

AbstractID: 2526 Title: A Novel Algorithm for MTF/NPS Measurement for LCD/CRT Characterization and its Evaluation: A Directional-Based Approach

**Purpose:** This paper presents an improved strategy for MTF and NPS measurements based on neighborhood approach, unlike the conventional approach.

**Method:** Since resolution (MTF) and noise (NPS) are important quantitative measures of image quality, our protocol characterizes the displays using these parameters. The novelty of our evaluation strategy lies in the way we compute our MTF. This involves computation of MTF in eight different directions from its central position, averaging them and then replacing it at its central location. Such a method is a directional-based MTF, and offers advantage of taking neighborhood pixels.

**Results:** It is observed that the directional MTF is higher than the conventional MTF. Hence, directional-based MTF approach presents a better method of computing the MTF. This also is justified by saying that the noise is being averaged by considering the directional approach. A similar behavior is observed for the NPS of the two displays. The noise observed in the NPS curves of the LCDs can be attributed to the discrete pixel structure of the LCDs. CRTs in this aspect have lower noise compared to the LCD displays. But the higher MTF of the LCDs indicates that LCDs have higher resolution, which is an important physical property for mammography applications.

**Conclusions:** Based on the experimental results we conclude the following: **(a)** Our algorithm demonstrated the measurement of MTF using directional approach was considerably higher than the conventional approach; **(b)** LCDs and CRTs have a larger MTF difference using directional-based approach compared to conventional approach; **(c)** All the measurements show that MTF and NPS curves obtained using directional-based approach are consistent and smooth; **(d)** All the MTF measurements using directional-based approach are better for LCDs compared to the conventional CRTs.