Adaptive anti-aliasing for fisheye cameras in Surround View Systems

The rapid advancement in the field of camera based systems has led their usage in the Surround View systems in automotive domain. Fisheye cameras, due to their unique property of large Vertical and Horizontal Field of View, are used in this system.

Fisheye images are plagued with radial distortions. The process of straightening or "Un-distortion" is performed to remove these distortions. During this process, aliasing artifacts arises, which in effects, decreases the image quality at peripheral regions of the image at Horizontal Field of View angles of above 130 degrees.

This thesis introduces the *Adaptive Anti-Aliasing* technique which aims to improve the quality of an undistorted fisheye image using its non-uniform pixel information distribution. The non-linearity in the fisheye image pixel information distribution is measured using its Pixel Density. The proposed Anti-aliasing method then adapts according to the measured local Pixel Density of the region of execution on the fisheye image.

By using standard image quality metrics like *Peak-Signal-To-Noise-Ratio* and *Structural Similarity Index*, the image quality improvement of the fisheye images are measured.