

1. Technical Specification

Platform: Cross-platform app (React Native)

Programming Languages: JavaScript & Python

Stylistic Conventions: JavaScript Style Guide & Python Style Guide

SDK: Facebook SDK

IDE: Visual Studio Code, PyCharm

Tools/Interfaces: Mobile devices

Target Audience: people who want to invest in stocks

2. Environment Setup and configurations

In terminal, get info correct folder **getData**.

Then type in python3 stockdata.py.

```
s-25-246:getData mengwang$ python3 stockdata.py
 * Serving Flask app "stockdata" (lazy loading)
 * Environment: production
   WARNING: This is a development server. Do not use it in a production deployment.
   Use a production WSGI server instead.
 * Debug mode: on
 * Running on http://127.0.0.1:5000/ (Press CTRL+C to quit)
 * Restarting with stat
 * Debugger is active!
 * Debugger PIN: 208-527-227
```

3. Operations and the results: API

Open link: http://127.0.0.1:5000/api/stock_info?stock_name=MSFT

We can get stock info of MSFT as following:



```
{ "52WeekChange": 0.36422956, "SandP52WeekChange": -0.03984058, "address1": "One Microsoft Way", "algorithm": null, "annualHoldingsTurnover": null, "annualReportExpenseRatio": null, "ask": 165.42, "askSize": 800, "averageDailyVolume10day": 53417450, "averageVolume": 5323981, "averageVolume10days": 53417450, "beta": 0.962017, "beta3Year": null, "bid": 163.39, "bidSize": null, "bookValue": 14.467, "category": null, "circulatingSupply": null, "city": null, "companyOfficers": [], "country": "United States", "currency": "USD", "dateShortInterest": 1585612800, "dayHigh": 167.77, "dayLow": 163.33, "dividendRate": 2.04, "dividendYield": 0.0124, "earningsQuarterlyGrowth": 0.383, "enterpriseToRevenue": 10.334, "enterpriseToRevenue": 9.005, "enterpriseValue": 1208978636800, "exDividendDate": 1589932800, "exchange": "Nasdaq", "exchangeTimezoneName": "America/New_York", "exchangeTimezoneShortName": "EDT", "expireDate": null, "fax": "425-706-7329", "fiftyDayAverage": 156.05118, "fiftyDayAverage": 156.05118, "fiftyTwoWeekLow": 119.01, "fiveYearAverageReturn": null, "fiveYearAvgDividendYield": 1.97, "floatShares": 1494998724, "forwardPE": 6.1, "forwardPE": 26.678513, "fromCurrency": null, "fullTimeEmployees": 144000, "tunisely": null, "fundInceptionDate": null, "gmtOffsetMilliseconds": "-14400000", "heldPercentInsiders": 0.01421, "heldPercentInstitutions": 0.74305, "industry": "ComputerHardware", "isSspPopulated": false, "lastCapGain": null, "lastDividendValue": null, "lastFiftyYearsReturn": 1561852800, "lastMarketPrice": null, "lastSplitDate": 1045526400, "lastSplitFactor": "2:1", "legalType": null, "logo_url": "https://logo.clearbit.com/microsoft.com", "longBusinessSummary": "Microsoft Corporation develops, licenses, and supports software, services, devices, and solutions worldwide. The company's Productivity and Business Processes segment offers Office, Exchange, SharePoint, Microsoft Teams, Office 365 Security and Compliance, and Skype for Business, as well as related Client Access Licenses (CAL); and Skype, Outlook.com, and OneDrive. It also provides LinkedIn that includes Talent and marketing solutions, and subscriptions; and Dynamics 365, a set of cloud-based and on-premises business solutions for small and medium businesses, large organizations, and divisions of enterprises. Its Intelligent Cloud segment licenses SQL and Windows Servers, Visual Studio, System Center, and related CALs; GitHub that provides a collaboration platform and code hosting service for developers; and Project that provides a management tool for teams and organizations."}
```

Open link: http://127.0.0.1:5000/api/stock_data?stock_name=MSFT&stock_period=30d

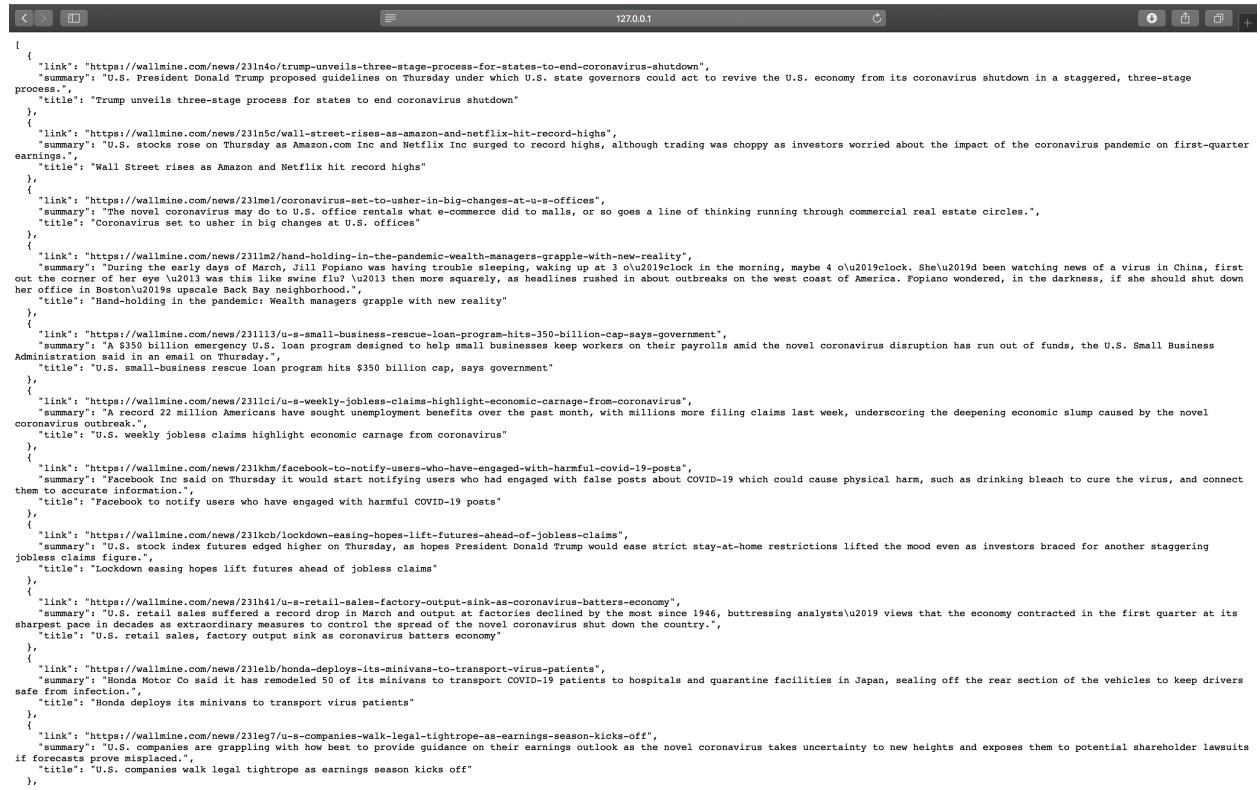
We can get stock MSFT's recent 30 days close prices as following:



```
{ "data": [ 162.01, 172.79, 164.51, 170.55, 166.27, 161.27, 150.62, 160.92, 153.63, 139.06, 159.42, 135.42, 146.57, 140.4, 142.71, 137.59, 135.98, 148.34, 146.92, 156.11, 149.7, 160.23, 157.71, 152.11, 155.26, 153.59, 165.27, 163.49, 165.13, 165.14 ], "index": [ 15828480000000, 15831072000000, 15831280000000, 15832800000000, 15833664000000, 15834528000000, 15834528000000, 15837128000000, 15837340000000, 15838848000000, 15839712000000, 15840576000000, 15841164000000, 15844320000000, 15844896000000, 15845760000000, 15846624000000, 15846624000000, 15850000000000, 15850944000000, 15851808000000, 15852678000000, 15853480000000, 15856128000000, 15856992000000, 15857856000000, 15858726000000, 15861200000000, 15862176000000, 15863040000000, 15863904000000 ], "name": "Close" }
```

Open link: http://127.0.0.1:5000/api/financial_news

We can get recent financial news as following:



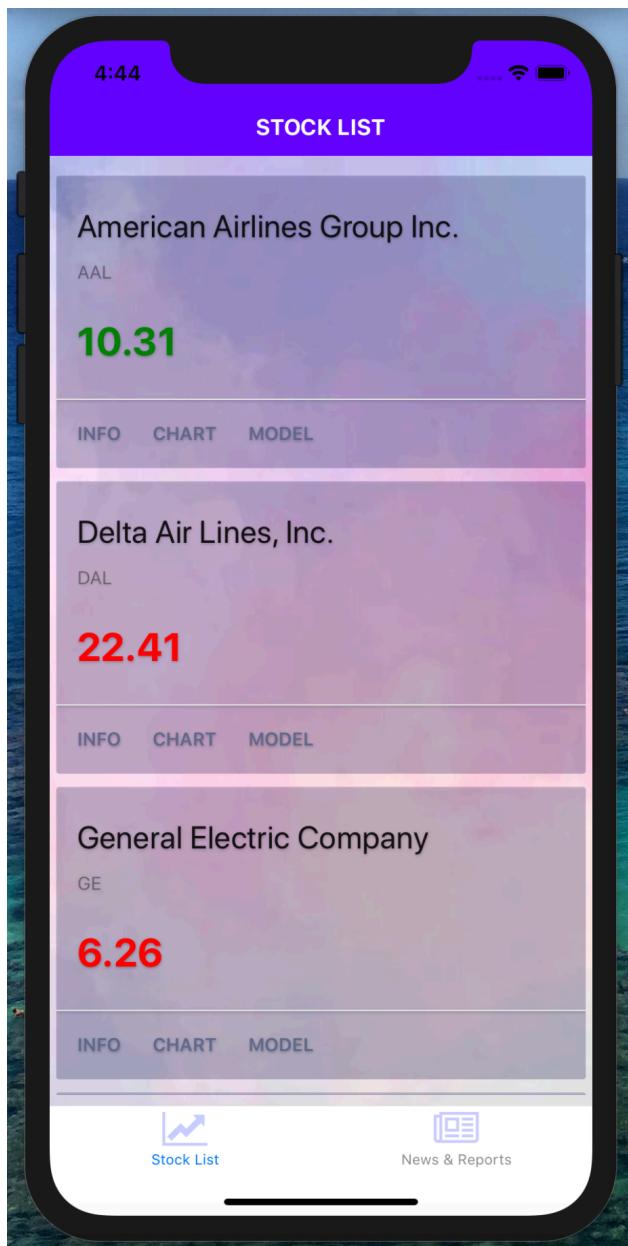
```
[{"link": "https://wallmine.com/news/23ln4c/trump-unveils-three-stage-process-for-states-to-end-coronavirus-shutdown", "summary": "U.S. President Donald Trump proposed guidelines on Thursday under which U.S. state governors could act to revive the U.S. economy from its coronavirus shutdown in a staggered, three-stage process.", "title": "Trump unveils three-stage process for states to end coronavirus shutdown"}, {"link": "https://wallmine.com/news/23ln5c/wall-street-rises-as-amazon-and-netflix-hit-record-highs", "summary": "U.S. stocks rose on Thursday as Amazon.com Inc and Netflix Inc surged to record highs, although trading was choppy as investors worried about the impact of the coronavirus pandemic on first-quarter earnings.", "title": "Wall Street rises as Amazon and Netflix hit record highs"}, {"link": "https://wallmine.com/news/23ln6l/coronavirus-set-to-usher-in-big-changes-at-u-s-offices", "summary": "The novel coronavirus may do to U.S. office rentals what e-commerce did to malls, or so goes a line of thinking running through commercial real estate circles.", "title": "Coronavirus set to usher in big changes at U.S. offices"}, {"link": "https://wallmine.com/news/23lm2/hand-holding-in-the-pandemic-wealth-managers-grapple-with-new-reality", "summary": "During the early days of March, Jill Fopiano was having trouble sleeping, waking up at 3 o\u2019clock in the morning, maybe 4 o\u2019clock. She\u2019d been watching news of a virus in China, first out the corner of her eye \u2019and this like swine flu? \u2019then more squarely, as headlines rushed in about outbreaks on the west coast of America. Fopiano wondered, in the darkness, if she should shut down her office in Boston\u2019s upscale Back Bay neighborhood.", "title": "Hand-holding in the pandemic: Wealth managers grapple with new reality"}, {"link": "https://wallmine.com/news/23ln12/u-s-small-business-rescue-loan-program-hits-350-billion-cap-says-government", "summary": "A $35 billion emergency U.S. loan program designed to help small businesses keep workers on their payrolls amid the novel coronavirus disruption has run out of funds, the U.S. Small Business Administration said in an email on Thursday.", "title": "U.S. small-business rescue loan program hits $350 billion cap, says government"}, {"link": "https://wallmine.com/news/23l1ci/u-s-weekly-jobless-claims-highlight-economic-carnage-from-coronavirus", "summary": "A record 22 million Americans have sought unemployment benefits over the past month, with millions more filing claims last week, underscoring the deepening economic slump caused by the novel coronavirus outbreak.", "title": "Weekly jobless claims highlight economic carnage from coronavirus"}, {"link": "https://wallmine.com/news/23lkhm/facebook-to-notify-users-who-have-engaged-with-harmful-covid-19-posts", "summary": "Facebook Inc said on Thursday it would start notifying users who had engaged with false posts about COVID-19 which could cause physical harm, such as drinking bleach to cure the virus, and connect them to accurate information.", "title": "Facebook to notify users who have engaged with harmful COVID-19 posts"}, {"link": "https://wallmine.com/news/23lkcb/lockdown-easing-hopes-lift-futures-ahead-of-jobless-claims", "summary": "The stock index futures edged higher on Thursday, as hopes President Donald Trump would ease strict stay-at-home restrictions lifted the mood even as investors braced for another staggering jobless claims figure.", "title": "Lockdown easing hopes lift futures ahead of jobless claims"}, {"link": "https://wallmine.com/news/23lk4i/u-s-retail-sales-factory-output-sink-as-coronavirus-batters-economy", "summary": "U.S. retail sales suffered a record drop in March and output at factories declined by the most since 1946, buttressing analysts\u2019 views that the economy contracted in the first quarter at its sharpest pace in decades as extraordinary measures to control the spread of the novel coronavirus shut down the country.", "title": "U.S. retail sales, factory output sink as coronavirus batters economy"}, {"link": "https://wallmine.com/news/23lehb/honda-deploys-its-minivans-to-transport-virus-patients", "summary": "Honda Motor Co said it has remodeled 50 of its minivans to transport COVID-19 patients to hospitals and quarantine facilities in Japan, sealing off the rear section of the vehicles to keep drivers safe from infection.", "title": "Honda deploys its minivans to transport virus patients"}, {"link": "https://wallmine.com/news/23leg7/u-s-companies-walk-legal-tightrope-as-earnings-season-kicks-off", "summary": "U.S. companies are grappling with how best to provide guidance on their earnings outlook as the novel coronavirus takes uncertainty to new heights and exposes them to potential shareholder lawsuits if forecasts prove misplaced.", "title": "U.S. companies walk legal tightrope as earnings season kicks off"}]
```

4. Operations and the results: application rendering

Get into folder **FinancialProject** in terminal. Type in **npm install**, then type in **npx react-native run-ios**.

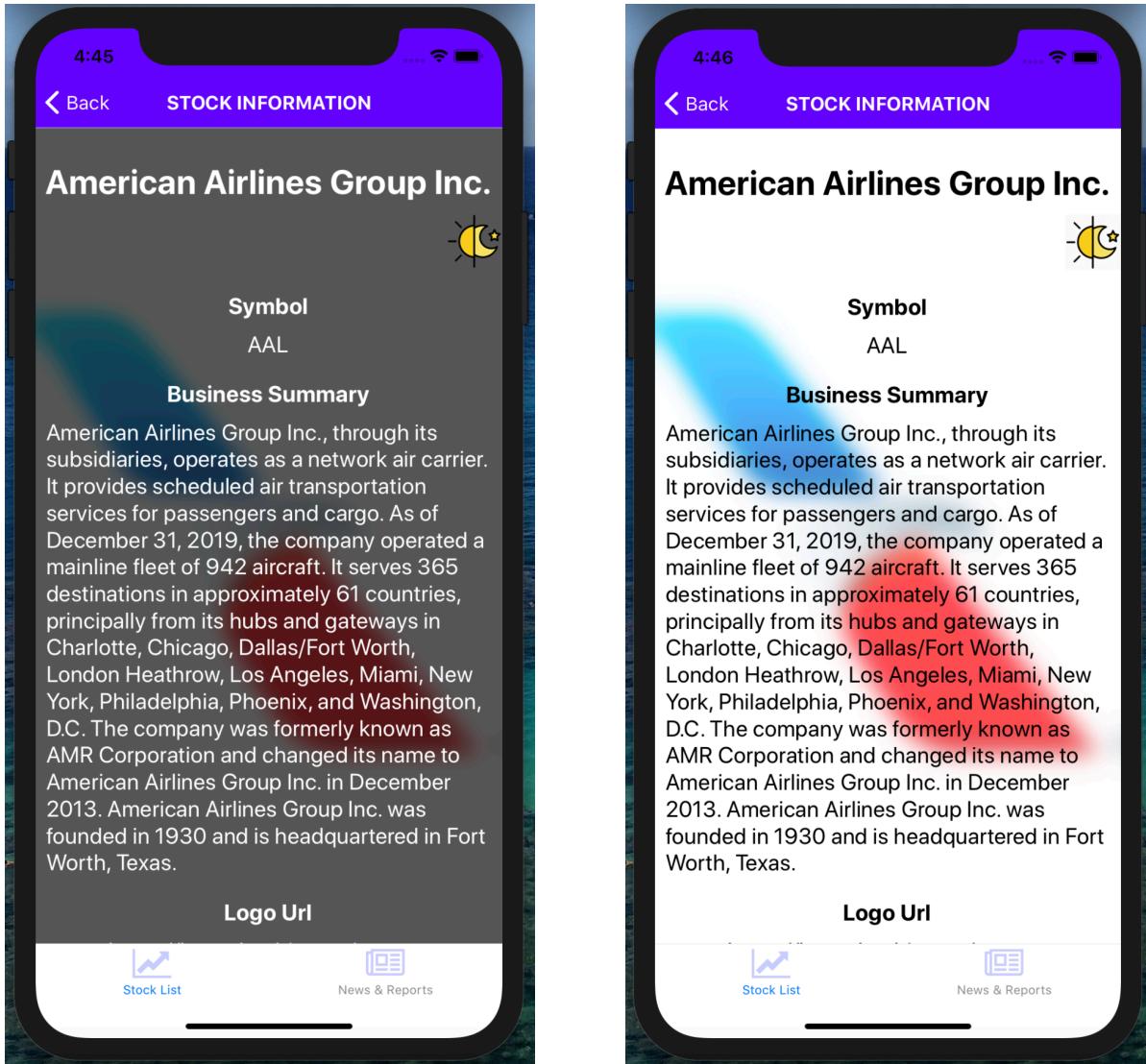
Xcode simulator will pop out the app **FinancialProject**.

The first screen is Stock List. It shows a list of stocks with stock name, stock symbol and real-time price.



For each stock, there are three buttons: INFO, CHART and MODEL.

Click on button INFO, you can jump to screen Stock Info.



Click on the sun-moon button can change the mode from dark to light.

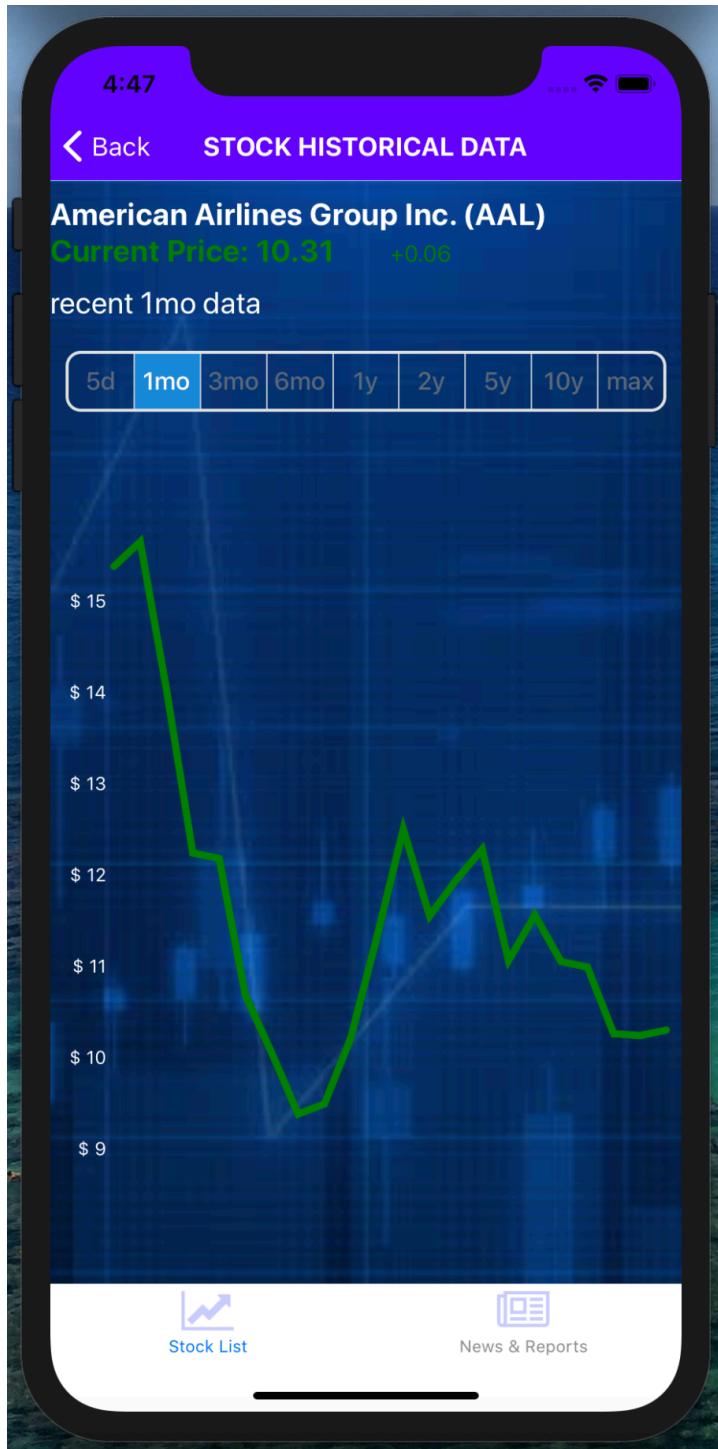
The screen will show all kinds of info of this stock, including symbol, business summary, logo url, sector, industry, full time employees, city, state, zip code, country, website, phone, fax, market, exchange, exchange time-zone name, exchange time-zone short name, day high, day low, ask, bid, bid size, regular market price, previous close, regular market open, two hundred day average, trailing annual dividend yield, payout ratio, regular market day high, regular market day low, average volume 10 days, etc.

Click on button Stock List, you can go back to the screen Stock List.

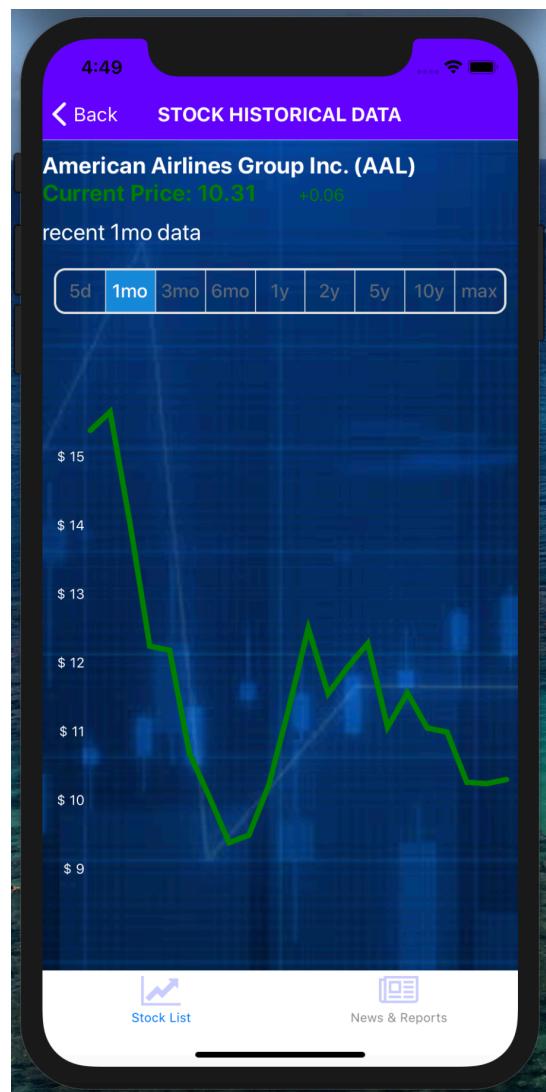
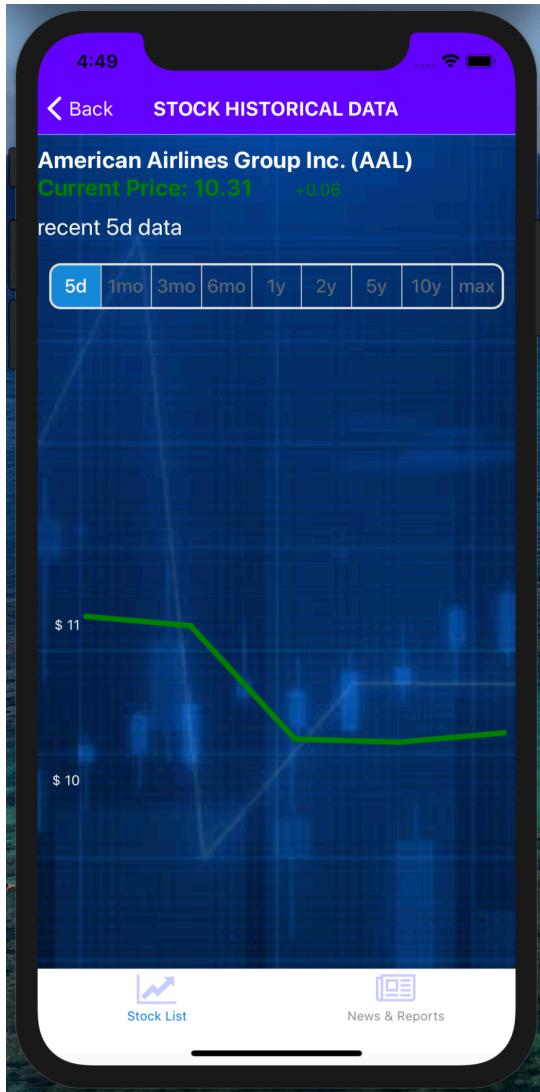
Then click on button CHART, you can jump to screen Stock Data.

The initial period is 1 month. The line chart displays the trend of the stock for the most recent month.

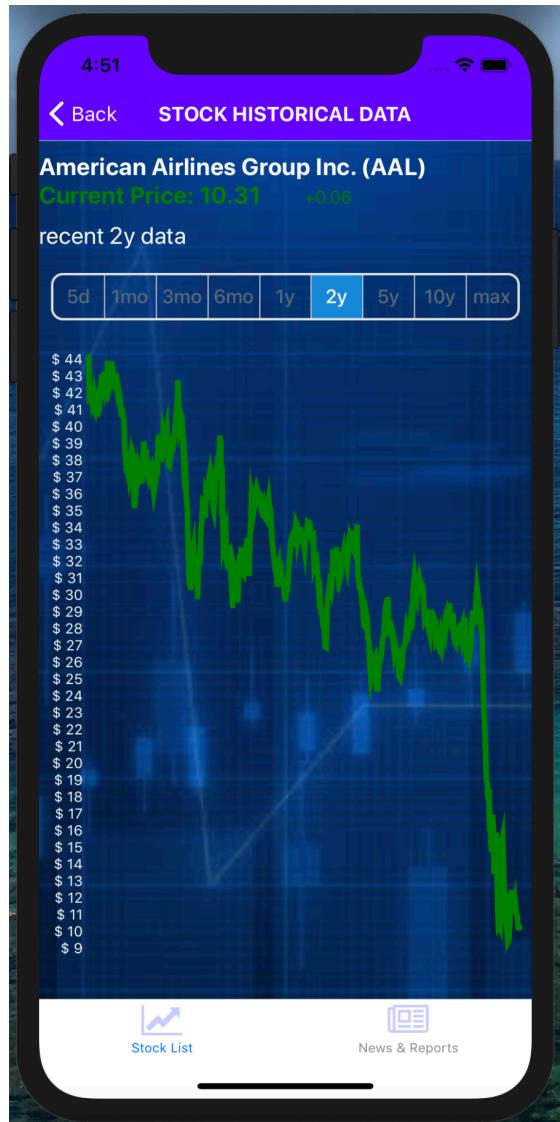
You can change period by clicking on buttons.

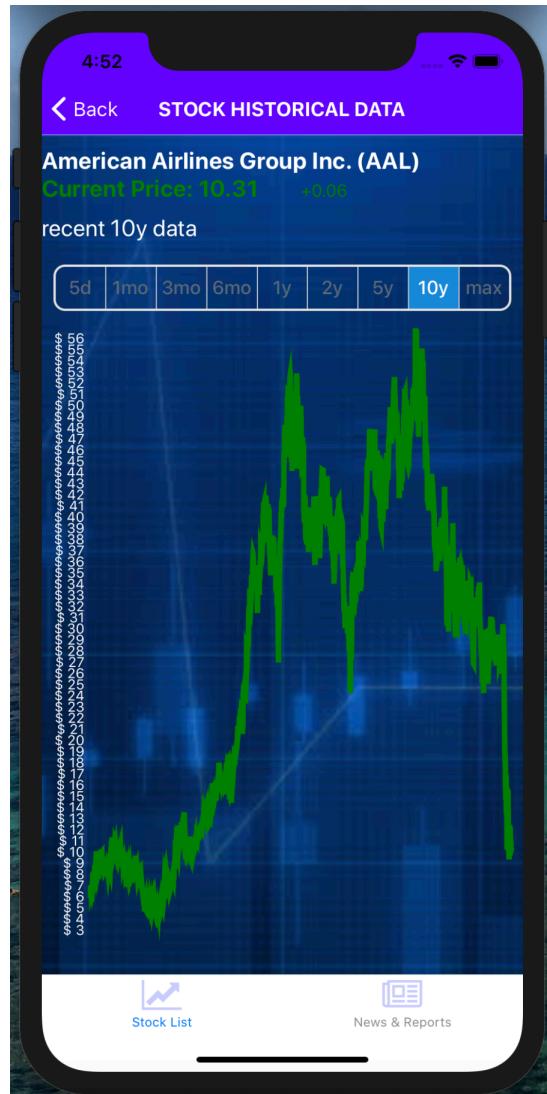
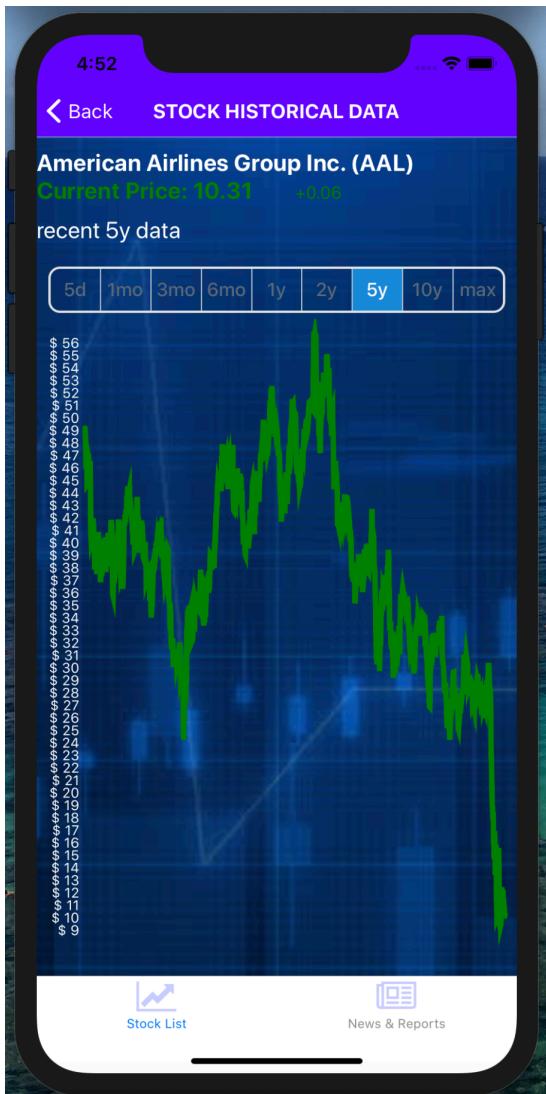


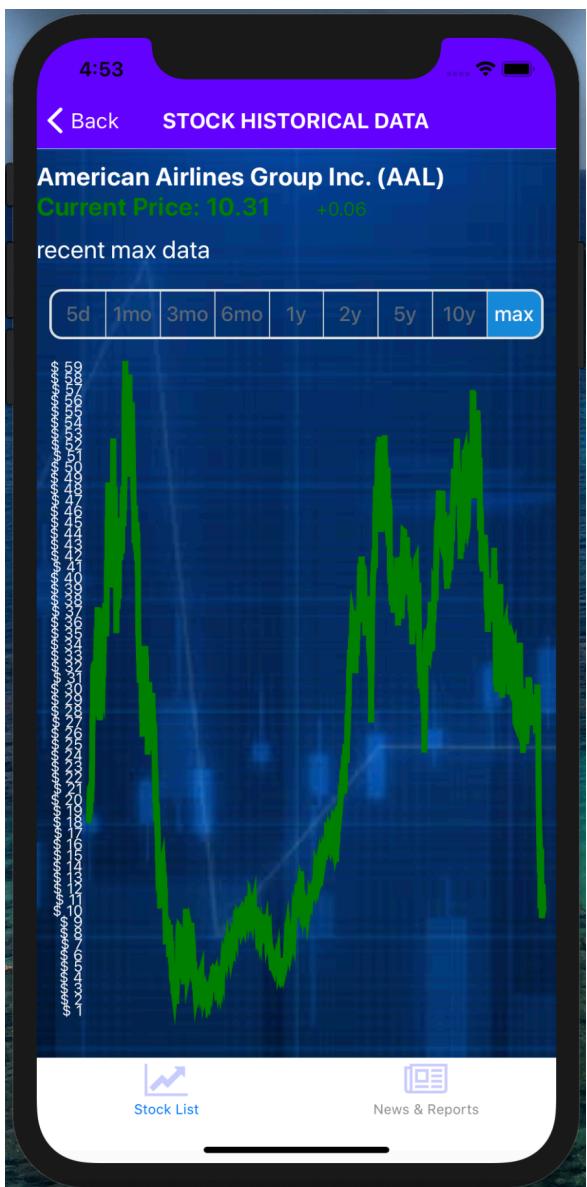
Click on them can change the stock period.



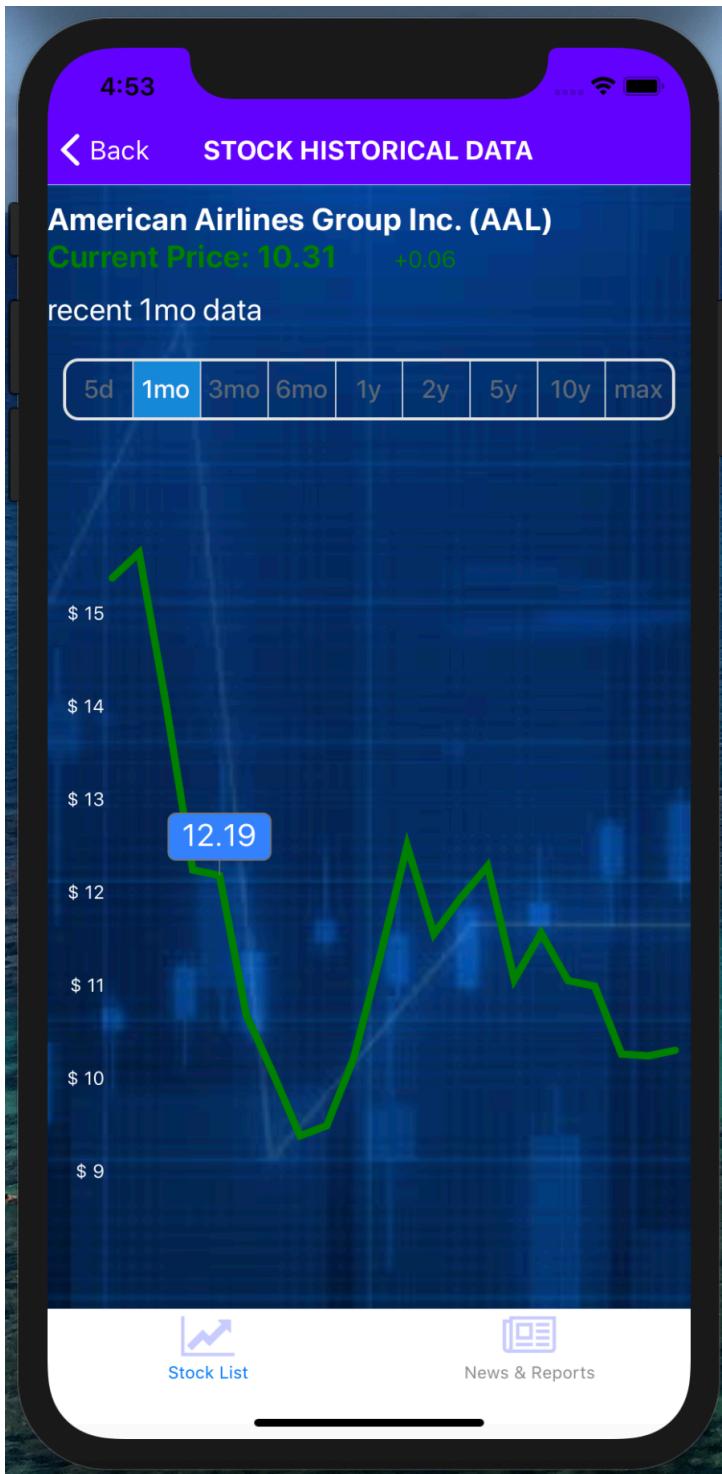








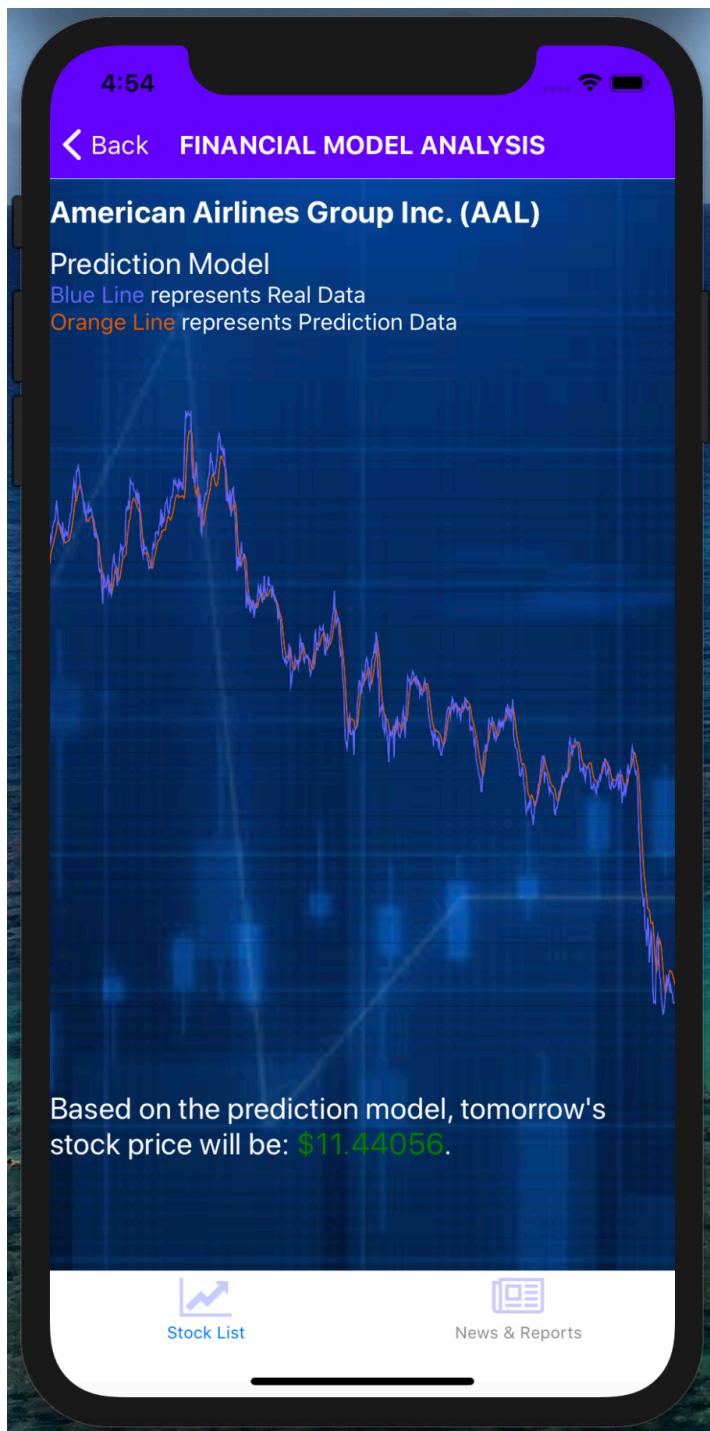
Clicking on the points of trend line shows each point's data, which is specific stock price.



Click on button Stock List, you can go back to the screen Stock List.

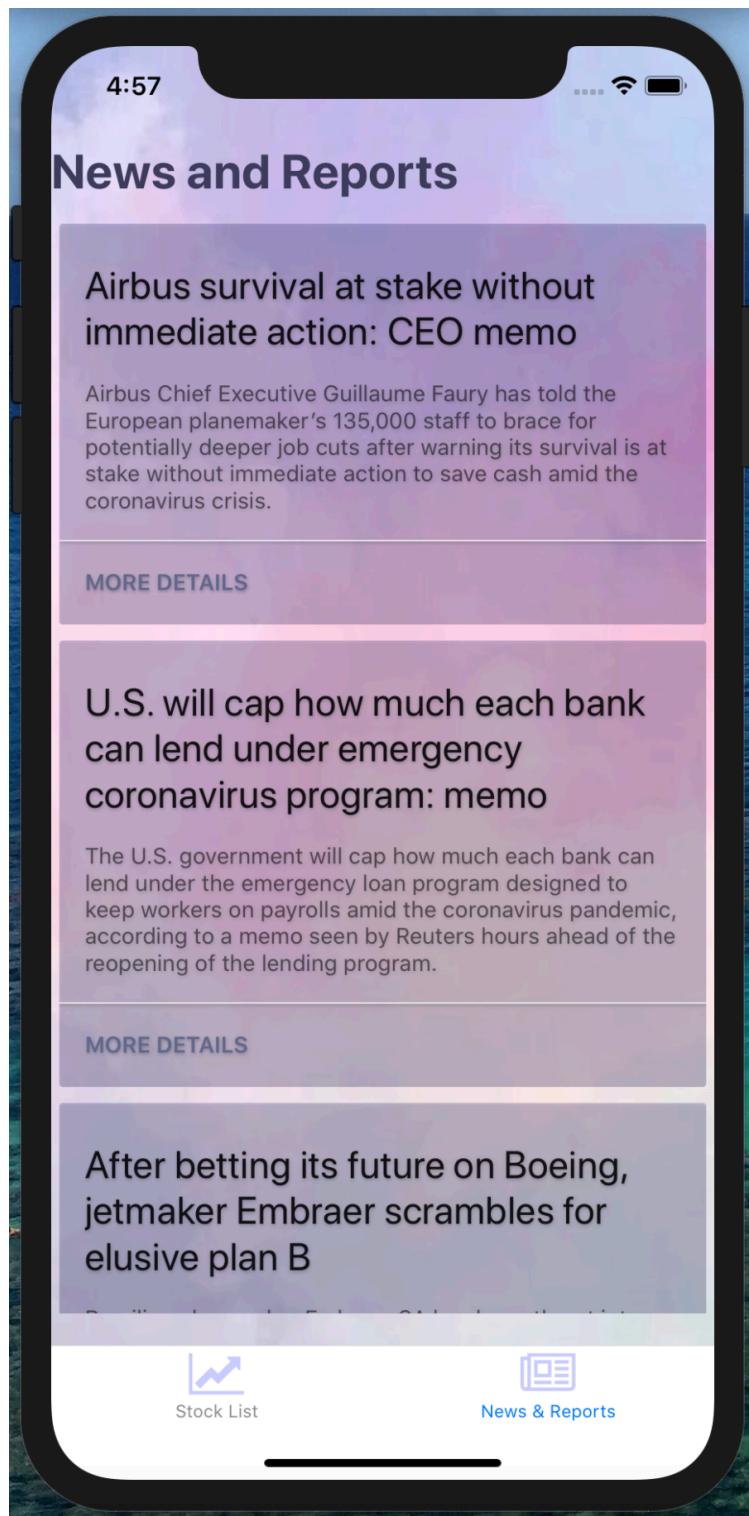
Then click on button MODEL, you can jump to screen Stock Model.

This page shows the prediction model, and the result for tomorrow's stock price.

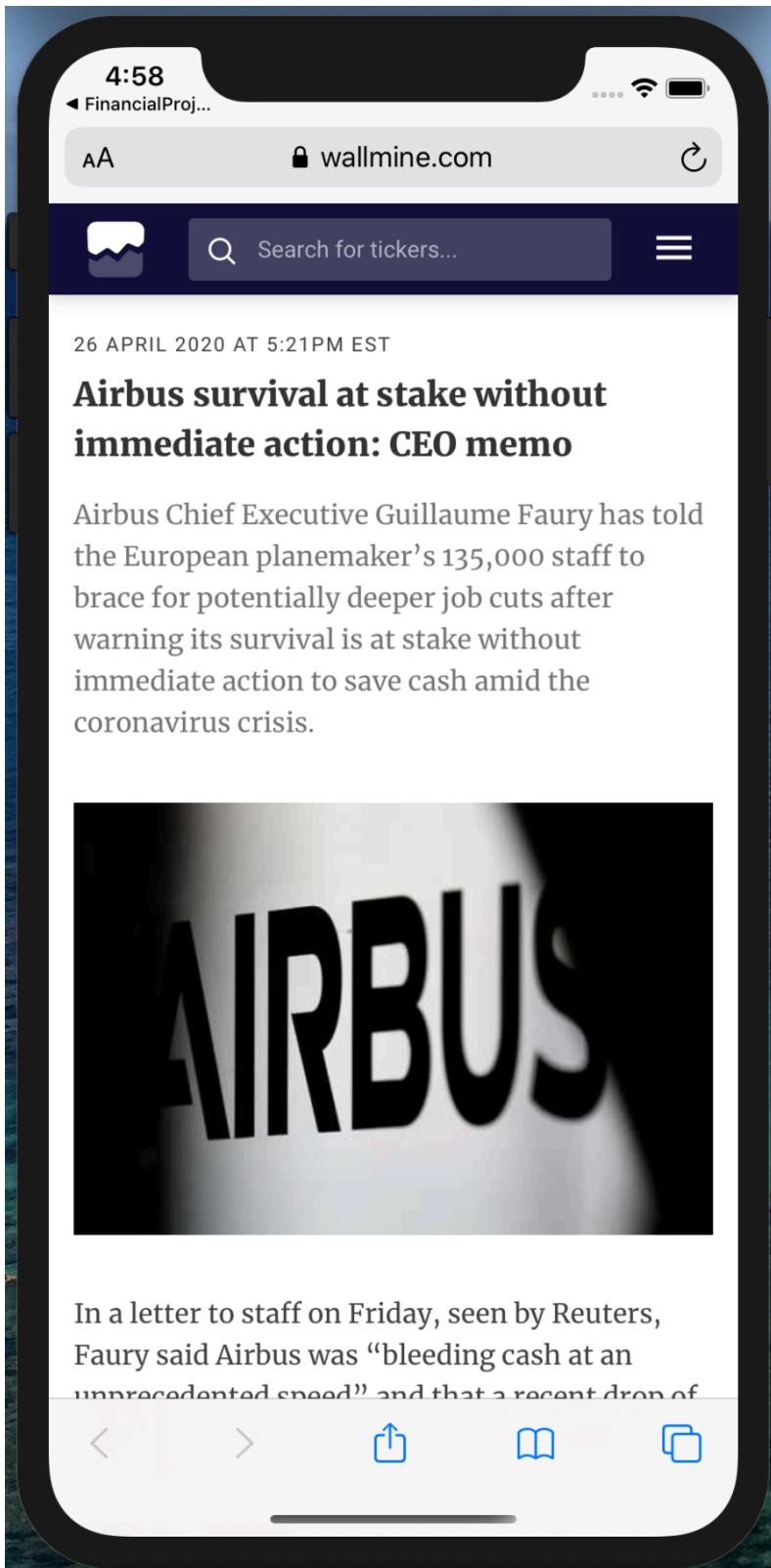


Click on News & Reports button in tab navigator, we can jump to screen News and Reports.

On this screen, you can see a list of news related to stock market.



Clicking on button MORE DETAILS can jump to news page.



5. Test Result

API test:

The screenshot shows the PyCharm IDE interface during an API test session. The left side displays the project structure for 'sp20-cs242-project' with several CSV files under 'getData' and a 'test.py' file under 'apiTest'. The right side features a 'SciView' window with multiple plots, likely generated from the test results, showing various stock price trends over time. Below the SciView is a 'Run' tool window showing the test execution details: 'Tests passed: 6 of 6 tests - 17 s 461 ms'. The bottom status bar indicates the current time as 27:04, file encoding as UTF-8, and Python version as 3.7 (untitled).

```
import requests as req
from unittest import TestCase

class Test(TestCase):
    def test_api_stock_list(self):
        res = req.get('http://127.0.0.1:5000/api/stock_list')
        assert res.status_code == 200

    def test_api_stock_info(self):
        res = req.get('http://127.0.0.1:5000/api/stock_info?stock_name=MSFT')
        assert res.status_code == 200

    def test_api_stock_data(self):
        res = req.get('http://127.0.0.1:5000/api/stock_data?stock_name=MSFT&stock_period=30d')
        assert res.status_code == 200

    def test_api_financial_news(self):
        res = req.get('http://127.0.0.1:5000/api/financial_news')
        assert res.status_code == 200

    def test_api_send_stock_prediction(self):
        res = req.get('http://127.0.0.1:5000/api/stock_prediction')
        assert res.status_code == 200

    def test_api_send_stock_original(self):
        res = req.get('http://127.0.0.1:5000/api/stock_original')
        assert res.status_code == 200
```