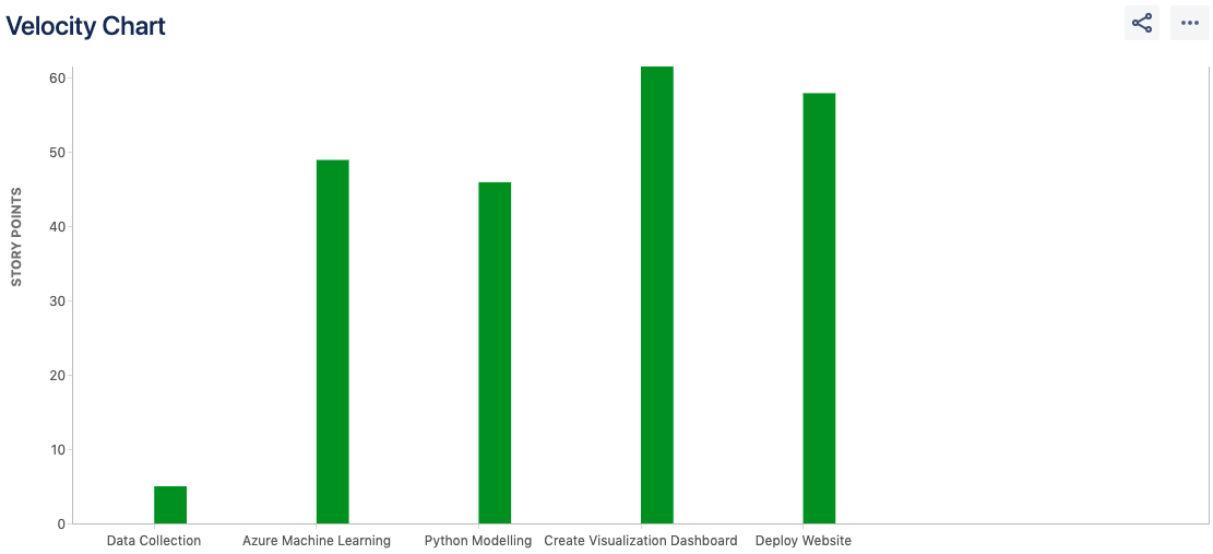

Story Point Estimates: 224
Website: http://rjennings.lmu.build/

Sprint 1: Data Collection

User Story: Gather Dataset of SPY Historical Prices
Description: As an end product user, I want the ML algorithm to be trained on as much data as possible, so that I have the most accurate predictions given to me.
Assignee: Julian Lach
Story Point Estimate: 5
Comments:

- Best 6 stock market APIs for 2020
  Check this link for potential api's ^^

- Yahoo finance api looks promising: Best 5 free stock market APIs in 2020 | by Shen Huang. This guys says its the "Gold Standard

- Juptyer or Collab, which one should we use?

Sprint Review/Retrospective 02/23/2021 Notes

Challenges
-Many different APIs to choose from, a lot of them cost money
-API documentation was not the best so creating the functions for the call was a bit difficult

What worked well?

The comment system we setup, helps communicate and store our thinking process as well as valuable information when solving each issue we have.

What can we improve?
We need to improve on finding time to all work together instead of working on our own and then coming together to share what we did. It creates redundancy and we often overlap our work. We basically need to improve communication and collaborative time.

What can be done in the next Sprint to improve the process?
We are going to actually text each other every small thing we find and do and update comments right after we find something so there are no redundancies.

Sprint 2: Azure Machine Learning

User Story: Clean the Dataset
Description: As an end product user I want legible content that I can derive financial insights from
Assignee: Julian Lach
Story Point Estimate: 5
Comments:

- Don't do start_date & end_date, we can just use [period='max'] instead
- Make sure to drop Normalized Column
- Before we go to azure we all need to set up accounts and share the workspace with each other.

User Story: Linear Regression
Description: As an end product user I want the final model to be as accurate as possible so I can trust the financial implications of the product.
Assignee: Joseph Jensen
Story Point Estimate: 13
Comments:

- Were going to predict close
- Some basic background info, if you need it Statistics Solutions What is Linear Regression?

User Story: Decision Forest Regression
Description: As an end product user I want the final model to be as accurate as possible so I can trust the financial implications of the product.
Assignee: Julian Lach
Story Point Estimate: 13
Comments:

-https://docs.microsoft.com/en-us/azure/machine-learning/studio-module-reference/decision-forest-regression This is how you configure the model

User Story: Neural Network Regression
Description: As an end product user I want the final model to be as accurate as possible so I can trust the financial implications of the product.
Assignee: Rhys Jennings
Story Point Estimate: 13
Comments:

- Yet another towardsdatascience article that will help provide a general understanding Deep Neural Networks for Regression Problems | by Mohammed AL-Ma'amari,
- https://docs.microsoft.com/en-us/azure/machine-learning/studio-module-reference/neural-network-regression This is how you configure the model

User Story: Score & Evaluate Models
Description: As an end product user I want the final model to be as accurate as possible so I can trust the financial implications of the product.
Assignee: Julian Lach
Story Point Estimate: 5
Comments:

- Models were all very similar in accuracy

User Story: Visualize Best Model
Description: As an end product user I want the final visualizations to be clear & legible so I can trust the financial implications of the product.
Assignee: Rhys Jennings
Story Point Estimate: 8
Comments:

- Having trouble visualizing with ML Azure, Anyone having any luck?

- Python has several Visualization libraries
- Can't download forecast model and test train data to make useful visualizations
- Test Train in Azure is randomized, it's still split 80/20 but it is not in chronological, so it is basically useless for website visualizations

Sprint Retrospective 03/16/2021 Notes

Challenges
-Tuning Models to create accurate one
-Biggest Issue: we need to pivot to actually programming rather than Azure because it lacks the deployment and visualization capabilities we need for the final product.
-We are now moving to Python where we will either do a time series or linear regression model because those worked the best in Azure
-We have pushed visualization of data to the backlog

What worked well?
We texted a lot more, so we discovered issues and resolved them before it became too redundant to work on. This is how we discovered that the visualization is useless in Azure and it lacks the customizability we need to make a good end product.

What can we improve?
Since we are about to code we need to improve how we meet. You basically have to code at the same time, so that there are no bugs and everyone is on the same page. We have to begin meeting synchronously.

What can be done in the next Sprint to improve the process?
We are just going to start meeting in person since we all live by each other. It will make coding and collaboration much easier. We do not really like using zoom and discord to code together, so this is probably the best solution.

Sprint 3: Python Modeling

User Story: Import and Clean Data
Description: As an end product user I want legible content so that I can derive financial insights from
Assignee: Rhys Jennings
Story Point Estimate: 3
Comments:

- Rerun the Juptyer notebook to get newer data
- Same cleaning steps as before

User Story: Explore and Visualize Data
Description: As an end product user I want to trust that the Data was thoroughly explored and correct decisions were made moving forward.
Assignee: Rhys Jennings
Story Point Estimate: 8
Comments:

- Make sure data looks correct
- This helped me a lot!! Intro to Data Analysis / Visualization with Python, Matplotlib and Pandas | Matplotlib Tutorial

User Story: Define Parameters for LSTM Model
Description: As an end product user, I want the developers to spend time understanding the way a models parameters effect it, so that the output is as accurate as possible
Assignee: Julian Lach
Story Point Estimate: 8
Comments:

User Story: Optimize LSTM Model

Description: As an end product user, I want the developers to spend time optimizing a model, so that the output is as accurate as possible
Assignee: Rhys Jennings
Story Point Estimate: 13
Comments:

- https://towardsdatascience.com/choosing-the-right-hyperparameters-for-a-simple-lstm-using-keras-f8e9ed76f046 Try this

User Story: Score Model
Description: As an end product user, I want to know the accuracy of the model I am using, so that I understand the risk that I am taking
Assignee: Rhys Jennings
Story Point Estimate: 3
Comments:

- Most accurate so far 95+%

User Story: Visualize Results
Description: As a end product user, I want to be able to see how the model works and play around with it, so that I can grasp the concepts better
Assignee: Joseph Jensen
Story Point Estimate: 8
Comments:

- Just use normal pandas and plotly

- Need to see what it looks like before we create dashboard

User Story: Save & Download Model From Collab
Description: As an end product user, I want my developers to be able to work in a cross platform development environment, so that I get a better end product quicker
Assignee: Rhys Jennings
Story Point Estimate: 3
Comments:

- Make sure to extract from the runtime table in Collab
- Then download to local drive

Sprint Retrospective 03/30/2021 Notes

Challenges

-Needed to find the correct model as a solution, but settled on LSTM because at its basis, it does exactly what we need, creates a function by observing past events and uses past trends as an input to predict the future.
-After pivoting to code, morale was low at first because we basically had to restart project
-Optimizing and learning about how to use LSTM model, none of us had any experience with it in the past

What worked well?
Coding in person worked extremely well. It was much easier to talk and collaborate in real time since we could all have the code up and coordinate what we were doing instead of just one person on Zoom.

What can we improve?
We need to improve how we learn new programs, tools, and models. We just watched a lot of Youtube videos for this model, but next sprint we will have to learn a lot to create the dashboard because none of us have done it before.

What can be done in the next Sprint to improve the process?
At the start of the sprint, we need to find a datacamp or medium article that has made a dashboard and do it as a project together. This will hopefully help us all understand how to apply it before starting our dashboard rather than learning on the fly.

Sprint 4: Create Visualization Dashboard

User Story: Install Necessary Packages for Dashboard
Description: As an end product user I want the developers to have optimal packages in order to deliver the best possible dashboard.
Assignee: Rhys Jennings
Story Point Estimate: 3
Comments:

- Dash, Plotly, Numpy, skLearn

User Story: Learn Dash & Plotly
Description: As a end product user I want the developers to have a thorough understanding of the applications they deploy so that I can trust the final product
Assignee: Rhys Jennings
Story Point Estimate: 13
Comments:

- https://www.youtube.com/watch?v=hSPmj7mK6ng Great Video for learning incubator
- https://realpython.com/python-dash/ This is the project we are doing before we start

User Story: Test Dash Server
Description: As an end product user I want the developers to have several series of testing to insure a bugless deployment, so that the end product is delivered on time.
Assignee: Julian Lach
Story Point Estimate: 3

Comments:

- Test with generic dataset with no model first to make sure its functioning

User Story: Implement Downloaded Model
Description: As an end product user I want the developers to insure the previously trained model is deployed into the dashboard, so that I can trust the visuals are reliant on the same model
Assignee: Julian Lach
Story Point Estimate: 13
Comments:

- Make sure model is in same directory as the dashboard

User Story: Create Scatter Plot of Actual Closing
Description: As an end product user I want the developers to provide informative visuals, so that I can make sound financial decisions
Assignee: Julian Lach
Story Point Estimate: 13
Comments:

- Do not use model simply use historical data
- Make sure its color coded and well labeled

User Story: Create Scatter Plot of Predicted Closing
Description: As an end product user I want the developers to provide informative visuals, so that I can make sound financial decisions
Assignee: Joseph Jensen
Story Point Estimate: 13
Comments:

- Run model on historical data and plot the forecasts

User Story: Test Final Dashboard
Description: As an end product user I want the developers to diligently test their product so that I can trust the insights from the dashboard
Assignee: Joseph Jensen
Story Point Estimate: 8
Comments:

- Make sure there is no lag
- Make sure the click through works well

Sprint Retrospective 04/13/2021 Notes

<u>Challenges</u>

- Dashboard was really difficult to implement because majority of content on the workflow was Microsoft oriented and we had to optimize for the Mac
- Finding ways to host the dashboard in a adequate manner was difficult
-Designing the UI of the dashboard to be aesthetically pleasing was difficult and required a lot of testing

What worked well?
We hosted a learning seminar at the beginning to get acquainted with building and developing dashboards. Doing a mini project before attempting our own project made doing ours much easier and helped us discover the Mac compatibility issues before we started.

What can we improve?
We need to improve on organizing our code and deliverables. Right now they are pretty scattered and we need to clean it up and fix them to upload on GitHub and put them on the final website.

What can be done in the next Sprint to improve the process?
Since it is our final sprint, we have to really focus on making everything easily digestible and understandable because that is the basis of our product. We want the biggest of beginners to understand it and have to really simplify things from a non coding perspective.

Sprint 5: Deploy Website

User Story: Set up WordPress through LMU Build
Description: As an end product user, I want to read the insights on a wordpress based website, because they are aesthetically pleasing
Assignee: Rhys Jennings
Story Point Estimate: 8
Comments:

User Story: Find Applicable Theme and Correct Plugins
Description: As an end product user, I want to have the website I go on to have a good UI so that I have an enjoyable customer experience
Assignee: Julian Lach
Story Point Estimate: 8
Comments:

- https://wordpress.com/themes find a cool theme here
- Make the background look very finance and techy

User Story: Design Website Functionalities
Description: As an end product user, I want to have the website I go on to have a good UX so that I have an enjoyable customer experience
Assignee: Julian Lach
Story Point Estimate: 8
Comments:

- Make sure that the scroll feature works well and does not lag

- Organize content into sections
- Look at medium data science articles for code part and do it like they do it

User Story: Research Stock Market Basics
Description: As an end product user, I want to be able to read about the stock market on the website because I am not educated about it.
Assignee: Joseph Jensen
Story Point Estimate: 13
Comments:
- https://www.investopedia.com/terms/m/market_indicators.asp market indicators source
- https://www.investopedia.com/terms/s/stockmarket.asp
- Get all info from investopedia
- Make sure it is hyperlinked on site

User Story: Write Educational Stock Content Section on Site
Description: As an end product user, I want to be able to read about the stock market on the website because I am not educated about it.
Assignee: Joseph Jensen
Story Point Estimate: 13
Comments:

User Story: Insert Code & Dashboard into Website
Description: As an end product user, I want to learn about the model and see visualizations, so that I understand the financial risk I am taking by trusting this model.
Assignee: Rhys Jennings
Story Point Estimate: 8
Comments:

Sprint Retrospective 04/27/2021 Notes

Challenges
-Had to brush up on WordPress a lot. Have not used it in a long time, so we had to figure out how to design the website to look good and be easily usable.
- Simplifying our content so that a beginner would understand it
-Researching the stock market basics and writing an introduction to it

What worked well?
We met in person to finalize the project and deploy it. Organizing was much easier in person and we got everything uploaded to GitHub and looking good.

What can we improve?

We completed the project but future improvements would simply be adding more content to the website as well as adding the capability to model and predict other stocks that are more volatile and have shorter history.

What can be done in the next Sprint to improve the process?
We want to add the capability to put whatever stock you want in, and add more and more educational content to make the website a full beginner to the market experience that can teach you the market at a basic level in a short period of time.