W209 Usability Study

Team 1 - Cryptocurrency Dashboard

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Introduction:

Our targeted audience is the users of cryptocurrencies with some basic understandings of trading and investment. Bitcoin is highly volatile and its intrinsic value is extremely hard to estimate because it does not have any underlying asset or is backed by any institution. This dashboard is intended to provide better visibility such as relative volatility of bitcoin compared to other asset classes and what are the primary factors that drive those volatility. With these visual interactions, users could gain some insights into the Bitcoin price trend and its level of risk.

W209 Project - Cryptocurrency Trading Dashboard
Team Members: Team Members: Jeffrey Adams, Pow Chang, Sweta Bhattacharya, Matt White
Link to visualization for usability study:
https://observablehq.com/@electroshock666/w209-final-project-cryptocurrency-trader-dashboard/3

Noted deficiencies in prototype:

- Cross filtering not currently working
- Volatility chart only displays bitcoin (due to availability of data)
- All items selection does not update (tied to crossfilter)
- No tooltip text on Events graph to indicate what underlying events are
- No zoom in capabilities in any graph or ability to change timelines

Usability Test Framework

Instructions for Testers

1. Please record your information below:
   Name: AJ White
   Computer Make Model: lenovo thinkbook laptop
   Computer Specifications (memory, cpu, if available): i5 CPU 355 8 GB RAM
   OS (Mac, Windows): Windows 10
   Screen Resolution: 1920x1080
   Monitor: Laptop monitor
   Web Browser (software and version): Chrome 91.0.4472.124 64 bit
   Familiarity with your desktop/OS (1-10): 7
   Familiarity with Trading Dashboards (1-10): 5
   Familiarity with Cryptocurrencies (1-10): 5
   Do you trade in crypto?: No

2. Please record your information below:
   Name: Mark White
   Computer Make Model: custom
   Computer Specifications (memory, cpu, if available): 12 GB, i7-960
   OS (Mac, Windows): Windows 10
   Screen Resolution: 1920x1080
   Monitor: External monitor
   Web Browser (software and version): Edge
   Familiarity with your desktop/OS (1-10): 9
   Familiarity with Trading Dashboards (1-10): 0
   Familiarity with Cryptocurrencies (1-10): 5
   Do you trade in crypto?: No

3. Please record your information below:
   Name: Amanda Jameer
   Computer Make Model: macbook pro
   Computer Specifications (memory, cpu, if available): i7 CPU 16 GB RAM
   OS (Mac, Windows): Mac OSx
   Screen Resolution: 1920x1080
   Monitor: Laptop monitor
   Web Browser (software and version): Chrome
   Familiarity with your desktop/OS (1-10): 6
   Familiarity with Trading (1-10): 1
   Familiarity with Cryptocurrencies (1-10): 4

Do you trade in crypto?: Yes

4. Please use a web browser (preferably Chrome or Firefox) to visit the site https://observablehq.com/@electroshock666/w209-final-project-cryptocurrency-trader-dashboard/3

Overall User Goals:

1. Be able to assess the returns on cryptocurrencies compared to publicly traded stocks and indices.
2. Be able to compare the ATR (price volatility) versus returns of cryptocurrencies against publicly traded stocks and indices.
3. Be able to assess the volatility of cryptocurrencies versus stocks by assessing the fluctuations in price.
4. Be able to understand the impact of events on the prices of cryptocurrencies versus other stocks.

Overall Dashboard Functionality

1. Please go into fullscreen mode.

Observations:

Tester 1: Went into full screen mode, but each visualization cannot fit on screen at this resolution. Scrollbars appear to move left and right, and up and down.

Tester 2: Went it to full screen. Shows up but bottom is not in screen, requires scrolling.

Tester 3: went into full screen mode, some vertical scrolling required.

2. Please exit fullscreen mode.

Observations:

Tester 1: Exited full screen mode, clicked fullscreen button and it exited.

Tester 2: Successfully exited full screen mode.

Tester 3: Successfully exited full screen mode.

3. Explore interface to see what “tickers” does:

Tester 1: enables stocks and they appear.

Tester 2: Allows to select pre-selected stock tickers and updates 3 graphs.

Tester 3: Toggles on 3 charts of 4 the values for that ticker.

4. Explore interface to see what “events” does:

Tester 1: Unclear what “BTC history”, “Global”, “Elon” and “Financial” represent. Not clear what the colored time bars represent.
Color flip flops depending on number of events selected, color doesn't follow event.

Tester 2: Only Events chart updates. Scaling issues, suggests changing to log scale.

Tester 3: Toggles events on one chart with lines.

User Goal 1: Be able to assess the returns on cryptocurrencies compared to publicly traded stocks and indices.

1. Compare the returns between the two cryptocurrencies:

Observations:

Tester 1: What is the scale of the return, What does the y-axis represent? 2x returns? Some number? Sometimes the numbers cover one another and hard to read (tool tip text.) No exact date in the tool tip text.

Tester 2: Hard to see details, can’t tell the date, and the timescale is crushed. For day traders then this won’t work. They seem to move together.

Tester 3: The timescale is very long, no ability to zoom in. Hard to assess as some tickers are over top of others. Unable to make an accurate assessment. What is the measure of returns?

2. Compare the returns between bitcoin and a publicly traded stock, which outperforms the other?:

Observations:

Tester 1: observed that bitcoin looks more volatile than msft.

Tester 2: observed that bitcoin has more volatility than JP morgan.

Tester 3: Similar to above, when comparing two elements it's not too difficult but with 3 or more it becomes hard to read. Observed that bitcoin moves around more than stocks but not sure what the means.

3. Compare the returns between bitcoin and a stock index:

Observations:

Tester 1: Index looks like bitcoin fluctuates drastically. Does this show total returns or price volatility?

Tester 2: Bitcoin has more volatility than the DJI.

Tester 3: See lots of movement in Bitcoin, ups and downs compared to stocks.

Conclusion for Objective:

Tester 1: Would not be able to answer the question which has better returns. Hard to visually see the difference between two.
Usability (1-7): 3
Effectiveness: (1-7): 2

Tester 2: It would be very difficult to conclude anything. BUt he can see that the cumulative peaks are higher than the lows with Bitcoin, which means that it's returns are higher. Can't say what percent increase, not really indicative of actual returns.
Usability (1-7): 2
Effectiveness: (1-7): 2

Tester 3: Overlapping values, only able to see top value. Can see fluctuations but can't attribute them to anything.

Usability (1-7): 3

Effectiveness: (1-7): 3

Suggestions for Objective:

Tester 1: What does the baseline mean, centered on 0? What is the value of the baseline? Is this actually returns? Being able to see the numbers at a point in time, ability to change resolution of time. Not obvious what everything does, suggests adding help and tool tip text and explanations.

Tester 2: Range needs to be selectable, rescale timeline. Suggesting cumulative returns chart (total.)

Tester 3: Provide context about what graph does, allow zooming and selecting to be able to see at a deeper level. Explain the positive and negative returns, what they translate to in terms of value.

User Goal 2: Be able to compare the ATR (price volatility) versus returns of cryptocurrencies against publicly traded stocks and indices.

4. Compare the ATR vs returns of bitcoin.

Observations:

Tester 1: chart zooms in and out but scale doesn't change and x does not start at 0 but some negative number. What does ATR vs Return help you do?

Tester 2: No explanation about what goes into ATR. Appears to be plotted daily, which doesn't really provide much information.

Tester 3: Not sure what this chart does, how does it help figure out which stocks or cryptocurrencies to purchase? Zoom is not obvious, happened by accident.

5. Compare the ATR vs returns of bitcoin against another stock.

Observations:

Tester 1: Appears that with higher volatility the returns are more positive, at about 3000, then after 2004. Could improve the numbers on X axis, maybe on an angle.

Tester 2: Nothing that says how you can zoom in and out.

Tester 3: Bitcoin shows up more spread out, assuming that is volatility, but not sure.

6. Compare the ATR and returns between bitcoin and a stock index:

Observations:

Tester 1: Able to scroll left and right and in and out. graph gets cluttered around 0.

Tester 2: same issues noted above, also plots cover one another.

Tester 3: Can see the difference between the two but not sure what it means. Functionality seems to work.

Conclusion for Objective:

Tester 1: Can but to a certain degree. Difficulty interpreting what the difference means.
Usability (1-7): 3
Effectiveness: (1-7): 2

Tester 2: Does not know what ATR is, and not sure what value it offers.
Usability (1-7): 2
Effectiveness: (1-7): 2

Tester 3: Not sure about ATR and it's value, what does it mean? Is this compounded over time or daily?
Usability (1-7): 2
Effectiveness: (1-7): 1

Suggestions for Objective:

Tester 1: Numbers on x axis hard to read. Zooming out 0 should be always at the leftmost area.

Tester 2: identifying time scale, what does this graph actually do. More useful information.

Tester 3: Inform the user what ATR is and how to use this graph.

User Goal 3: Be able to assess the volatility of cryptocurrencies versus stocks by assessing the fluctuations in price.

7. Please assess the volatility in value of bitcoin price.

Observations:

Tester 1: TImeframe is too short, should match. Dates seem arbitrary, should be similar to other graphs. Able to assess volatility, losses.

Tester 2: timeframe doesn't match, only shows bitcoin. No tool tip text. Doesnt' show volatility, to should be renamed to "market value". Guesses reds are dropping, and greens are increasing. Prices appear to be incorrect.

Tester 3: Not sure how to do that from this graph.

8. Can you tell when the price of bitcoin peaked?

Tester 1: Needs tool tip text to get exact date and value.

Tester 2: appears early may, but not tool tip text to give exact date. Can't assess actual price. No zoom.

Tester 3: appears around 5/15/2021 but not certain exactly. Not able to zoom.

9. Compare bitcoin versus a conventional stock:

Observations:

Tester 1: can't do as functionality doesn't exist

Tester 2: can't do as functionality doesn't exist.

Tester 3: can't do as functionality doesn't exist.

Conclusion for Objective:

Tester 1: Can't compare. Can see the fluctuations in price.
Usability (1-7): 3

Effectiveness: (1-7): 4

Tester 2: Can see price movement over the year but need larger time horizon.
Usability (1-7): 3
Effectiveness: (1-7): 4

Tester 3: Not sure how to read chart. Only able to assess approximate value.
Usability (1-7): 2
Effectiveness: (1-7): 2

Suggestions for Objective:

Tester 1: Timescale is too short. Date marks appear random. Could use a bar on timeline to select point in time.

Tester 2: no way to zoom in, no interaction, no tool tip text, prices incorrect, not a measure of volatility.

Tester 3: Would like to be able to see exact details when hover over a point and zoom in.

User Goal 4: Be able to understand the impact of events on the prices of cryptocurrencies versus other stocks.

1. Can you see the impact of Elon musk tweets on Bitcoin values.

Observations:

Tester 1: No, cannot because they are clustered together. They need to be indicated with tool tip text, the resolution is too zoomed out.

Tester 2: No, resolution is too far out. Can see that there is likely a correlation but no ability to zoom in.

Tester 3: Can see the impact of tweets but can’t zoom in to see more details to see exactly how much.

2. Can you see the impact of global events on bitcoin and a conventional stock?

Observations:

Tester 1: No, because the values are too low for stocks. Also the bars cover the values.

Tester 2: No, can't see any strong correlations. No details about the actual events. Tool tip text doesn't show up unless exactly on the line.

Tester 3: Not on stocks, maybe some events like pandemic on bitcoin.

Conclusion for Objective:

Tester 1: not able to perform the task, cannot see the difference of impacts between events. Some of the vents appear to show but cannot see them.
Usability (1-7): 3
Effectiveness: (1-7): 4

Tester 2: Can assess. Scaling is an issue and the diagram. It wasn't clear to him that he could select the tickers boxes and it would show up in this graph.
Usability (1-7): 4
Effectiveness: (1-7): 4

Tester 3: Unable to see enough detail to really understand, also tool tip text comes and goes. You have to be centered on the event line to see anything.
Usability (1-7): 5
Effectiveness: (1-7): 3

Suggestions for Objective:

Tester 1: Might be better to use dots than bars for events? Bars cover over the values in the chart. Ability to zoom in. Might need to rescale Bitcoin because its values are so high compared to regular stocks.

Tester 2: Ability to zoom in, details about each event. Log scaling. Ability to line up and overlay charts.

Tester 3: Need to be able to zoom in, and pan the timeline. Close values between anything but bitcoin are at such a small scale that they cannot be seen well. Add zoom and pan, and change time scale.

Prioritized List of Issues and Changes

Must Have:

1. Issue: Events Issues
   Recommendation: Replace Events chart with a Value Chart, and allow events to show up on all graphs with tool tip text. Move the chart in bottom right (events) to top left (as values.)

2. Issue: ATR vs Return Chart
   Recommendation: Consider a more informative type of visualization with a defined timeline or explain ATR in detail and how its valuable.

3. Issue: Graphs are small.
   Recommendation: Ability to make 1 graph occupy the entire screen.

4. Issue: Scaling issues between crypto and others
   Recommendation: Perhaps use log scale to get bitcoin closer to others.

5. Issue: Chart Names & Descriptions
   Recommendation: Rename charts to be more descriptive, add tooltip text to describe what each chart does.
6. Issue: Help Page
   Recommendation: Create link to popup help page that describes the functions of the dashboard.

7. Issue: No description of event names
   Recommendation: Add event descriptions, with tooltip text

8. Issue: All selected items does not update
   Recommendation: Understood, need to get crossfiltering working across all graphs

9. Issue: Volatility Chart only shows bitcoin and 2021
   Recommendation: Recognized as an issue, needs to have data integrated with other charts.

10. Issue: Unable to change resolution (time scale)
    Recommendation: Add ability to pan and zoom in each graph

11. Issue: Unclear what scale positive and negative returns are on

Recommendation: Include UNITS on all plots (x and y axis)

12. Issue: in ATR vs REturns chart the numbers on X axis are overlapping
    Recommendation: rotate x-axis text 45 degrees

13. Issue: Some tool tip text doesn't include exact value, and most do not include a date
    Recommendation: Ensure all charts have both value and date (where relevant) included in the tooltip text.

14. Issue: Bitcoin values compared to other crypto or stocks/indices is much higher in value which creates a large scale pushing other values close together, obscuring them.
    Recommendation: Consider rescaling to log.

Should Have:

15. Issue: For some resolutions scroll bars appear (horizontal and vertical) which hides some amount of the visualizations.
    Recommendation: Scale each graph as a % of total width and height (not fixed)

16. Issue: Not clear you can pan and zoom
    Recommendation: Add tooltip text to graphs, or some text in instructions on how to zoom in and out and how to pan.

17. Issue: Graphs can be hard to see
    Recommendation: Consider being able to send a graph to fullscreen for closer analysis

Could Have:

18. Issue: ATR vs Returns chart when zoomed in shows negative returns space
    Recommendation: Chart should be anchored to the 0 on the X-axis and not go left of it.

19. Issue: colors in charts are not tied to the ticker or events, but rather first assigned in order based on what is selected.
    Recommendation: Colors should be associated with a particular ticker and event in all charts.

20. Issue: Not clear that Tickers and Events belong to all graphs (or just some)
    Recommendation: Create a bounding box around Tickers and Events to provide a visual cue

Will Not:

21. Issue:Returns are daily
    Recommendation: Returns should be cumulative. For returns chart we should stick with daily because that is the level of detail of our samples.