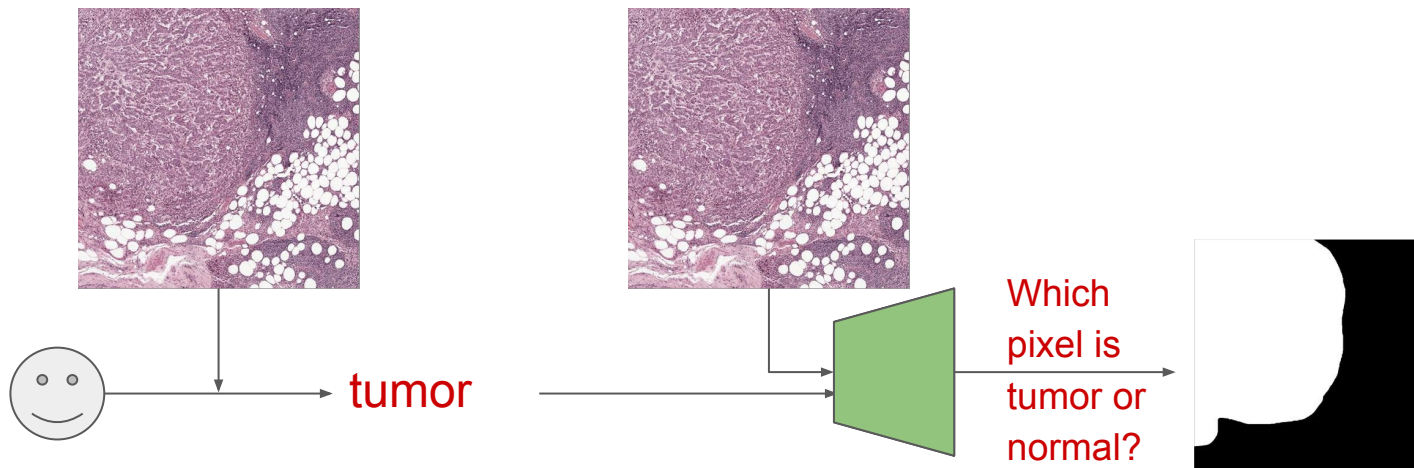


Assignment 3

Implement the paper “Weakly Supervised
Clustering By Exploiting Unique Class Count
(in ICLR’20)”

Motivation

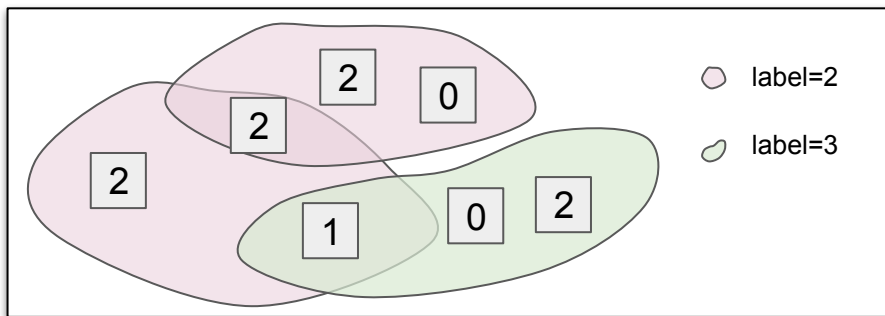
- Experts can give a diagnosis of metastasis, but labeling each pixel is laborious



- Explore the feasibility of finding out **labels of individual instances**(pixel) inside the bags(metastasis) **only given the bag level labels**, i.e. there is no individual instance level labels.

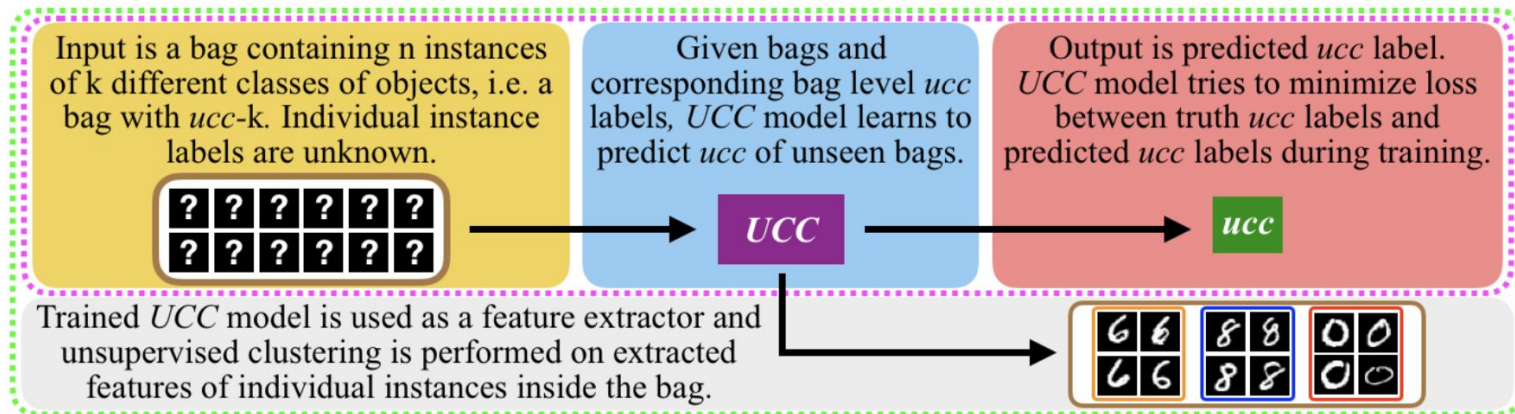
Task

- **Learn a ucc (unique class count) classifier by MIL** (multi-instance learning)
 - Input: bags of instances (unknown labels)
 - Output: bag label
 - Objective: Learn a mapping between bag and the associated label and predict unseen bag
- The ucc classifier has to learn discriminant features for underlying classes, then it can group the features obtained from the bag and give ucc prediction



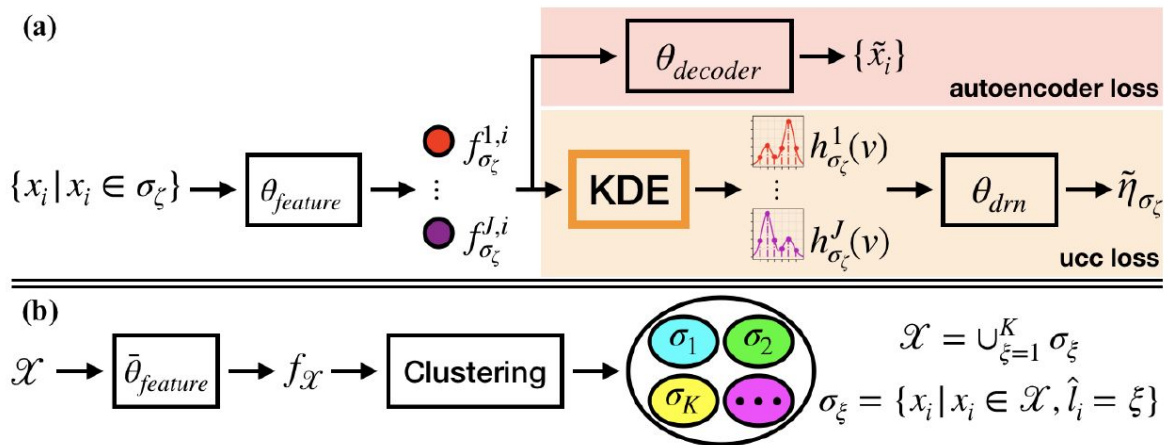
Task

- **Perform unsupervised clustering based on the feature extracted from *ucc* classifier**
 - Input: feature of instances
 - Output: clusters
- **Overall framework**



Method

- (a) UCC model
 - ucc loss
 - autoencoder loss
- (b) unsupervised clustering



What you need to implement?

- Reproduce the results of cifar10 (Table 1)
 - Implement the method (see instructions in Assignment3.pdf)
- Plot training loss and validation loss
- Improve the method
- Provide detailed explanations in the report, e.g., the choice of optimization strategy, data augmentation..
- Submit your code and discussion report

	min. JS divergence			<i>ucc</i> acc.			clustering acc.		
	mnist	cifar10	cifar100	mnist	cifar10	cifar100	mnist	cifar10	cifar100
<i>UCC</i>	0.222	0.097	0.004	1.000	0.972	0.824	0.984	0.781	0.338

Taken from Table 1 (cifar10) in Weakly Supervised Clustering By Exploiting Unique Class Count, ICLR'20

Submission

- Follow the folder structure
- main.ipynb should keep the cell outputs and be produceable
- You can refer to official code, but you should reimplement the algorithm yourself
- DO NOT copy the code from the internet, e.g. GitHub.
- Post your questions on the Canvas/Discussions/Assignment3

```
YourNUSNETID_YourName
├── report.pdf
└── code/
    ├── main.ipynb
    └── ..
```

Assignment3



All sections

Last post at 16 Oct, 15:51

Available until 31 Oct, 23:59



- Upload to LumiNUS before deadline (October 31, 2023 at 6pm)