

SCIENTIFIC SEMINAR



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Natural computing in the field of population genomics

The development of machine learning methods has been spurred by the lack of model-specific statistics for specific events, even in moderately complex evolutionary problems. Natural computing uses meta-heuristic algorithms, drawing inspiration from nature, to address challenging problems not easily optimized by error function-based approaches. Artificial neural networks draw from neuronal tissue, enabling learning from observed data. Deep learning (DL) pertains to networks with concealed layers, modeling intricate data patterns. DL is used for identifying signals related to positive selection, archaic introgression, and demographic modeling. However, understanding why a DL model produces specific outputs from input data, particularly in evolutionary predictions, can be challenging, especially when applying transfer learning to different data types. In interpretable machine learning, parameters can be explained by experts, enhancing prediction understanding. In natural computing, Evolutionary Algorithms replicate evolution to adapt organisms to environments. Genetic programming (GP) generates machine intelligence comparable to human performance, with applications in patent generation, but is underutilized in population genomics. In this presentation, I'll discuss DL in Population Genomics and novel GP implementations for demographic topologies and haplotype-based GWAS associations.

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Friday
October 20
Atrio 800
11.00H



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