Specific Contributions

Specific Contributions of this work are divided into major and minor contributions. The list is as follows:

Major Contributions:

1. Comparative analysis of performance of six feature detectors (Harris-Affine, hessian-Affine, Maximally Stable Extremal Regions (MSER), Scale Invariant Feature Transform (SIFT), Affine-SIFT (ASIFT) and Speeded Up Robust Features (SURF)) with respect to quality of images used for experimentation determining image scenes under varying imaging conditions of viewpoint change, scale change, blur change, illumination change and JPEG compression.
2. An improved No-Reference Image Quality Assessment (NR-IQA) model, developed by combining the efficiency of three NR-IQA metrics using Multi Linear Regression (MLR) Model.
3. An improved No-Reference Video Quality Assessment (NR-VQA) model, developed by examining the quantification of five distortions (ringing effect, frame difference, blocking, clipping and contrast) in video frames. Neural Network (NN) model used for fitting the distortion quantification metrics yield a goodness of fit of R=0.8785.
4. An improved feature detection procedure, Multi-Scale Linear-MSER (MSLinear-MSER), using MSER for image registration.
5. An offline Augmented Reality (AR) system prototype using MSLinear-MSER, with correct augmentation precision of 0.9729.
6. A novel feature descriptor, with speed up of 1.6 from the conventional SIFT feature descriptor for image registration using circular and elliptical sampling for determining the neighborhood pixels of the extracted keypoint in a more affine invariant manner.
7. Complete program listing of scan converting a general conic using curve tracking.

Minor Contributions:

8. Documentation of possible applications of AR for Education.
9. Program listing for statistically assessing the quality of a set of large number of images using NR-IQA and Full-Reference Image Quality Assessment (FR-IQA) metrics.