



THE WEIZMANN INSTITUTE OF SCIENCE  
FACULTY OF MATHEMATICS AND COMPUTER SCIENCE

Vision and Robotics Seminar

on Thursday, Jan 28, 2021  
at 12:15

<https://weizmann.zoom.us/j/91363737177?pwd=bEdNSU9tcVRCQXhjaDRPSXlyWCswUT09>

Shai Avidan  
Tel Aviv University

## Learning to Sample

Abstract:

There is a growing number of tasks that work directly on point clouds. As the size of the point cloud grows, so do the computational demands of these tasks. A possible solution is to sample the point cloud first. Classic sampling approaches, such as farthest point sampling (FPS), do not consider the downstream task. A recent work showed that learning a task-specific sampling can improve results significantly. However, the proposed technique did not deal with the non-differentiability of the sampling operation and offered a workaround instead. We introduce a novel differentiable relaxation for point cloud sampling that approximates sampled points as a mixture of points in the primary input cloud. Our approximation scheme leads to consistently good results on classification and geometry reconstruction applications. We also show that the proposed sampling method can be used as a front to a point cloud registration network. This is a challenging task since sampling must be consistent across two different point clouds for a shared downstream task. In all cases, our approach outperforms existing non-learned and learned sampling alternatives.

Based on the work of: Itai Lang, Oren Dovrat, and Asaf Manor

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