

Master Thesis Offer: 360 Image Compression using Filterbanks on Graphs

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Level: Master 1 or 2 / 2nd or 3rd year of engineering school

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MOTIVATIONS AND DESCRIPTION

The popularity of omnidirectional (360) images lead to a need for advanced method for representing and processing these images. In particular, to deal with the challenges of their spherical topology, most methods project these images on a planar space, but at the cost of non-homogeneous spatial distribution of the original pixels. Recent advances show promising compression rates using the HEALPix grid on the sphere and generalizations of convolutive neural networks [1, 4].

The goal of this internship is to leverage recent advances of point cloud attribute compression using graph signal processing [3]. With such an approach, the spherical topology is equipped with a hierarchical division with graphs at each levels, leading to a multiscale decomposition of the sphere. A filterbank can then decompose the signal (the omnidirectional image) into approximation and details features. The internship goal is twofold: i) formalize and implement omnidirectional image compression using this multiscale filterbank, and ii) compare it with the state of the art.

EXPECTED RESULTS

- ▶ Formalize this multiscale filterbank and image compression on the sphere using [3] and [2]
- ▶ Implement omnidirectional image compression
- ▶ Run experiments, produce rate-distorsion plots, and compare them with the state of the art
- ▶ Optionally, implement an auto-encoder for omnidirectional image compression using the output of the filterbank

REFERENCES

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