N93-25807

Multi-Layer Holographic Bifurcative Neural Network System for Real-Time Adaptive EOS Data Analysis

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Summary:

Optical data processing techniques have the inherent
advantage of high data throughout, low weight and low power
requirements. These features are particularly desirable for
onboard spacecraft in-situ real-time data analysis and data
compression applications. The proposed multi-layer optical
holographic neural net pattern recognition technique will utilize
the nonlinear photorefractive devices for real-time adaptive
learning to classify input data content and recognize unexpected
features. Information can be stored either in analog or digital
form in a nonlinear photofractive device. The recording can be
accomplished in time scales ranging from milliseconds to
microseconds. When a system consisting of these devices is
organized in a multi-layer structure, a feedforward neural net
with bifurcating data classification capability is formed. The
interdisciplinary research will involve the collaboration with
top digital computer architecture experts at the University of
Southern California.