

대학원 인공지능학과 & AI융합네트워크학과

Artificial Intelligence & AI Convergence Network Colloquium

Title : Various Roles of Total Variation Regularization in Computer Vision and MR Image Reconstruction

When : 2021.4.7 (Wed.) A.M. 10:30 ~

Where : Zoom 링크 <https://zoom.us/j/98619855260?pwd=TLJjeHAzenBrQTdweUdFSVFJUHR0dz09>

회의 ID: 986 1985 5260, 암호: 3898

Speaker : Assistant Member, Youngwook Kee

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Abstract :

In this talk, I will present 3 different roles of total variation (TV) regularization in variational methods in image segmentation and MR image reconstruction. First, TV as a measure of the perimeter of a candidate partition encoded by the indicator function of a set: In unsupervised image segmentation, the total length of region boundaries is often minimized to obtain a compact partition that likely matches the way humans perceive. A statistical distance between color distributions of distinctive regions in a candidate partition is maximized with the minimization of TV for unsupervised image partitioning. Second, TV as a measure of streaking artifacts in QSM deconvolution: QSM is a noninvasive MRI method for a quantitative study of the tissue magnetic susceptibility distribution by solving the magnetic field to susceptibility source inversion problem. A major challenge in the ill-posed inverse problem is streaking artifacts from noise in the field which propagates at the complementary magic angle. These artifacts can be selectively reduced by weighted TV regularization that makes use of anatomical information of the corresponding magnitude image. Lastly, TV as a measure of undersampling artifacts in image reconstruction for multi-contrast MRI. In clinical MRI, multiple contrasts such as T1w, T2w, and FLAIR are sequentially acquired, consequently taking a long scan time. To shorten the scan time, structural information shared between contrasts is extracted and can be incorporated into the TV term as an orthogonal projector in the model-based image reconstruction for the subsequent contrasts that are highly undersampled.

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