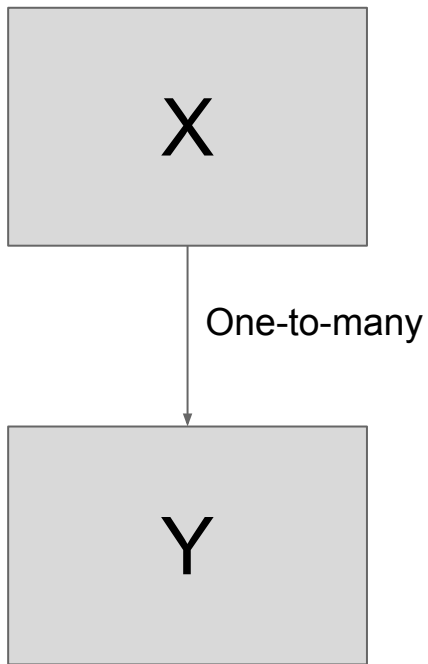


Bottleneck Conditional Density Estimation



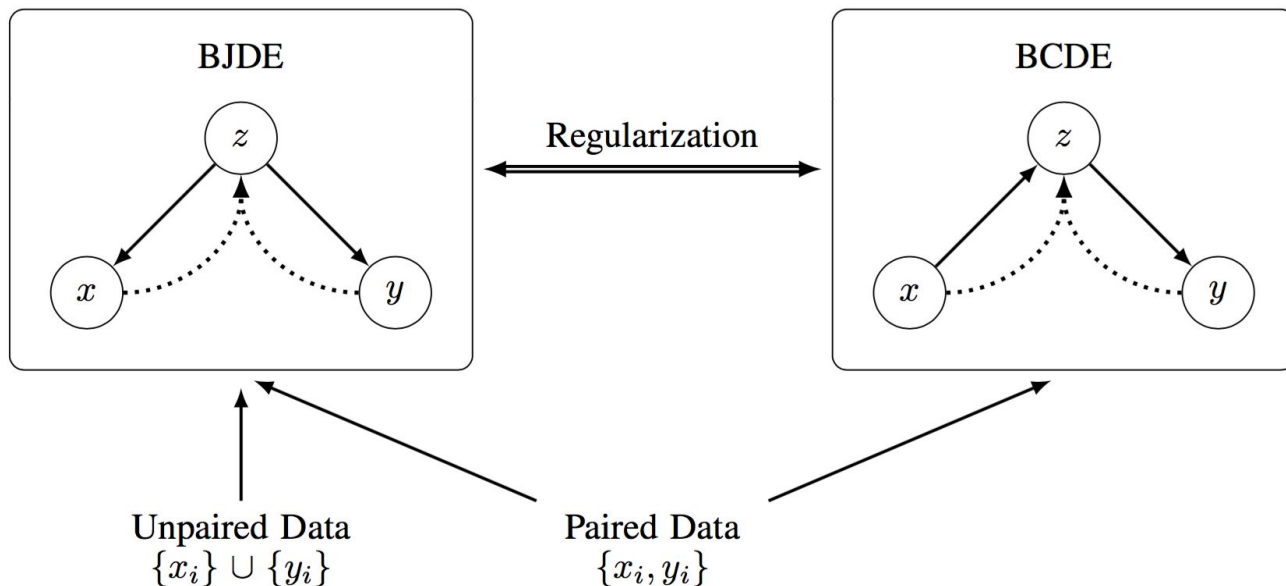
Rui Shu, Hung Bui, Mohammad Ghavamzadeh

Conditional Density Estimation



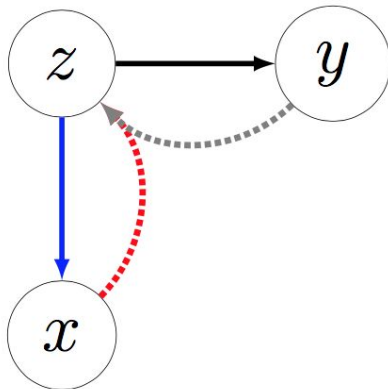
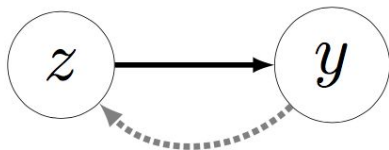
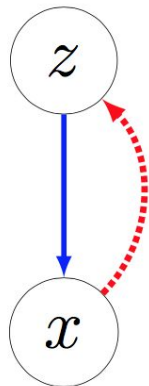
- **Cannot** leverage (x) data
- **Cannot** leverage (y) data
- **Does not** take advantage of the marginal distributions of x and y

Bottleneck Conditional Density Estimation



- **Can** leverage (x) data
- **Can** leverage (y) data
- **Does** take advantage of the marginal distributions of x and y

Factored Inference

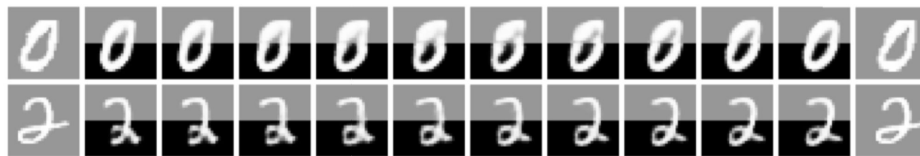


- Ties proposal distributions between paired and unpaired data streams
- Reduces complexity of recognition model

$$p(z|x) \approx q(z|x)$$

$$p(z|y) \propto p(z)p(y|z) \approx p(z)\hat{\ell}(z; y)$$

$$p(z|x, y) \propto p(z|x)p(y|z) \approx q(z|x)\hat{\ell}(z; y).$$



(a) Hybrid



(b) Conditional

