The captured images have been chosen to reflect different grades of malignancy in prostatic tissues and they are labeled into 4 classes: 176 cases of cancer (PCa), 160 cases of BPH, 144 cases of PIN and 144 cases of Stroma (STR). The samples were routinely viewed at prostatic section seen at low power (x 40 objective magnification) by two highly experimented independent pathologists. The pathologist initially views slides at low power, thereby enabling the location of potentially abnormal regions. Subsequent analysis of these regions at high power enables the histological grading of these areas.

The X-Y resolution depends on the magnification chosen, which is usually high for visualization purposes. In this study, the images of 128 by 128 pixels were captured at an X-Y resolution of 0.12 microns/pixel.

Usually, when a biopsy is submitted for analysis, it is very rare that the pathologist finds that the sample is perfectly normal. There must be at least some benign condition that would explain the high levels of PSA that usually justify needle biopsy. So the main issue is to identify benign from malignant and premalignant conditions.

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1 The data set used in this study were provided from Pathology department team at Queen’s university of Belfast under the direction of Prof. Hamilton.