



Financial Risk Modeling With Deep Learning

FE800
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Team VIXXX (Group 7)
Advisor: Dr. Khaldoun Khashanah
Jiaji Dai
Shuda Wang
Huanghaotian Fu





Project Motivation

“A pullback for this Teflon stock market could come like a thief in the night”

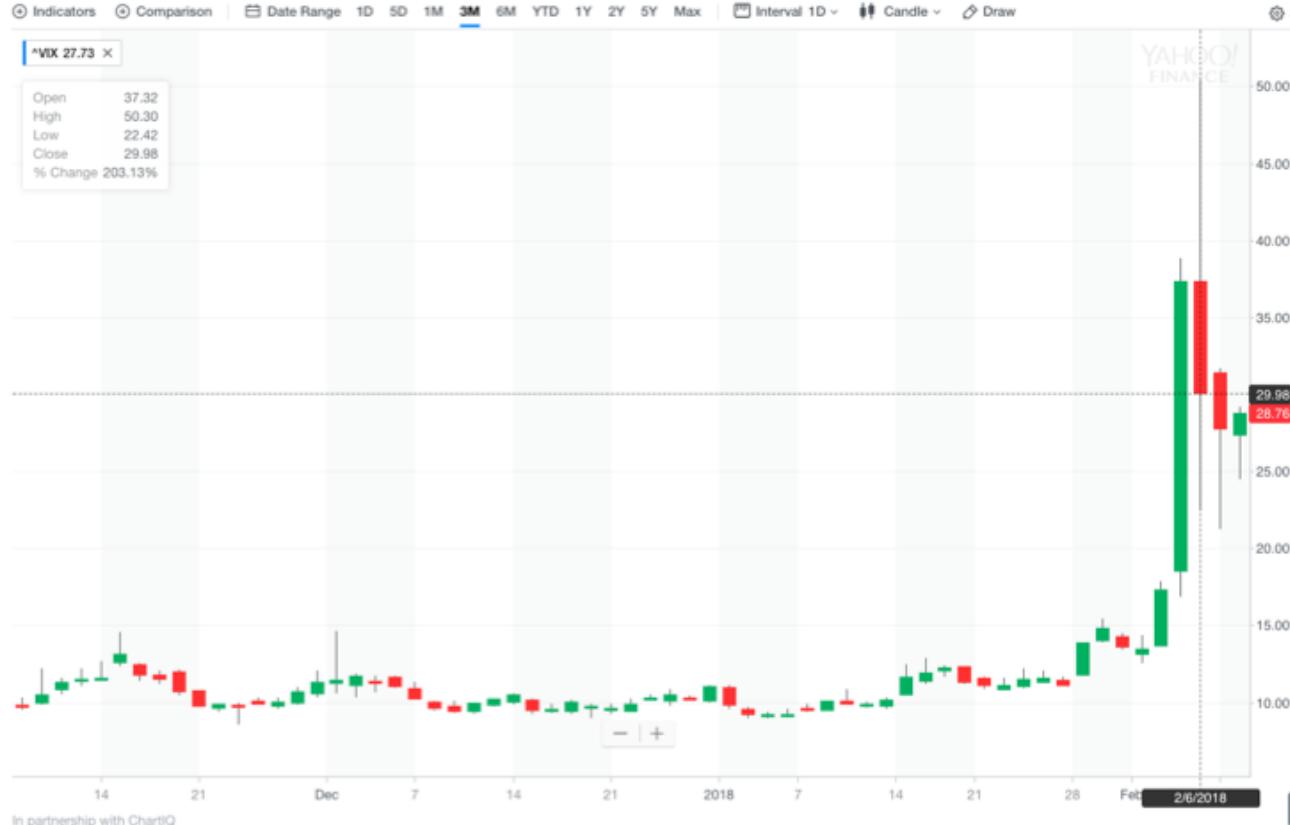
--- Robert Shiller, 1/23/2018

CBOE Volatility Index (^VIX) [Add to watchlist](#)

Chicago Options - Chicago Options Delayed Price. Currency in USD

28.76 +1.03 (+3.71%)

As of 10:54AM EST. Market open.



In partnership with ChartIQ



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“A pullback for this Teflon stock market could come like a thief in the night”

--- Robert Shiller, 1/23/2018

VelocityShares Daily Inverse VIX ST ETN (XIV) [Add to watchlist](#)

NasdaqGM - NasdaqGM Real Time Price. Currency in USD

5.64 -0.59 (-0.55%)

As of 11:12AM EST. Market open.



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Project Introduction

Financial Risk Modeling With Deep Learning

- Focus
 - 1. Stock Return Volatility
 - 2. SPY and 10 Sector ETFs
- Objective
 - 1. Neural Networks
 - 2. Comparison with GARCH
 - 3. Portfolio Allocation
 - 4. Risk Management

Ticker	Sector
XLE	Energy
XLU	Utilities
XLK	Technology
XLB	Material
XLP	Consumer Staples
XLY	Consumer Discretionary
XLI	Industrials
XLV	Health Care
XLF	Financials
XLRE	Real Estate



Project Data

Data Acquisition And Processing

- Time Frame: 1/1/2010 – Now
- Source: Yahoo Finance
- Data Format: daily adjusted closing price



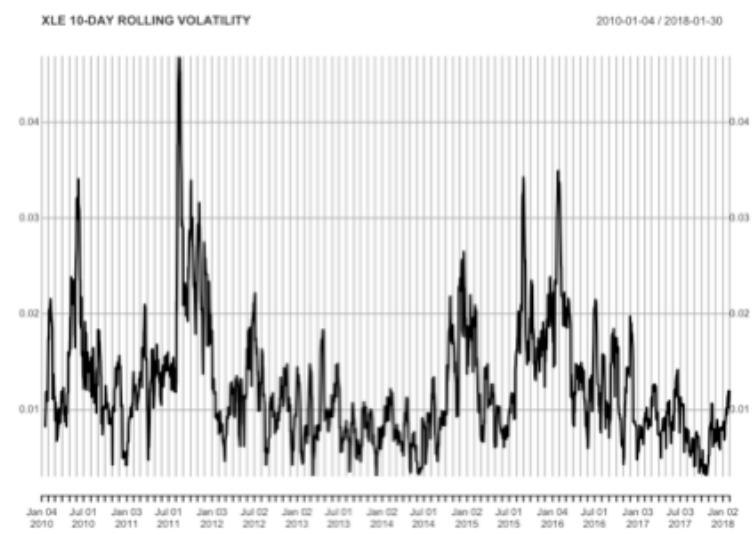
- Convert daily closing price into daily return (arithmetic)
- Volatility: standard deviation of stock return
- Construct a 10-day rolling window

Data Visualization

Price Movement And Volatility Trend

- Candlestick chart with volume
- Rolling Volatility (std of return)
- Shiny App
- Live demo

shinyapps.io





Next Step

Comparing Neural Network with other popular alternatives

- More literature review on volatility forecasting and neural networks
- Rolling VaR and covariance matrix
- GARCH models (Jiaji Dai, Shuda Wang)
- Basic neural network model (Huanghaotian Fu)
- Platform: R and Python

Billionaire hedge fund manager Ray Dalio says market surge ahead: 'If you're holding cash, you're going to feel pretty stupid'

- "We are in this Goldilocks period right now. Inflation isn't a problem. Growth is good, everything is pretty good with a big jolt of stimulation coming from changes in tax laws," Ray Dalio told CNBC on Tuesday from the World Economic Forum in Davos, Switzerland.
- The investor said we're in the late part of the cycle and predicts we will see "a market blowoff" rally, fueled by cash from banks, corporations and investors.

Tae Kim | @firstadopter

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stevens.edu

Team VIXXX
hfu7@stevens.edu