VIRTUAL DOCTOR
Computer Aided Medical Image Analysis

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Project Overviews

The number of deaths caused by breast cancer has been increasing by 3% a year, making the disease one of the most serious threats to women's health.

Microcalcifications (MCs) are tiny deposits of calcium in the breast. They are sometimes clues to the presence of early breast cancer.

A screening mammogram is an X-ray of the breast used to detect breast changes in women. With a mammogram, it is possible to detect MCs or a tumor that cannot be felt.

However, reliable MC detection has so far been an extremely difficult task. Computer-aided detection and diagnosis (CAD) schemes have been developed to improve the detection rate and to reduce the false positives.

In this project, a scheme which can detect MCs are designed along with a user friendly interface.
System Flow Chart

Data set
(.ICS file and
four .LJPEG)

To decompress
the lossless jpeg
image

To segment the
breast tissue

Display

Analysis

To improve the
contrast

To mark breast
boundary

To mark the
abnormalities
notified by
radiologists

To mark the MCs
and MC clusters
located by the

To label possible
MCs

To extract features
with texture
inpainting

To train the
classifier with
training cases

To classify MCs
with the trained
classifier

To cluster the
MCs

To train the
classifier with
training cases

To classify MCs
with the trained
classifier

To cluster the
MCs

To mark the MCs
and MC clusters
located by the
Results

Analysis

In this project, 50 cases are used for the training process and 50 cases are used for testing.

For some cases, the result is acceptable which score a high true positive rate of about 95% and a false positive of about 8 clusters per mammogram. But on average, the true positive rate is about 87% and the false positive is about 15 clusters per image.

Display

A user friendly interface is implemented with various functions.