

## 每周研究展阶段汇报

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时间段: 2020 年 9 月 7 日 (周一) 至 2020 年 9 月 12 日 (周六)

一、本周工作:

1. 阅读周志华《机器学习》第三章: 线性模型
2. 阅读《认知神经科学》第一章: 认知神经科学简史; 第二章: 细胞机制与认知
3. 阅读多模态综述剩余部分, 及文中所提及的部分工作。

二、思考总结:

**Part 1.**

这是一个示例, 文档支持中文和英文。中文为宋体, 英文为 **Times New Roman**。编译时: **xe->bib->xe**。中间可能会报错, 但是不要紧, 连续编译过后就可以生成正确的 **pdf** 文件。

在《机器学习》第三章: 线性模型中, 多分类学习是之前没有接触过的内容。容易想到, 将多分类任务拆解为二分类任务就可以应用二分类方法, 这也是解决多分类任务的一般方法。解决多分类任务关键是如何对多分类任务进行拆分, 以及如何对多个分类器进行集成。

**Part 2.**

这是一段引用示例, 参考文献在 **refer.bib** 中。Training Deep Neural Networks is complicated by the fact [1–3] that the distribution of each layer’s inputs changes during training, as the parameters of the previous layers change. This[2] slows down the training by requiring lower learning rates and careful parameter initialization, and makes it notoriously hard to train models with saturating nonlinearities. We refer to this[3] phenomenon as internal covariate shift, address the problem by normalizing layer inputs. Our method draws its strength from making normalization a part of the model architecture and performing the normalization for each training mini-batch. Batch Normalization allows us to use much higher learning rates and be less careful about initialization.

**Part 3.**

这是一段插入公式示例。 We calculate AUC by Eq(1).

$$AUC = \frac{\sum_{ins_i \in positiveclass} rank_{ins_i} - \frac{M \times (M+1)}{2}}{M \times N} \quad (1)$$

where  $M$  is the number of positive class, and  $N$  is the number of negative class.  $rank_{ins_i}$  represents the possibility rank of sample  $ins_i$  in the positive class. AUC indicates classifiers’ ability to distinguish both positive and negative classes. Even in the condition of the highly imbalanced dataset, it can still put forward sensible evaluation.

三、下周规划:

1. 阅读周志华《机器学习》第三章: 线性模型
2. 阅读《认知神经科学》第一章: 认知神经科学简史; 第二章: 细胞机制与认知
3. 阅读多模态综述剩余部分, 及文中所提及的部分工作。

## 参 考 文 献

- [1] K. Diesase, “Improving global outcomes (kdigo) acute kidney injury work group: Kdigo clinical practice guideline for acute kidney injury,” *Kidney Int Suppl*, vol. 2, no. 1, pp. 1–138, 2012.
- [2] A. S. Levey, K.-U. Eckardt, N. M. Dorman, S. L. Christiansen, E. J. Hoorn, J. R. Ingelfinger, L. A. Inker, A. Levin, R. Mehrotra, P. M. Palevsky *et al.*, “Nomenclature for kidney function and disease: Report of a kidney disease: Improving global outcomes (kdigo) consensus conference,” *Kidney International*, 2020.
- [3] C. Hobson, T. Ozrazgat-Baslanti, A. Kuxhausen, P. Thottakkara, P. A. Efron, F. A. Moore, L. L. Moldawer, M. S. Segal, and A. Bihorac, “Cost and mortality associated with postoperative acute kidney injury,” *Annals of surgery*, vol. 261, no. 6, p. 1207, 2015.