

Graph diffusion for improving nodal feature classification**Authors:**

- Andreu Martorell, Dept. de Matemáticas. Universidad de Valencia (andreu.martorell@uv.es)
- Pep Mulet, Dept. de Matemáticas. Universidad de Valencia (pep.mulet@uv.es)
- Dionisio F. Yáñez, Dept. de Matemáticas. Universidad de Valencia (dionisio.yanez@uv.es)

Abstract: We propose a novel approach for optimizing the topology of graph neural networks using non-linear partial differential equations based on forward-backward diffusion mechanisms [?, ?]. Our approach introduces a natural technique for node feature classification, which improves efficient construction of proximity graphs in large, high-dimensional datasets [?, ?], substantially enhancing the accuracy of k -nearest neighbor searches. To address forward-backward diffusion equations on networks, implicit-explicit schemes are explored. Forward diffusion prompts the attraction between neighbor nodes, while backward diffusion fosters repulsion among distant nodes, leading to an effective data clustering method.

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