基于深度学习的股价预测解决方法分析研究

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1 绪论

1.1 选题背景与意义

最早的股市公司是 17 世纪荷兰和英国成立的海外贸易公司。在经历了 4 个多世纪的今天，股票市场已经进入了大多数国家。而且在当今世界经济格局中，各个国家的股市已经拥有了不可或缺、举足轻重的地位。对于在股市中投资的人来讲，赚钱是他们的首要目的。但是股市有着高风险性，一句“股市有风险，入市需谨慎”劝退了很多想进入股市分一杯羹的人。对于投资公司来讲，若他们能掌握股市未来的走向，那他们就可以获得利润。所以，股票价格的预测就成了上百年来人们追求的目标。在深度学习理论成熟之前，人们在股市预测领域主要采取一些微波转换 [19]、事件分析 [23] 等方法预测股价。但由于影响股市的因素过多（政策、经济发展情况、新闻等），使这些传统方法有局限性。在近几年来，深度学习技术有了突破性的进展 [16, 20]，很多深度学习算法被提出，使的股票市场的研究燃起了新的火焰。虽然深度学习在股票市场预测的研究中相比一些传统方法有优势，但深度学习算法未被应用于更广泛的股市预测领域。如今的股票市场研究领域，大多在研究、预测标准普尔指数和纳斯达克指数。这些新提出的深度学习算法是否能同样使用于中国股市未可知。所以，本文以这作为落脚点和出发点，深入探讨如今越来越先进的深度学习算法，是否能很好地预测中国股市未来的发展。

1.2 国内外研究现状

近年来，金融市场在我国发挥着的作用越来越显著，随着国民经济的发展和金融服务业的完善，金融市场已经引起了国内外学者和投资者的关注。他们定期提出各种可应用于实践的理论，试图预测市场趋势 [15, 3, 21, 24, 10]。在如今深度学习发展的基础上 [6, 7, 11, 13, 14, 22]，神经网络在模式识别、金融证券等领域得到了广泛的应用。此外，它也显示出了在股票市场预测中的优势。现已有多篇论文使用 LSTM、RNN 等神经网络算法研究股指、股价等相关信息 [18, 4, 1, 2, 5, 8, 9, 17]。例如，在早期的工作中 [12] 已经使用 RNN 代替了波动性预测模型来预测股价。然而，如今现有的股票市场分析领域，对数据的分析并不完备。

1.3 本文主要内容

1.4 本文的组织结构与技术路线

分析股票市场的不同数据的特点，影响因素等。 针对股票市场的不同数据建模。 实现不同算法（神经网络）的代码编写。 找到相关数据，形成训练集。 使用不同算法对这些数据进行预测。

2 深度学习理论基础

2.1 传统神经网络

2.2 深度神经网络

2.3 卷积神经网络 CNN

2.4 循环神经网络 RNN

2.5 长短期记忆网络 LSTM

2.6 神经网络训练的优化方法

3 模型构建

3.1 Python

3.2 PyTorch 介绍

3.3 基于 RNN 的模型构建

3.4 基于 LSTM 的模型构建

3.5 输入特征

4 股市数据的选取

4.1 数据来源

4.2 IT 领域企业股价

4.3 样本选取

5 实验分析

5.1 优化方法

5.2 参数设置

5.3 整体效果

5.4 指标分析

5.5 几种解决方法对比

6 结论

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