Video: Multi-task loss, Dataset size, and CNN Architectures

Examples (mass, pneumonia, edema)	Predicted Probabilities	Loss
P_1 0, 1, 0	0.3, 0.1, 0.8	0.15 + 1.00 + 0.20
P_2 0, 0, 1	0.1, 0.1, 0.8	0.05 + 0.05 + 0.10
P_3 0, 1, 1	0.2, 0.2, 0.7	0.10 + 0.20 + 0.15
P_4 1, 0, 1	0.6, 0.3, 0.8	0.21 + 0.15 + 0.10
P_5 1, 1, 1	0.7, 0.7, 0.9	0.15 + 0.15 + 0.05
P_6 1, 0, 0	0.8, 0.1, 0.2	0.10 + 0.05 + 0.10
P_7 0, 1, 1	0.3, 0.9, 0.8	0.15 + 0.05 + 0.10
P_8 0, 0, 0	0.1, 0.1, 0.2	0.05 + 0.05 + 0.10

$$L(X, y) = L(X, y_{mass}) + L(X, y_{pneumonia}) + L(X, y_{edema})$$

Multi-Label/Multi-Task Loss

Applied Weighted Loss:

$$\text{Multi-Task } L(X, y_{mass}) + L(X, y_{pneumonia}) + L(X, y_{edema})$$

$$L(X, y) = \begin{cases} -w_{p,\ mass\ pneumonia\ edema} \log P(y=1 \mid X) & \text{if } y=1 \\ -w_{n,\ mass\ pneumonia\ edema} \log P(y=0 \mid X) & \text{if } y=0 \end{cases}$$

Dataset size problem: In medical, the standard is to try out multiple model (Inception-net, ResNet-34, DenseNet, ResNext, EfficientNet) on desired tasks and see which one work best