Final Year Project Plan

Graph Convolutional Neural Networks for Text Categorization

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Introduction

Convolutional neural networks are a class of deep, feed-forward artificial neural networks inspired by biological processes that have applications in image and video recognition systems, recommender systems and natural language processing. In the field of natural language processing, for example, convolutional neural networks have been useful in building models for text categorization or text classification – the automated assignment of natural language texts to predefined categories based on their content.

Furthermore, in recent years, novel deep learning techniques have emerged through the fusion of standard convolutional neural networks and graph analysis, which allow convolutional neural networks to naturally work in the space of word topics represented as a graph. The overarching objective of this project is to apply these new deep learning techniques to text categorization using the well-known Reuters benchmark dataset, RCV1.

Objectives / Milestones

1. Understand the theory behind deep learning and convolutional neural networks, with a focus on the field of text categorization.
2. Understand the nuances of text categorization from the perspective of natural language processing and the implications of these nuances when building deep learning models.
3. Understand the theory behind deep learning models for graph structured data.
4. Study previous work on text categorization using deep learning, with a focus on graph convolutional neural networks.
5. Learn how to implement convolutional neural networks for graph structured data using one of the publicly available deep learning libraries in Python.
6. Reproduce the results from the experiment in Deep Convolutional Networks on Graph-structured Data by M. Henaff, J. Bruna and Y. LeCun.
7. Build improved deep learning models that perform better than existing models on the Reuters RCV1 benchmark dataset.
8. Build a client-side application for the model to better demonstrate the model's capabilities.

Progress Tracking & Reporting to Supervisor

- Weekly blog snippets will be uploaded to http://suyashlakhotia.com/FYPSnippets/.
- Bi-weekly meetings will be held to discuss progress and clarify difficulties on Monday evenings.