1. **Active Learning From Imbalanced Data: A Solution of Online Weighted Extreme Learning Machine** (doi: 10.1109/TNNLS.2018.2855446)

    a. **Authors:** Hualong Yu; Xibei Yang; Shang Zheng; Changyin Sun

    b. **What problem:** The effectiveness of active learning is often hindered by imbalanced data distributions. Some current imbalanced active learning methods either perform poorly or are too time-consuming.

    c. **How does it solve the problem?**
        i. By providing experiments with their claiming method

    d. **Contributions:** Introducing active online-weighted ELM (AOW-ELM) as solution;
        i. Discusses how imbalanced instance distribution disrupts active learning.
        ii. Uses hierarchical clustering to improve initial instance labeling.
        iii. Proposes weighted ELM (WELM) as a fair base classifier with an online update mode.
        iv. Introduces a flexible early stopping criterion.

    e. **Downside:** The AOW-ELM algorithm is particularly vulnerable to noise, especially in datasets with a high level of imbalance, where random sampling (ROW-ELM) can occasionally achieve better results than uncertainty-based sampling.

2. Supervised machine learning and active learning in classification of radiology reports

(https://doi.org/10.1136/amiajnl-2013-002516)

a. **Authors:** Dung H M Nguyen, Jon D Patrick

b. **What problem:** They need a survey of optimal data selection techniques

c. How does it solve the problem?

i. They collected previous researches and analyzed them in terms of optimal data selection techniques

d. **Contributions:**

i. Explained Active Learning as a Statistical Approach with examples
ii. Analyzing Active Learning with a Mixtures of Gaussians which is a powerful estimation and prediction technique model.
iii. Locally Weighted Regression for Active Learning was provided for analysis

e. **Downside:** They focused solely on function approximation problems.

3. AL-ELM: One uncertainty-based active learning algorithm using extreme learning machine (https://doi.org/10.1016/j.neucom.2015.04.019)

a. **Authors:** Hualong Yu, Changyin Sun, Wankou Yang, Xibei Yang, Xin Zuo

b. **What problem:** labeling instances is not cost / time efficient

c. How does it solve the problem?

i. Using extreme learning machine (ELM) classifier

d. Contributions:

i. Introducing ELM which has low computational costs and strong generalization ability. Also, ELM can also be applied to either binary-class and multiclass problems.

ii. They conducted 20 benchmark datasets experiment with active learning algorithm based on ELM (AL-ELM), which showed a result of reducing running time of learning procedure

e. **Downside:** It would be better to have more comparison with other methods not only with the non-uncertainty-based active learning techniques or at least mentioning it would be great