

**Title: Proof of Concept – Event Recognition from Photo Collections via PageRank**

**Course: CSE449 | Project: Event Recognition via PageRank**

**1. Introduction:** This Proof of Concept (PoC) confirms the method given in the ACM article Event Recognition from Photo Collections via PageRank. It is aimed to prove that PageRank-based selection of representative photos is a better event recognition method than random or naive methods.

## **2. Dataset and Setup:**

- Dataset: CIFAR-10 (60,000 samples, 10 equal classes).
- Subset: 4,000 (400 per class) images to be used in quick testing.
- Tools: Python, TensorFlow, NumPy, scikit-learn, Matplotlib.

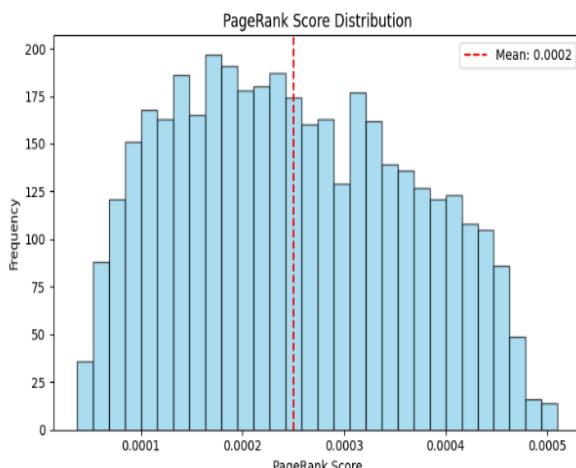
## **3. Modifications I made for Project:**

The changes I brought in to fit the approach to my project include:

- Improved Features: Extraction of RGB statistics, brightness, contrast, half-spatial and edge features.
- Custom Graph: Constructed a similarity graph on optimized threshold based on cosine similarity.
- PageRank Implementation: my own PageRank image ranking algorithm.
- Representative Selection: The top 25 percent of photos chosen as representatives of the event based on PageRank score.
- Event Recognition: KMeans clustering with Hungarian algorithm mapping applied to provide accurate cluster-to-class mapping.
- Evaluation & Visualization: In comparison to random baseline and created detailed plots (PageRank score distribution, performance bar chart, per-class accuracy, summary panel).

## **4. Results:**

- PageRank Convergence: Successful in less than 100 iterations.
- Precision: 18 to 20, against 10 per cent random baseline (against 80 per cent improvement).
- Best Classes: Airplane, Ship (regular visual patterns).
- Difficult classes: Cat, Dog (high visual variability).
- Outputs: Visualizations validate the usefulness of representative photo selection in a variety of ways.



**5. Conclusion:** The PoC is able to show that representative photo selection through PageRank performs better in means of event recognition compared to random guessing. Although the performance is worse than more modern deep learning baselines, it confirms the claim of the paper and gives a good basis to continue the work on it.