# Integrating Noisy Label Learning and Confidence Estimation

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# Context

- **Label noise**: Errors or inaccuracies in the labels or annotations assigned to data points in a supervised learning dataset.

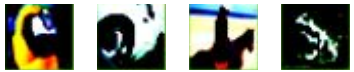
- **Confidence estimation:**

  Quantifying the level of certainty or confidence associated with the predictions made by a model.

**Ambiguity in annotation**

**Label**: Ox
(ImageNet Dataset)

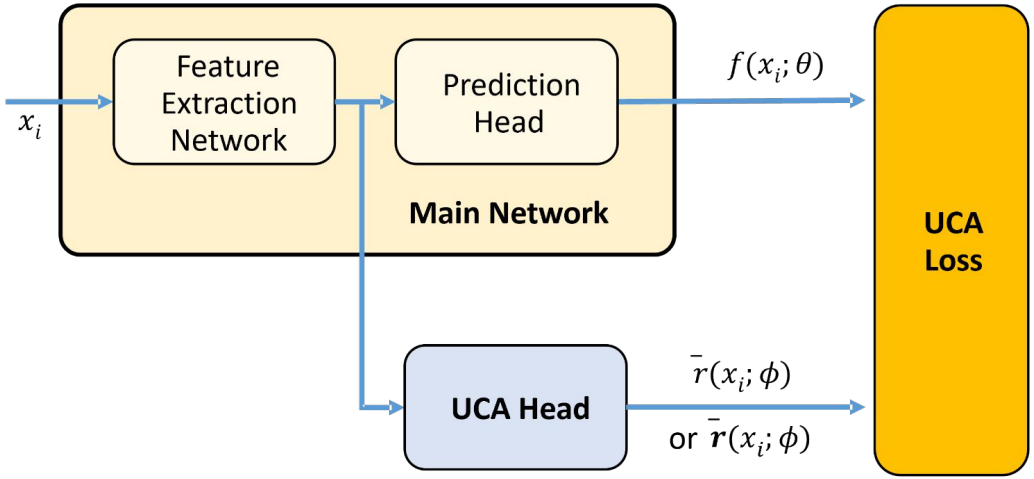
**Poor quality images**



**Labels**: Bird Car Horse Frog

(CIFAR-10 Dataset)

# UCA: Unsupervised Confidence Approximation

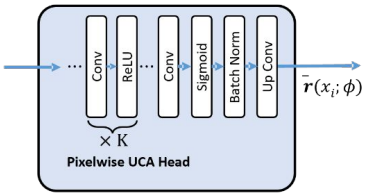


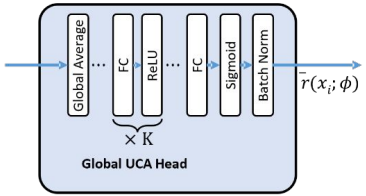
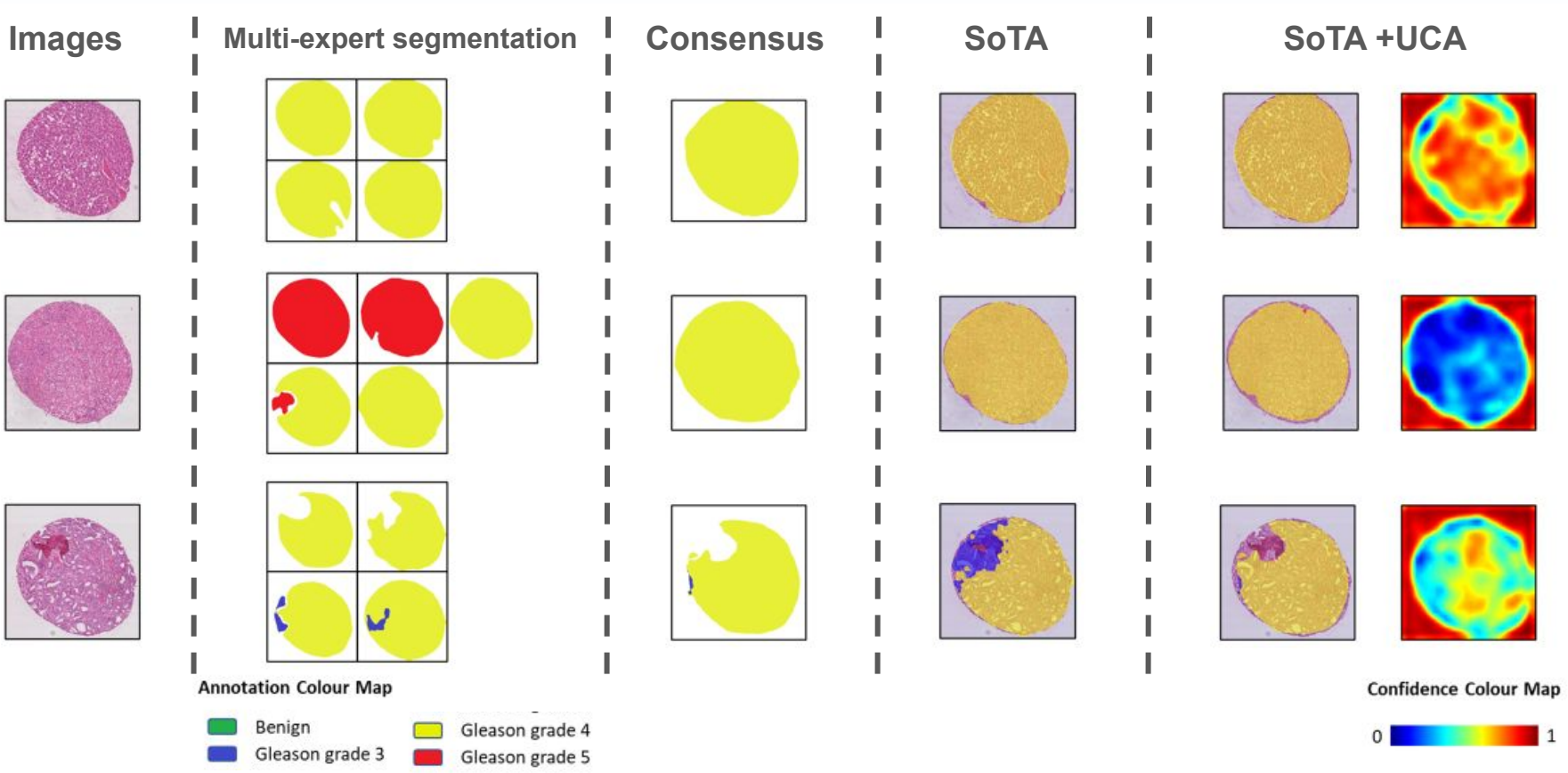

$$\theta^*, \phi^* = \underset{\theta,\phi}{\operatorname{argmin}} \sum_{i=1}^{N} \bar{r}(x_i;\phi) L\left(x_i, \bar{y}_i; \theta\right) + \beta D(w,u)$$

subject to:

$$\bar{r}(x_i;\phi) > 0,$$

$$\sum_{i=1}^{N} \bar{r}(x_i;\phi) = NA$$






# Test on microscopic image segmentation