Sample of Level 3 Editing

Biomedical – yellow shows medical expertise

Comment [OA1]:
At Uni-edit, all native-speaker English Editors have a background in field related to your research.

Therefore the Editor knows how to clarify the meaning of text correctly.

In this sample, see the yellowed text. Only a Uni-edit English Editor with a background in medical research is able to correctly make these edits because she understands the medical terminology and concepts. The Editor is a medical researcher herself.

Assessment of Reduced Encoding Diffusion Spectrum Imaging Implemented with a Bi-Gaussian Model Using Phantoms and Manganese-Enhanced Optic Tracts

Introduction

Diffusion MRI has become an essential tool for contrast imaging ~~mechanism~~ of the ~~for~~ central nervouse system. This~~,~~ has led to ~~and made~~ a significant improvement in clinical diagnosis. Further ~~progress~~advancement to the technique has been made with the ~~design~~introduction of diffusion tensor imaging (DTI) [1, 2],~~The technique makes further progress along with the design of diffusion tensor imaging (DTI) [1, 2], which is a feasible~~ valuable technique ~~for~~in identifying ~~to model~~ anisotropic diffusion as well as non-invasively ~~to~~ delineat~~e~~ing the principle orientations of white matter tracts ~~non invasively~~ [3-5]. ~~.~~ However, the assumption~~—~~ of a single Gaussian diffusion compartment in the tensor model results in the ambiguous orientation~~s~~ of fibers in regions where they cross each other ~~containing crossing fibers~~ [6]. Thus,~~, it~~ with the typical resolution of a MRI, it may be ~~becomes intricate~~ difficult to interpret the complex neural connections between functional areas of ~~a~~the human brain ~~with under typical resolution of an MRI~~.

In recent years, various diffusion imaging strategies have been developed to improve the depiction of water diffusion and to resolve the intravoxel fiber orientations.~~.~~ Diffusion spectrum imaging (DSI) [7]~~,~~ for example, utilizes the 3-D spectra of water displacement~~s~~ to characterize the heterogeneity~~ities~~ of fiber architecture~~s~~. DSI ~~was~~is based on the~~Its~~ theory established ~~on~~ by the q-space imaging

technique—.; —technique, whichThe theory describes the Fourier relationship between echo signal attenuation and the probability density function (PDF) —of the displacement of water moleculess displacements with the prerequisite of a narrow pulse approximation [8-10]. The DSI technique washas been used into map the mapping tissue architecture of biological systems DSI has shown its capability of mapping tissues architectures in biological systems [7,—11] , providing information on the intravoxel compartment sizes scales of the neural fibers [12], thus allowing and interpreting the physiological and structural conditions of the neural tissues to be interpreted. In addition, 3-D tractography and comparative segmentation of human brain structures have been identified based on DSI and the proceeding orientation distribution function (ODF) [13].—.

Notwithstanding tThe utility of DSI comes at a cost:, a complete reconstruction of the diffusion PDF requires 515 q-value encoding points distributed on a Cartesian lattice across 3-D q-space. This involves long acquisition times as well as adequate— —q—values for sufficient resolution. Since the available gradient strength in clinical systems are limited, tThe latter requirement is achieved by prolonging the diffusion gradient duration (δ) and the diffusion time (Δ) since the available gradient strength in clinical systems is limited. Unfortunately, this would accompany leads to a long echo time (TE) and a decline in the SNR— level due to a severe T2 decay in anthe echo planar imaging (EPI) sequence. As a consequence of this, The angular accuracy and discrimination would beare —unavoidably diminished —as a consequence [11]. Both tThe lengthy acquisition times, cost and the requirements of the gradient system, request have retardedhindered the further applications of DSI on clinical scanners.

Comment [TK2]: CHECK: Please clarify this sentence further. It seems you are saying that tractography and comparative segmentation of brain structures were identified with DSI. Then you write about what appears to be another technique, ODF. However, it is not clear how this technique is related to DSI or was it just another technique used in conjunction with DSI? Consider rewording to clarify. Also, if ODF is another technique (in addition to DSI), which has been helpful in reconstructing tissue structure, it may useful for readers to point that out.

Comment [TK3]: CHECK: Consider not using the word “adequate”. Perhaps use ‘large quantities of’ if that is appropriate.

~~–~~These limitations basically stem~~s~~ from the need to exhaustively sample on a 3-D Cartesian sampling lattice.

A hemispheric encoding scheme (half-q-DSI) ~~could~~ can be applied to halve the scan time in DSI since the ~~the~~ diffusion contrast is positive and spherically symmetric [7, 14]. However, uncorrected cross-term interactions between diffusion and imaging gradients might result in the ~~a misunderstanding~~misinterpretation of the q-space analysis and inaccurate ODFs in half-q-DSI [15, 16]. Instead of a Cartesian lattice, a body-centered cubic lattice (~~BBC~~BCC) sampling scheme ~~is~~was proposed to ~~gain~~ improve the imaging efficiency of DSI by 30% [17]. Another non-Cartesian q-space encoding scheme, ~~H~~hybrid diffusion imaging (HYDI), ~~was~~has also been employed for DSI-PDF reconstruction. This scheme consists~~s~~ of five concentric spherical shells and may be applied to multiple types of diffusion analysi~~e~~s [18]. ~~, which is flexible for multiple diffusion analyses, employs a non-Cartesian q-space encoding scheme comprising five concentric spherical shells for DSI-PDF reconstruction.~~ Although it ~~was~~is possible to shorten the ~~the~~ acquisition times ~~could be shortened~~ with ~~all of~~ the ~~above~~ q-space sampling strategies described above, the ~~need~~requirement ~~for~~of a large number of~~high~~ q-values to preserve adequate spatial resolution~~ acquisitions~~ could not be omitted~~ to preserve adequate spatial resolution~~.

Another category of diffusion imaging techniques~~methods~~ utilizes an encoding scheme formed by a single spherical shell with a constant diffusion weighting~~,~~ as opposed to ~~a~~the 3-D Cartesian lattice with multiple diffusion weightings. These techniques include high angular resolution diffusion imaging (HARDI) [19, 20], q-ball imaging (QBI)

Comment [TK4]: CHECK:
Are you trying to say that the cross-term interactions would not be corrected (uncorrected) or that they would not be correct (incorrect)? Please clarify.

Comment [WL5]: CHECK:
You don't use this term anywhere else, so there is no need for an abbreviation. Consider removing it.

Comment [TK6]: CHECK:
You don't use this term anywhere else, so there is no need for an abbreviation.

[21, 22], persistent angular structure MRI (PAS-MRI) [23], fiber orientation estimationeed using continuous axially symmetrical tensors (FORECAST) [24], diffusion orientation transformation (DOT) [25], and spherical deconvolution methods [26, 27]. These approaches provide information on the orientationdirectional information of complex neural fiber networkss within a a feasible reasonable scan time and may befor routinely implemented. implementation. The substantially increase in imaging efficiency mainly results from the fewer numbers of diffusion-weighted images (DWIs) needed required for data analysis. In addition, the shortened TEs following on a moderate b-value could enhance the SNR of DWIs. These conditions, however, may be insufficient to characterize the 3-D diffusion function that is derived from the multiple q-value diffusion measurements, and would thus would be unable to For inferring tissue microstructural tissue conditionsshape and orientations.

, however, they might be insufficient to characterize the 3-D diffusion function derived from the multiple q-values diffusion measurements.

In this study, it is proposed that the reduced-encoding DSI implemented complemented with a bi-Gaussian model (RE-DSI), is proposedbe used to trim down the drawbacks of DSI as well aswhile to retaining q-space information. In RE-DSI, a reduced Cartesian sampling scheme, where high q-value acquisitions are omitted, is used to bypass long acquisition times and gradient system demands in DSI. To achieve sufficient resolution for to resolving determiningdetermine the fiber orientations of fibers, the 1-D bi-Gaussian model fitting is performed onis applied to the sampled data at low q-space to regain all diffusion signals at high q-space. Previous studies on animal and

Comment [TK7]: CHECK: Would it be appropriate to say: 'estimation of fiber orientation using continuous axially symmetrical tensors'?

Comment [WL8]: CHECK: Do you mean "are routinely implemented" or only "may be routinely implemented"? "May be" indicates that they are not currently routinely implemented but "may be".

Comment [TK9]: CHECK: 'following a moderate b value' OR 'followed by a moderate b value' would make more sense. If neither of those fits, consider revising that part of the sentence. Perhaps 'following' is not an appropriate word choice here.

Comment [WL10]: CHECK: Do you mean "can enhance" or "could enhance"? If they always enhance it, use "can enhance".

Comment [TK11]: CHECK: Throughout the paper, you refer to high q-values. However, it is not clear what you mean by that. Is it many q-values? Or, a high value of q? It would be helpful if this term was explained more clearly early on in the paper to avoid confusion.

Comment [TK12]: CHECK: Do you mean 'regain' or 'retain'?