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Investigation of Abnormal Prostate Region Detection Using Different Modality Combinations of mpMRI Scans

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There are many prevention programs in effect for various organ cancer nowadays and prostate cancer is not an exception. Prostate cancer is not only the second most frequent tumor among men, but is also one of the most morbid tumors worldwide. Lithuania has adopted a law for funding a program for early prostate cancer diagnosis on a national level in 2005. Despite biopsy being the only way to conclude a definite diagnosis of prostate cancer, it still misses up to 30% of clinically significant cancer and reason for that is taking samples from wrong location. National Comprehensive Cancer Center recommends using multiparametric magnetic resonance imaging (mpMRI) for aiding the diagnosis of prostate cancer by determining the location to perform biopsy on. According to the latest guidelines, radiologists must find abnormalities in at least three different mpMRI modalities for the region to become a biopsy candidate. The detection of these areas usually includes manual work, which depends on the experience of the personnel. In order to reduce the room for mistakes, a software is needed to aid with this task. This work is therefore dedicated to investigate the use of deep learning techniques for identifying regions to perform biopsy on and the effect of combinations of different modalities on segmentation results.