Sample a chained transformation for adversarial data augmentation

x $\mathcal{T}_{morph}$ $\mathcal{T}_{noise}$ $\mathcal{T}_{bias}$ $\mathcal{T}_{affine}$ x'

$\nabla_{\boldsymbol{\theta}}\left[(\mathcal{L}_s) + \lambda\mathcal{R}\right]$ ❷ **Minimize** $(\mathcal{L}_s) + \lambda\mathcal{R}$

$f_\theta(\cdot)$

Network

x

$\mathcal{T}_{\boldsymbol{t}}(\cdot)$
Adversarial Data
Augmentor

x'

p

p'

$\mathcal{L}_s$
Supervised loss
(If its label is available)

$\mathcal{R}$
Consistency regularization
loss

$-\boldsymbol{\nabla_t}\mathcal{R}$

❶ **Maximize** $\mathcal{R}$

⟶ Forward   ⇢ Backprop   ▮ Image   ● Prediction