Biological Study of Geometry

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Introduction

Recent studies use machine-learned surrogate, especially Gaussian process (GP) surrogate, to reduce the number of electronic structural calculations (ESCs) required to perform surrogate model-based (SMB) geometry optimization. In this article, we will consider meta-optimization of geometry using GP surrogate. Here, the SMB Optimizer learns more from the previous "experience" of performing geometry optimization. To test this idea, we start with the simplest setting that the geometry metaoptimizer learns from previous optimizations of the same molecule with different starting geometries.

Description

Unlike peripheral nerves, axonal regeneration after spinal cord injury is limited. The central nervous system "CNS" appears to be more important in limiting regrowth in the white matter environment, although the ability of damaged neurons to regenerate may be reduced. Several factors can inhibit regeneration, and neutralizing them can slightly promote regeneration. However, most studies do not consider cytoarchitecture of the white matter of the spinal cord. Several studies have shown that maintaining, repairing, or restoring the parallel shape of the spinal white matter promotes axonal regeneration. In this review, we focus on environmental factors that have been implicated as putative inhibitors of axonal regeneration and the evidence that their organization may be an important determinant in whether they inhibit or promote regeneration.

Cardiovascular tissue engineering is a promising approach for developing grafts that, unlike current alternative grafts, have the ability to grow and reconstruct like natural tissue. This approach relies heavily on cell-driven tissue growth and remodeling, a highly complex process that is difficult to control within the scaffolds used in tissue engineering. The results of harmful tissue growth and remodeling have been reported by several tissue engineering approaches, including: B. Aneurysm formation in vascular grafts and leaflet contraction in heart valve grafts. The results of tissue growth and remodeling, whether physiological or pathological, are at least in part the establishment of a homeostatic mechanical state in which one or more mechanical quantities within the tissue are balanced. It is increasingly recognized that it depends on.

Modeling the size and shape of the human skull and scalp is essential for head trauma assessment, helmet and head-mounted device design, and many other safety applications. The Finite Element (FE) head model is an important tool for assessing the risk of injury and designing personal protective equipment. However, the current FE head model is primarily based on medium-sized men, ignoring important morphological changes present in the skull and brain. The purpose of this study was to develop a statistical head shape model that illustrates changes in size and shape in adolescents and young adults.

Conclusion

Dedicated to the multifocal study of biological geometry and phenomenology, the main purpose of this special issue is to explore the objects and manipulations of geometry and topology, dynamic variables and specific biological mechanisms and their relationships. The other is to show the need to work with each integrated model. Basically, with a multi-level, integrated approach, knowing the gene and protein bills alone does not give much insight into how many biological processes in life work. Tissue is a complex dynamic system in which hundreds of thousands of biomolecules interact to perform many related functions of an organism. The production of complex organisms owes much of its function to several topological mechanisms (ie, four-dimensional transformations and transformations) that function clearly at the three levels of organization, regulation, and evolution of biological systems.