NORMALIZATION ON VISUAL DATA FOR CATEGORIZATION

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BACKGROUND: Computer vision (CV) is the scientific discipline concerning techniques for automated extraction of information from visual digital media. Modern audits of Internet transmission show that over 80% of all data processed represents some form of visual data. This sheer magnitude has spearheaded both the academic and industrial interest in computer vision systems. CV technology is rapidly advancing as more capable hardware and techniques inspired by biological vision systems have been incorporated.

METHODS: Currently, one of the most popular methods used in computer vision applications are convolutional neural networks (CNNs). CNNs are biologically inspired networks that loosely mimic the hierarchical structure of neurons in the brain's visual cortex.
An effective CNN not only depends on the architecture design, but careful consideration of input data format. In neural cortical processing a computation known as normalization has been deemed as a canonical computation in the brain as there is rich evidence of its occurrence at different stages and sensory modalities. CNNs have included simple forms of normalization.

RESULTS: In this work, we set out to study the role of more sophisticated forms of normalization incorporated to intermediate stages of the CNN. In particular, we focus on the problem of object recognition in cluttered background. We expect normalization at intermediate stages can reduce the influence of clutter in the computations downstream, and thus provide better accuracy in the object recognition task.

CONCLUSTIONS: For our experiments we use a standard benchmark dataset known as the NORB dataset. We expect this work can help understanding the role of normalization at intermediate stages of the visual cortex as well as building better artificial systems.