Cancerous Tumor Identification from MRI Image Analysis

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Proton beam therapy is a type of treatment that is more effective than traditional radiation therapy and is used in treating certain types of cancer. However, in order to reap the benefits of the treatment, it is very important that the therapy is well planned, which is the job of a medical dosimetrist. One critical step in the planning process is the identification of tumor boundaries. Although dosimetrists use MRI images, they also have to rely a lot on human interpretation to determine the irregular tumor boundary, which is very time consuming. In this research project, I worked with some MRI images from the databases of ProCure, a proton beam therapy facility for cancer treatment, to explore the possibilities of automating the process of tumor contouring in order to speed up the contouring process and allow more patients to be treated with this therapy. I am exploring the relationship between the grayscales, or levels of darkness, at various locations in the image and the location of tumors in those same images. The work done indicates that spikes in the histograms of grayscale values can be used to determine potential locations of tumors. Additionally, the grayscale values can be used to filter out the tumor portion from each layer and then assembled to form a 3D model of the tumor. The images used were anonymized data that the ProCure scientists shared with me so that I could develop my procedure.

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