Title: Smart systems driving nanomechanical essay in cancer diagnostic (smart microscopy)

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Project AIM

A biopsy is a sample of tissue taken from the body in order to examine in detail its cellular and molecular properties. Biopsies are a common diagnostic approach in oncology. Atomic force microscopy can be applied to study the biomechanical properties of cells and subcellular structures, and retrieve important information on the tumour malignancy and prognosis. However, the measurement is strongly position dependent, and its significativity depends on the acquisition of a large number of points at the right location. “Smart systems driving imaging microscopy in cancer diagnostic” the will implement new smart algorithms, based on image recognition, to drive an AFM-modified microscope and obtain a fully authomatic mechanical evaluation of the bioptic sample within 24h from the sample recovery

Description of the activities that the student will have to carry out

- literature analysis and context study;
- identification of the opportune algorithms and their implementation on a commercial microscope (defined according to possible interaction with trainsheep activity to CNR-IOM – Trieste headquarters);
- identification and implementation of the most appropriate algorithms to support experimental analysis based on data clustering

Engineering-design contribution of the proposal

Design and implementation of the algorithm that will define the microscopy position based on the optical imaging of the sample; design and development of appropriate software to support the analysis of the experimental data.