深度學習於天氣的應用與趨勢

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摘　要

　　深度學習是指通過對數據進行反向工程來開發軟件例程的一組技術。通過這種方法,有可能開發出超出我們可以手工構建的功能。使用這些技術,我們可以改善數值天氣預報管道的各個方面。在演講中,將回顧機器學習背後的一些主要思想,並描述已經或可能取得的突破。例子包括自主傳感器,智能影像修復,反轉建模,數據同化加速,模型參數化改進,無模型臨近預報,惡劣天氣檢測等。對於科學家而言,重要的是要了解這些技術的潛力和局限性,因為深度學習、機器學習將繼續存在,並且有可能在未來幾十年內徹底改變科學。

Deep Learning for Weather

Abstract

Deep Learning refers to a set of techniques for developing software routines by reverse engineering them from data. With this approach, it is possible to develop capabilities beyond those we can build by hand. Using these techniques, we can improve all aspects of the numerical weather prediction pipeline. In this presentation, I will review some of the main ideas behind deep learning and describe breakthroughs which have been or may be achieved. Examples include autonomous sensors, intelligent in-painting and down-scaling, inverse modeling, acceleration of data assimilation, improvements to model parameterizations, model-free nowcasting, detection of severe weather, and many more. It is important for scientists to understand both the potential and limitations of these techniques as deep learning is here to stay, and it has the potential to revolutionize science over the coming decades.