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Repcoin: A Market-Based Approach to Reputation

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Abstract

Individuals use measures of reputation as heuristics for determining how much interest and trust they should place in other individuals. Clear measures of reputation save time and increase efficiency because they prevent individuals from having to go through the traditional process of determining reputation, especially in cases where these traditional measures no longer suffice. Repcoin aimed to give experts in different areas a platform for highlighting their expertise, provide an avenue for users to find credible experts in different areas, and a place for users to try and predict whose reputation will increase and thereby prove their ability to identify who will be credible in the future. Repcoin's 300 users used the site on a regular basis and displayed complex behavior. Repcoin failed in its aim to function as a proof-of-concept for accurately storing and predicting future reputation, and didn't provide a sufficient incentive for its users to display their content on the site. The Repcoin experiment illustrates the difficulties of building a simple but accurate market for reputation but shows that users are willing to participate in these sorts of markets.

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Chapter 1

Introduction

1.1 Background

Individuals use measures of reputation as heuristics for determining how much interest and trust they should place in other individuals. Traditionally, we determine an individual's reputation by interacting with them and gathering information about them from other individuals. Before online recommendation systems, a person hiring a carpenter might ask their friends for recommendations for carpenters and likely choose one based on this. However, this process is time-consuming, difficult, and unnecessary in a world where many interactions happen entirely through the web. Clear measures of reputation save time and increase efficiency because they prevent individuals from having to go through the traditional process of determining reputation, especially in cases where these traditional measures no longer suffice.

With the advent of Youtube, Kickstarter, Soundcloud and other idea and content aggregators, reputation fluctuates more than ever. On any of these sites, one successful piece of content can skyrocket an individual from unknown to famous. Amateur musicians on Youtube such as Justin Bieber can achieve instant success in their genre if one of their videos becomes a hit, garnering millions of views, increasing their reputation on the web. Predicting these fluctuations is difficult since most areas of expertise consist of many unknown individuals and a few famous ones, as displayed in Figure 2.2.

Furthermore, the factors which lead to any one individual's success in an area of expertise are unclear.

Domain-specific solutions for measuring current reputation do exist. LinkedIn, the "World's Largest Professional Network", boasts a user base of over 347,000,000 users [1] who use the site with the hope that it will improve their career prospects and increase their credibility. Yelp provides a robust reputation measure that is "the best way to find great local businesses" [12]. However, no existing platform provides a measure for individuals' reputations across categories and disciplines that takes into account the rapid rate of change in individual popularity on the web.

Systems called prediction markets focus on predicting future events using market dynamics. Recent literature has shown that these systems produce more accurate predictions of future events than many traditional systems such as polls. These systems provide a potential method for aggregating predictions of individuals' future reputation in different areas of expertise.

We present the design, implementation, and evaluation of Repcoin. Repcoin is a web platform built using Javascript frameworks NodeJS[10] and ReactJS[8], and MongoDB[11] as a database. Repcoin aims to give experts in different areas a platform for highlighting their expertise, provide an avenue for users to find credible experts in different areas, and a place for users to try and predict whose reputation will increase and thereby prove their ability to identify who will be credible in the future. Repcoin sets out to enable users to participate in a market for reputation as investors and experts. Investors use Reps, a play money currency totally separate from real currency, to speculate on how experts' reputations will fare in different categories in the future. Experts display their expertise in different areas by linking to personal work. Repcoin's measure of reputation attempts to combine current reputation with predicted future reputation and allows for rapid increases and decreases in individual reputation, mirroring the dynamic which has emerged on the web.

1.2 Related Work

1.2.1 Where the Idea Comes From

The initial concept for Repcoin comes from science fiction literature. In *Down and Out in the Magic Kingdom*[4], Cory Doctorow explores a future where a currency based around an individual's reputation called Whuffies has entirely replaced our current form of currency based around resource scarcity. In Doctorow's future, individual worth fluctuates wildly and often unpredictably as a function of public actions and how members of the web community perceive individuals. The Whuffie inspired Repcoin by showing its creators how important reputation would be in the future. In *Accelerando*[18], Charles Stross imagines a future where scarcity has been altogether eliminated and a new complex form of currency "replaces the single-indirection layer of conventional money, and the multiple-indirection mappings of options trades, with some kind of insanely baroque object-relational framework based on the parametrized desires and subjective experiential values of the players" [18, p. 244].

Stross' ideas, although less focused on reputation, illustrate how a currency can derive its value purely from the desires of its users, independent of resource scarcity or value, a key component of Repcoin's market.

1.2.2 Academic Literature

Repcoin derives its conceptual foundation from both academic literature and industry. The idea of a tool for making predictions based around stock-market dynamics has been discussed extensively in economics literature about prediction markets.

A prediction market is a platform that allows participants to buy and trade contracts that pay a value based on the results or occurrence of some event. Prediction markets allow participants to buy and trade these contracts in addition to purchasing them from a third party.

Prediction Markets utilize three contract types, displayed in 1.1.

Contract Type	Dynamic	Shows
Winner-takes-all	Pays y\$ if Album A sells more than s copies	Probability of event
Index	Pays x - s \$ where s is is a constant and x is the actual number of sales of A	Expected Value of x
Spread	Costs x; Pays 2x if A sells $x > s'$ copies where $s' >> s$	Median value of x

Figure 1.1: The three different types of prediction markets and the form of security they each utilize, as described by Zitzewitz et al. [19]

Zitzewitz et al. [19] provide a more detailed discussion of the differences between the different types of prediction markets. They discuss examples of successful prediction markets utilizing all three contract types.

Prediction markets have been successful in the political domain, despite the significant regulatory obstacles they face [5]. The Iowa Presidential Stock Market that ran during the 1998 election allowed traders to buy and sell contracts that paid an amount determined by the percentage of the popular vote the candidate the contract specified received in the election. Thus, the price of a contract for any given candidate should have reflected the expected percentage of the popular vote they would receive. The Iowa Presidential Stock Market had 192 participants, all of whom invested less than 30 dollars in the market. Despite this, the results of this market were shown to be more accurate than mainstream polls [2]. This result shows the potential for prediction markets to make accurate predictions in cases where they have few participants and use small sums of money.

An internal prediction market at Hewlett Packard further illustrated the efficacy of these tools. In this market, a carefully chosen group of HP employees traded securities tied to different HP business outcomes, such as product sales and profit share percentages. The HP market differs from the Iowa Presidential Stock Market since its predictions focused on events about which relatively little information was available to each participant. Each prediction in the HP market had under 30 participants actively trading bets on it. This market still performed significantly more accurately than HP's own internal forecasts for every case in which it was employed [14].

While the discussed prediction markets all used real currency as their medium of exchange, a study of two comparable prediction markets, Tradesports - a real money market - and NewsFutures - a play-money market, showed that, in the case of sports predictions, using real money does not seem to provide a predictive advantage [2]. The authors do note, however, that the sports betting market has the advantage of possessing fans whose intrinsic interest in the topic provides an incentive for them to participate independent of profit. This result indicates that prediction markets may be able to avoid the regulatory obstacles by using play-money.

1.2.3 Industry Competitors

Industry competitors to Repcoin focus on measuring current reputation.

LinkedIn[3] maintains a network of professionals and their skills. LinkedIn recently unveiled an "Endorsements" platform which aims to allow users friends and connections to endorse them for certain skills. Endorsements give a summary of a user's skills and the people who can verify that this person possesses each skill. LinkedIn's method works well for aggregating current ability but doesn't focus on predicting future reputation.

Genius[9] aims to "annotate the world". Users of the site add annotations to a wide variety of documents (both Supreme Court cases and rap lyrics are found on the site). Through adding these annotations, users accrue "IQ" points, which function as their reputation on the site. Genius works well for crowd-sourced document annotation. Their IQ points system shows users are willing to be rated and enjoy rating other users' contributions to the site. We aim to generalize our reputation system to more areas of expertise and allowing users to show their expertise by directly linking to their work.

StackOverflow[16] and the StackExchange[17] network use Q&A as their primary determinant of a user's reputation. This model works well for determining who is a successful contributor to the site but may not generalize as a form of universal reputation.

Chapter 2

Discussion

Figure 2.1: User behaviors for the two Repcoin user types (Experts, abbreviated as "E", and Investors, abbreviated as "I").

2.1 The Reputation Market

Figure 2.1 shows how users of Repcoin participate in the market. Users of Repcoin act as invest in people who they think have merit and expertise in domains, called Experts. The Repcoin market functions using dividends. Each investment corresponds to an expert and a domain. As an example, an investor, Bob, could invest in Alice in Cooking. An investment accrues dividends based on the quantity of reps invested in the same user for the same category after the initial investment. The market rewards investors who invest reps early on in the right users for the right categories.

Repcoin aims to aggregate expert reputation. Take an example user who uses Repcoin as a way for her pop music to gain traction. This user joins Repcoin and promptly posts links to all of her pop music on the site. A seasoned investor in Pop Music on Repcoin discovers this enterprising musician through the Repcoin Feed, which aggregates new users and their content, and, after listening to her music, decides to invest in her. Suddenly, this artist finds herself displayed in a trending table for the category of Pop Music on Repcoin. Other investors who follow Pop Music, finding this artist in the Pop Music trending table and that our well-known investor in Pop Music has invested his reps in this user. Through this, the user's original content, posted on sites like Youtube and Soundcloud, also becomes more popular, and, as she posts more music, users continue to invest in her and promote her music. Finally, the user posts her Repcoin credibility in Pop Music on these sites under her profile, showing users that she has credibility in Pop Music on Repcoin, a universal source of reputation with which many of them are already familiar. This example illustrates the ideal Repcoin user scenario. On the investor side, a successful investment acted as both a prediction of and a trigger for success for a user in a category. On the expert side, our Pop Music artist posted on the site and gained credibility in a category by showing ability and, more importantly, potential.

2.2 Prediction Market Dynamics

The Repcoin market determines investments' dividends using a simple formula:

(.1)$\times$ (original percentage of total invested in user) $\times$ (total reps now invested in user for category)

We aim to ensure that the market rewards investors for investing in experts for categories in which they will later receive more investments through this formula.

With sufficient time and users, Repcoin would ideally function as a prediction market where investors predict the future popularity of experts, as in the above example. The best investors would invest in users, who, through a combination of real-life occurrences and promotion on Repcoin, will soon become much more popular, and, therefore, receive more investments than they currently receive. Experts' posting of content would encourage this connection between investment on the site and real world events and content production. Unfortunately, in practice, investments did not seem to correlate with real life popularity as much as prior friendships and relationships, as will be discussed in the Results section in detail.

2.3 Design: User Interface and Experience

We aim to use the dynamics of a prediction market to accurately predict and quantify success in a wide variety of disciplines, with a focus on areas where users' content can be found distributed throughout the web. In order to do this, we require a userbase large enough to sustain continuous activity, a simple way to interact with the market and view market activity, and a user experience compelling enough to keep users coming back to the site.

In order to gain a significant userbase, we must overcome a chicken and egg problem. Investors don't want to use Repcoin if there aren't enough experts to invest in and experts don't want to promote their content on a site with a small audience. To overcome this, we could attack a niche market of users and convince a significant percentage of said market that their peers and counterpart user type will use the site. The culture market, loosely comprised of bloggers, musicians, artists, graphic designers, and short film producers, may present a good initial market for Repcoin.

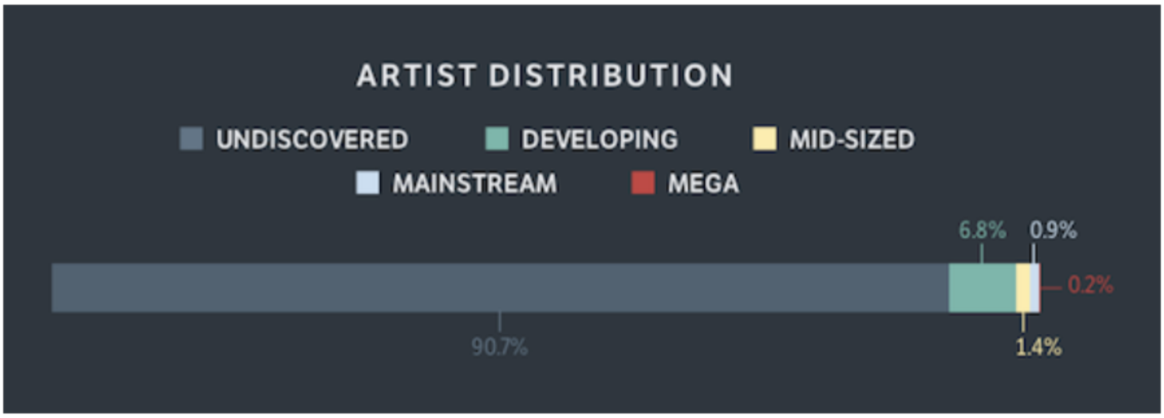

Figure 2.2: The distribution of music artists by popularity. The creators of this figure assigned artists categorizations based on social media benchmarks at pivotal points in the artists' careers including but not limited to signing on with a record label and appearing on a late night TV show. From [15]

Figure 2.2 shows the untapped potential of the music market alone. Of the over 1,000,000 musicians currently in the market, 90% are labeled undiscovered. We target these users in the hope that they have an incentive to join Repcoin and post their content. As a result of their undiscovered status, these musicians don't have to worry about failing to gain traction on Repcoin as that will leave them in virtually the same position they are in now, as there is no penalty for not succeeding on Repcoin. Undiscovered participants may dominate other sub-markets of the culture market.

We also provide an incentive for users to invite their friends to the site. Users earn 5 reps for every user who joins the site at their request (mediated through a Facebook invitation). We hope to encourage market saturation by incentivizing users to invite other people who likely share their interests and, in many cases, fall into the same niche market as they do.

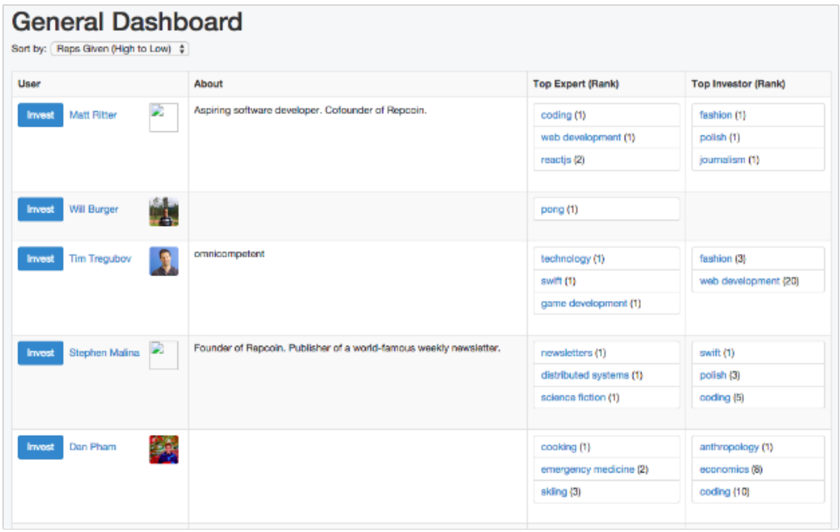

Figure 2.3: The Repcoin dashboard, a table of experts that can be sorted based on "Reps Given", "Trending" (a custom metric determined by recent investment activity on that user), and "Newest" or "Oldest". This table, displayed on Repcoin's Home page, also allows investors to directly invest in users without navigating away from the page. Clicking the "Invest" button brings up a modal displayed in Figure 2.4, the same modal used to make investments across Repcoin.

Distilling Repcoin's complex conceptual foundation into a simple to use and understand user experience presents a significant obstacle. Investor behavior becomes complex quickly as superuser investors desire ways to view time-series data, such as graphs of investment returns in different categories, (Figure 2.3) and trending expert data (Figure 2.4), and make investments based on this information. Despite this, experts must be able to easily add content and see how they're doing in all of their different categories. Users who are both experts and investors should be able to view their status in both areas easily.

Repcoin uses tables and lists to maximize space usage and present the most information to

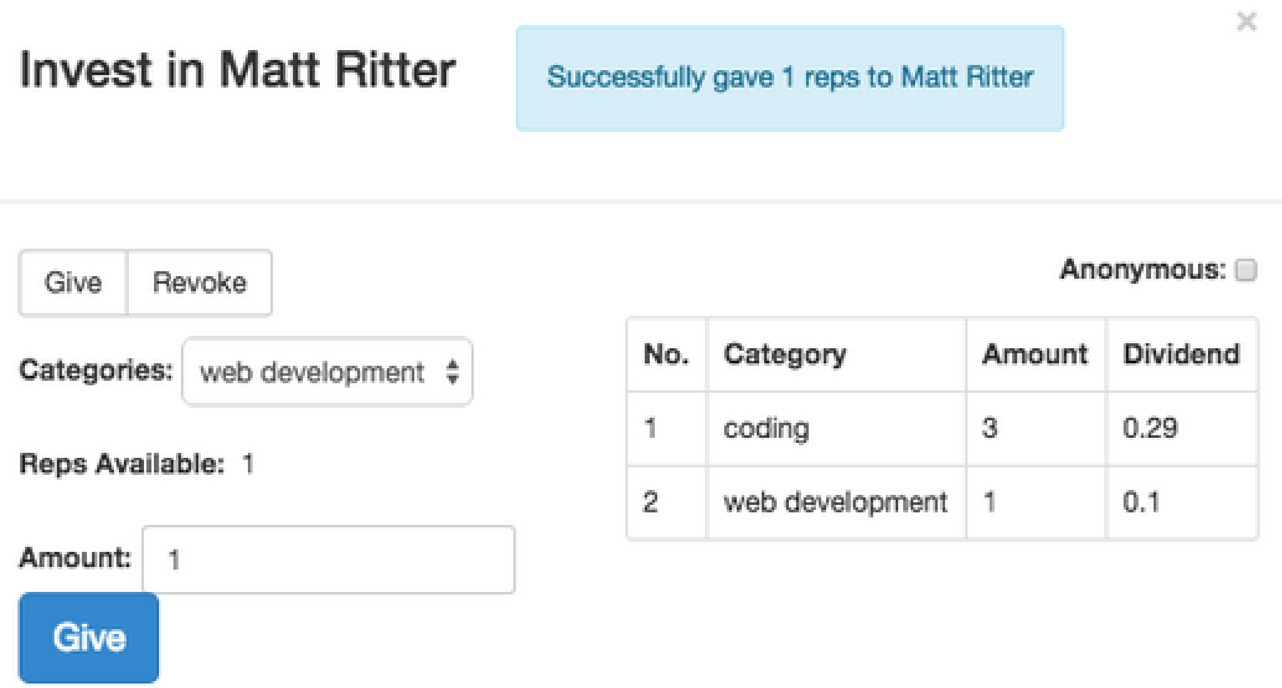

Figure 2.4: This modal allows investors to make investments in an expert. Using this modal, investors can view how existing investments in that expert are performing. Using the same modal for investing across the site simplifies the user experience for investors and reduces cognitive load.

investors in an efficient way. Although many designers eschew the use of tables, on Repcoin, tables have proven a boon for displaying a large amount of information and allowing users to easily filter and sort this information, depending on the metric they employ to rate experts and find potential investments.

On the expert side, Repcoin employs a feed to showcase events that can be filtered by user. The Feed provides experts with a summary of their recent investment activity and helps them get a sense of whether they are trending on the site. Repcoin also provides experts with a ranking for each category in which they are an expert. By glancing at their rank for each of their categories, experts can keep track of their status on the site. For more granular information about their trending status, experts can also go to specific category's pages and view trending tables which can be filtered by different time spans. We argue that these information display mechanisms allow experts on Repcoin to understand their status on the site at whatever level of detail they desire.

Finally, we endeavor to provide an incentive for both user types to return to Repcoin on a daily basis. Investors will only continue to invest their reps if they receive a compelling reward for successfully investing. While the feeling of accomplishment derived from making an accurate prediction provides some incentive for continuous participation, it is alone insufficient. Repcoin supplements this incentive by providing a social reward for being a successful investor. Successful investors earn significant clout on Repcoin through the public display and celebration of their success. These investors receive a rank of 1 in a category if their investments prove to be more successful than all others'. Dashboard and category tables also promote successful investors by displaying them at the top of tables when sorted by "Trending".

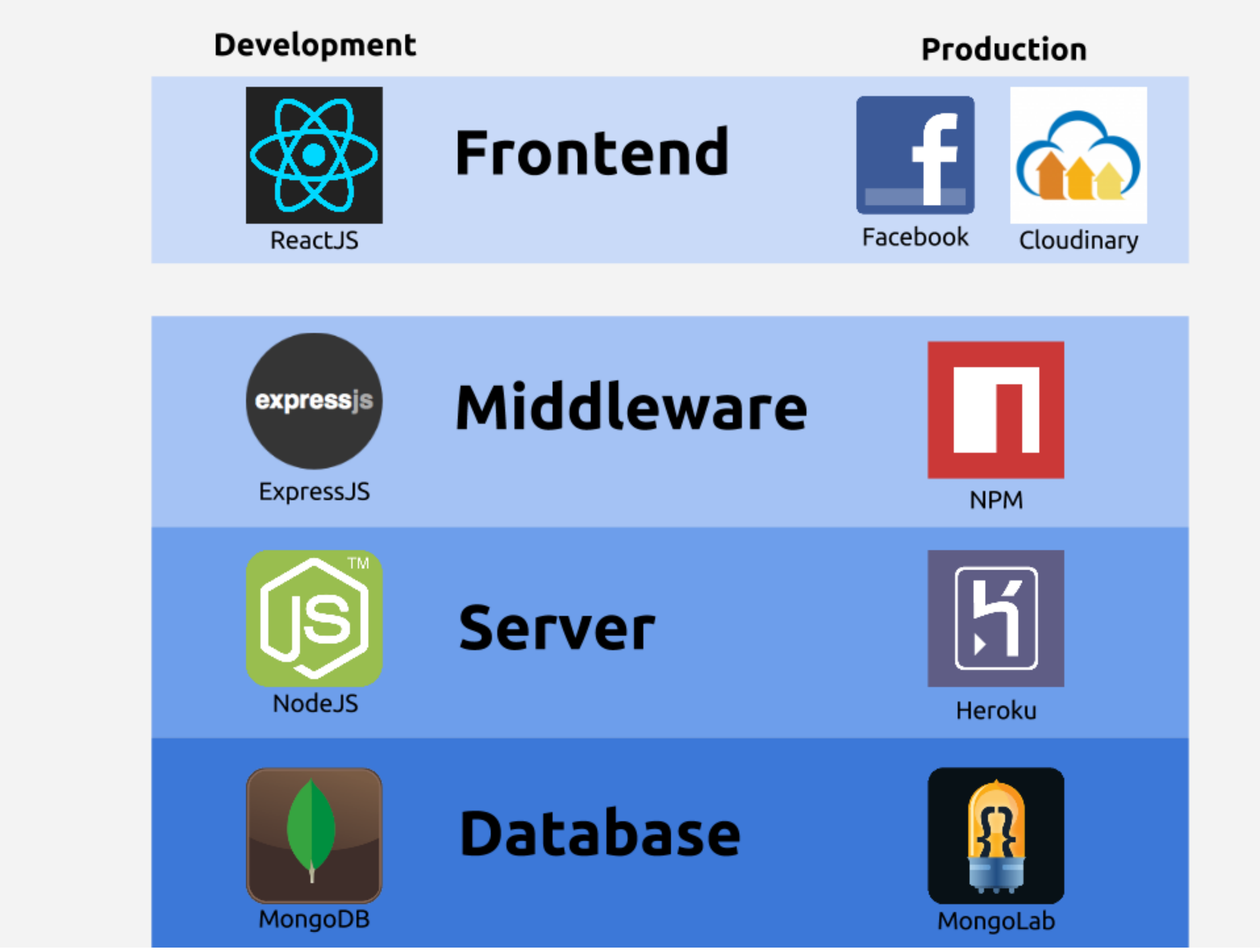

Figure 2.5: The Repcoin technical stack. Showcases the packages used for Repcoin's infrastructure, frontend, and backend.

2.4 Technical

2.4.1 React and the Flux Architecture

As a single-page application, Repcoin faces the technical challenge of providing complex, relational, real-time data to users. Repcoin's must manage this data while minimizing the number of calls it makes to the back end. Figure ?? showcases the entire Repcoin stack. This discussion focuses on the front end architecture and, therefore, the ReactJs (React) component of this stack.

We use React as the view engine in the browser. React provides in-code templating functionality and built-in functions for creating components, pages, and transitioning between these items.

React[13][6] allows for partial re-rendering of data without reloading the page. On Repcoin, this manifests itself when the user moves from page to page without refreshing (the most common way of navigating the site).

React also makes it easy to create modular, reusable components. On Repcoin, reusable components allow for investment modals throughout the site and similar ranking tables to be used both on the profile page and individual category pages.

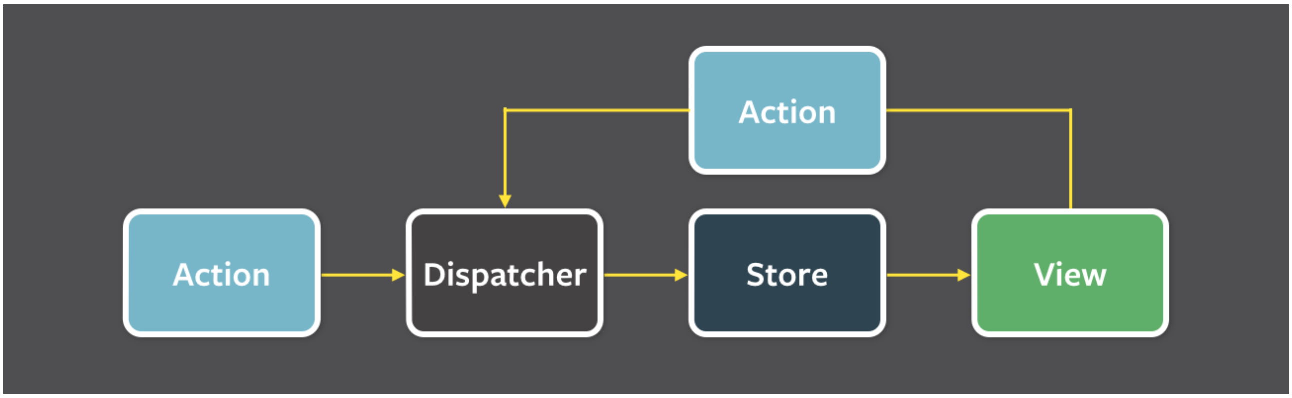

Figure 2.6: Flux's unidirectional data flow diagram used by Facebook to explain the architecture [7].

We manage data in the browser using the Flux architecture, designed by the architects of React (Figure 2.6). The Flux architecture uses a uni-directional data flow to simplify frontend Javascript development. The Flux architecture derives its principles from functional and event-driven programming to create a simple and testable architecture for managing data.

In a Flux system, views dispatch actions, the fundamental unit for communication and data passing. These actions are managed by a dispatcher, which alerts stores upon the dispatch of an action. Actions serve as alerts for both user and server actions. When a user clicks a button or enters data into a form, an action will be dispatched by the appropriate view. In addition, when the frontend application asks for data, actions are dispatched for both the request and response portion of the HTTP action. The dispatcher connects the different components of the application but stores no data. Stores act as state-managers and provide the frontend application's business logic. In Repcoin, stores consist of two major components. The first is a Javascript dictionary which stores data related to the domain of the store (Repcoin has a UserStore and a CategoriesStore, for example). This dictionary provides variables for storing this data and functions which views can call to retrieve this data in any form they require. Stores also have a watcher component. This watcher waits for dispatches from the dispatcher. Upon action dispatch, the watcher then checks the type of the action dispatched, and if it's programmed to act on this action, grabs the data the action contains (if there is any) and calls an action on the dictionary component of the store, likely updating some of the dictionary's data and emitting an event that alerts certain views that the store's data has been updated, thereby completing the circle of data flow in the application.

In Repcoin, the above data loop allows for event-driven updates of views and components across the application, dependent upon both user and server events. For example, on the Repcoin categories page, users can sort a list by a few different filters. This process works as follows using Flux:

- The Categories page top-level component listens for an event from the categories store signaling that its data has been update and updates its state upon emission of this event
- When a user selects a different filter for sorting the categories on the categories page, the categories page component dispatches CATEGORIES_SORT action with a string attached to it, indicating the filter to be used to sort the categories.
- The dispatcher dispatches this action and the categories store, seeing this dispatch and determining the CATEGORIES_SORT action is one for which it has a programmed behavior, checks the actions payload and sorts its list of categories based on the filter in the action.
- The categories store emits an event indicating its data has changed, and, as a result, the categories page asks for the categories stores' updated sorted categories list.

The Flux architecture also allows for centralized authentication and current user management. On Repcoin, the current user and their logged in status is managed with a store that caches login status data from the server, data that is asynchronously refreshed upon rendering of different views. This structure allows any view in the application to get the current user's data and their login status. This is especially important since Repcoin moderates what content it shows based on whether the user is a logged in user of the site. Public users can view the market and users on the site but cannot participate in the site without registering for an account.

2.4.2 Frontend Unit Testing

The Flux architecture centralizes most frontend business logic into stores. We test stores' code using a testing framework called Jest. Jest mocks all modules in the application by default and allows developers to specify which modules (from the application itself or third-party) it should not mock. Thus, frontend tests written using Jest can isolate components and test their unit functionality. We use frontend unit testing ensure that stores properly deal with every relevant action used by either a view or the server.

Chapter 3

Results

3.1 Sources

The author gathered user feedback data from three primary sources: interviews with users, Repcoin's database data, and a survey sent out to every user of Repcoin.

25 users filled out the survey. The survey asked 21 questions about various aspects of the site user experience.

The author interviewed 6 Repcoin users about their experience about the site in order to get more detailed feedback about their user experiences. See Supplemental Source for the audio files of the interviews.

Finally, the author gathered data from the Repcoin database itself about user behavior. The code for these scripts can be found on the Repcoin Github page.

3.2 Repcoin as a Content Hub

Repcoin aimed to provide a place for its experts to post their content and increase its popularity. In this capacity, the site struggled. Out of 300 users total and 145 with expert categories, only

36 posted any links to their content on Repcoin. This means that the majority of the users of the site and even expert users posted no content on Repcoin. All 6 users interviewed also stated that they didn't routinely click content links on Repcoin. As displayed in Figure 3.1, of the 23 users who answered this question, only 2 said that they Often clicked other users' content links. To summarize, while half of the users on Repcoin acted as experts in at least one category, only approximately a quarter of those users opted to post actual content, presumably related to the categories in which they were experts. If Repcoin had succeeded in this capacity, more users would have posted content and the content would have played a more active role in investors decisions to invest in experts.

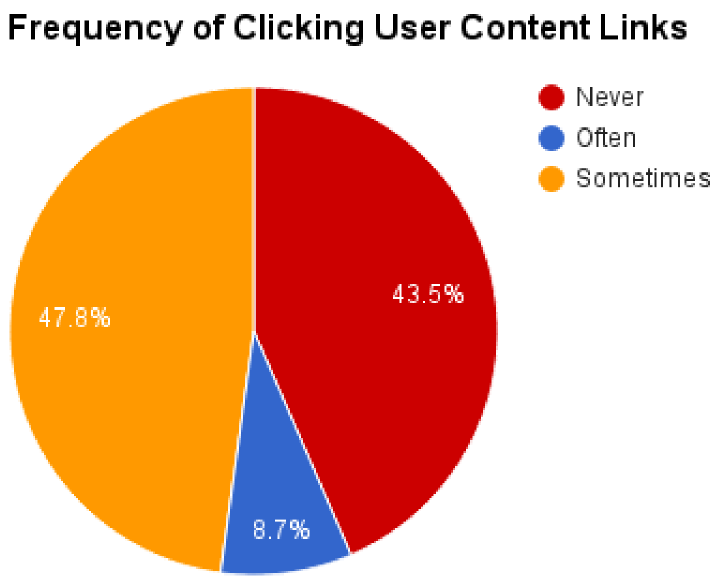

Figure 3.1: How frequently Repcoin users click other users content. Specifically, shows the answer to the question "I click other Repcoin users' content links...". Of the 25 users who responded to this survey, 2 chose not to answer this question, 10 chose "Never", 2 chose "Often", and 10 chose Sometimes.

Repcoin failed to attract its users to other users' content. User interviews indicated that many users feel that they already know where to find content for things they are interested in. Four users explicitly stated that, for the categories they are interested in (music and design for two users respectively), they know how to find content and do not struggle to do so. In other words, many users did not click content links because content discovery was not a problem that needed solving for them.

Although the data shows that users neglected to use Repcoin as a content discovery platform, it does not explain why investors didn't use content links as measures of experts' skills in a categories. While few experts posted content links, this does not account for this phenomenon entirely. also relates to the pages users used most often. Figure 3.2 displays the most popular pages on Repcoin. Only four pages were even listed by respondents as their most used pages: the categories page, individual category pages, the home page, and other users' profile pages. Out of these pages, only other users' profile pages display their content links. Furthermore, of the users who replied to this survey question, none of the users who focused on investing stated that they used other users' profile pages most often. This indicates that active investors preferred to use the home page and categories page as jumping off points for their investment activities, explaining why investors did not use content links to evaluate potential experts to invest in. This could be solved by adding content links to the table displays on these popular pages.

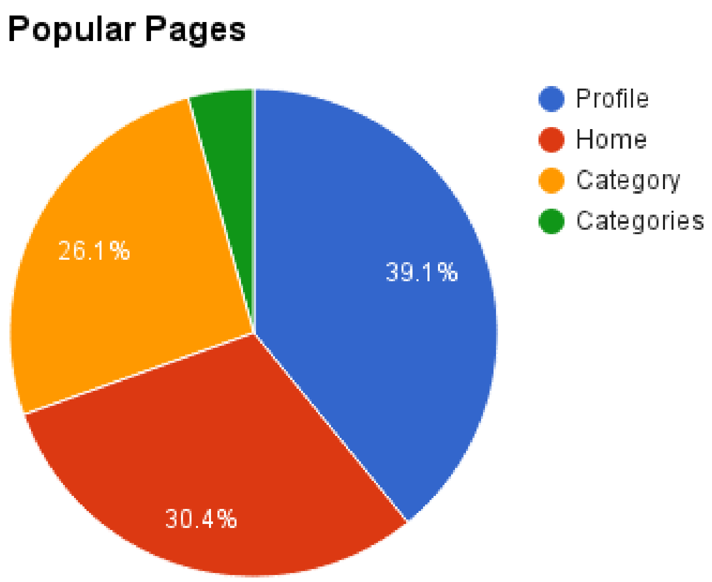

Figure 3.2: How frequently Repcoin users accessed different pages on the site.

The small size of Repcoin's network further contributed to the ignoring of content links. In interviews, users stated that they already knew most of the people they invested in, and, therefore didn't care about their content. Unfortunately, the only solution to this issue is increasing the size of Repcoin's user base, a prospect that will be discussed in the Conclusion section.

3.3 Repcoin as a Reputation Market

In its capacity as a market and store for reputation, Repcoin encountered a few large hurdles. Repcoin's initial dividends system allowed for a simple form of exploitation related to how dividends were calculated. Dividends for an investment originally equalled some constant times the total invested in a user times the initial percentage the investor owned in that user for that category. Thus, users could pump up their dividends by investing in the same user for the same category multiple times, rather than with one big investment. This created a dynamic where certain users on the site possessed so many reps that they effectively controlled entire markets. At one point, one user possessed half of the total reps in the entire market. To solve this problem, we reset the market and modified the dividends system so that investment dividends only factored in other users' investments in that expert.

Even after solving this problem, the Repcoin market displayed a noticeable superstar effect, where 36 experts received all of the transactions on the site, indicating that approximately a 5th of Repcoin's expert user base received all the activity on the site. This indicates one of two things: certain users increased their reputation drastically and all others remained stagnant, or investors piggybacked onto popular users. One interviewee indicated for them the latter was true, stating that the easiest way to earn more reps as an investor was to continuously invest in the same user, with the knowledge that other users would do the same. This dynamic arises due to the lack of an objective metric against which Repcoin's investments can be measured to determine their accuracy. On Repcoin, users can effectively trend upwards ad infinitum, with their investors continuously earning more and more dividends, which they can then reinvest in this same user. In practice, this means that two active users can generate exponentially increasing dividends through collusion. Solving this problem may require Repcoin's expert value in categories to be tied to some real world metric. For example, an expert's value in music could be determined by their future album sales or some similar metric. This idea will be discussed in the Next Steps section.

Repcoin's market did compel users to want to be good investors and continue to participate in the market. Out of 25 users surveyed, 6 said their goal on the site was to be the best investor. Furthermore, as seen in Figure 3.3, transaction creators remained active on the site even as transaction receivers and category creation activity declined.

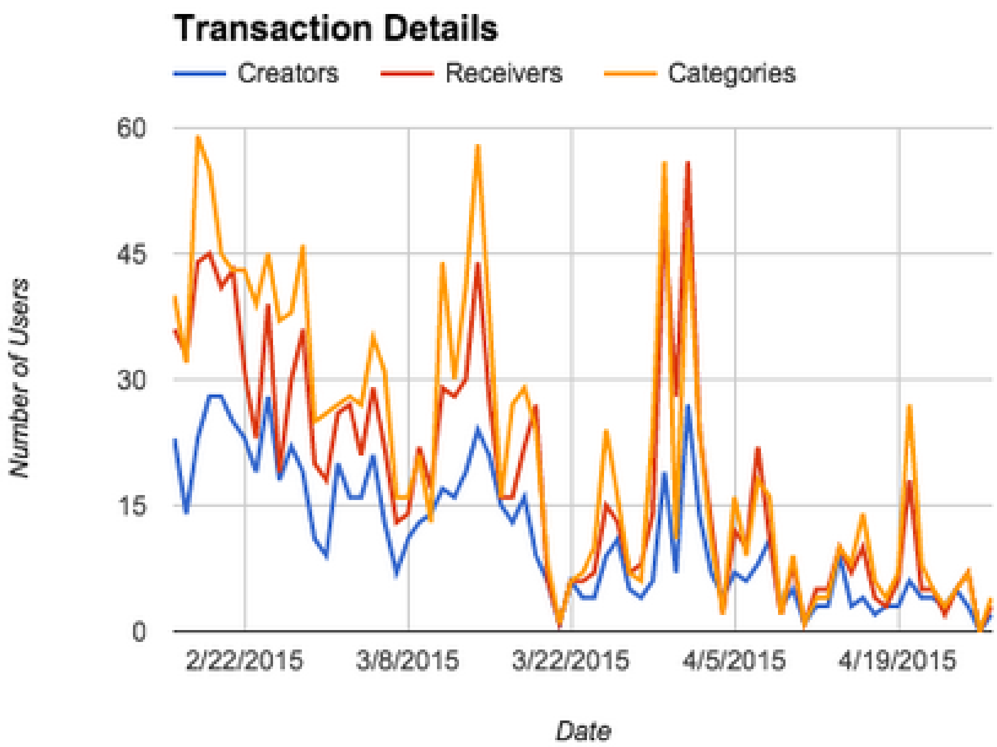

Figure 3.3: The number of transaction creators, receivers, and categories. On average, creators made transactions to more than one receiver in multiple categories.

Chapter 4

Next Steps and Concluding Thoughts

4.1 Next Steps

4.1.1 Stock Market

We initially aimed to mimic a stock market dynamic, but created a bond-like market, with users earning dividends from their investments. As discussed, this system's market dynamics lacked volatility and was easily exploited. To solve this, Repcoin could become a more stock-based system, with each user issuing shares for each category in which they are an expert. In this system, investors would purchase actual shares in users for categories through buy orders and sell them through sell orders. This system reduces exploitation vectors by introducing a more defined form of scarcity into the market. Users have a fixed number of shares issued for each category in which they are an expert. Shares' values will only increase if other users are willing to pay for these shares at a greater price than that for which they were bought. Furthermore, two users cannot exploit the market since selling shares to each other will only result in them slowly losing all of their reps.

The stock market system is complex. Many current users of Repcoin, particularly those who stated that they were interested in Repcoin as a Kudos system would not want to participate in this system. The prospect of placing buy and sell orders rather than making simple transactions might deter users who are not familiar with the real stock market already.

Creating a bot that makes sure that users' stocks will always be bought and sold immediately might alleviate this issue. This also dilutes the purity of the market and could lead to the complexities of the market being exploited or malfunctioning.

In order to become successful investors in this system, investors would have to determine whether experts' stock prices will rise in the future. Due to the scarcity in this market, the rise of an expert's stock price would hopefully signal more investor trust in their bet than it does now.

Updating Repcoin to a stocks-based system would allow for future changes which tie stock value more closely to events in the real world. Similar to the Hollywood Stock Exchange, events in the real world such as a music experts' album sales could affect their stock prices on Repcoin.

Overall, switching to a stock-based system would transform Repcoin from a half predictions, half content discovery platform into a fully-fledged prediction market. This could provide more accurate predictions and reduce exploitation of the market but also narrow the user base.

4.1.2 Kudos

Repcoin could transition towards a system more similar to the Whuffies described in *Down and Out in the Magic Kingdom*, called the Kudos system. In this system, the dividing line between expert and investor would not exist and categories would not play a role. People would receive Kudos for specific events in real life. A single Kudos score would ideally represent a person's general reputation. The Kudos market would be volatile, with users earning massive amounts of Kudos for single popular items of content they produced or acts they performed.

This system might appeal to a larger audience but also could suffer from an even larger network effect. Users would only use the Kudos network if their Kudos score would be seen by enough people. Overcoming this network effect would require Repcoin to attract a very specific market to the site initially and give users from this market incentives to continuously use the site.

Kudos scores could be embedded in profiles and content on other sites, such as YouTube, LinkedIn, Facebook, Svbtle, Medium, Reddit, and many other content hosting sites.

4.1.3 Bookie

Repcoin could focus entirely on predictions and remove the market and content components altogether. In this system, users would post verifiable predictions of future events and other users could wager on these events happening. This system, although it shares very little with Repcoin's original concept, could fill a hole in the market for online betting but would face significant regulatory hurdles. It could start by using play-money, however users would be more interested if the option to use real money was available.

4.2 Concluding Thoughts

Repcoin set out to function as a proof-of-concept for a store and predictor of future reputation. We had 300 users and maintained an active system for giving and revoking reps to experts for different categories. On Repcoin, investors displayed complex betting behavior indicating they hoped to succeed on the site, but this behavior exploited the site's market dynamic. The Repcoin experiment showed the difficulty of measuring reputation without using an outside standard against which reputation can be measured.

Repcoin failed as a content discovery platform. We set out to acquire a user base from a niche market but did not market the site to a niche market well. Thus, Repcoin's users lacked a compelling incentive outside the enjoyability of the site itself to keep returning and participating. From this, we learned the difficulties of maintaining a user base. Repcoin users rated the site well, with over half the userbase rating the site above a 5 out of 10 rating in the survey.

We believe that a central store of reputation on the web will exist. Although Repcoin will not become this store, it has been a valuable experiment and acted as a proof of concept for a system for centralizing reputation through a market for it. Repcoin has shown that users

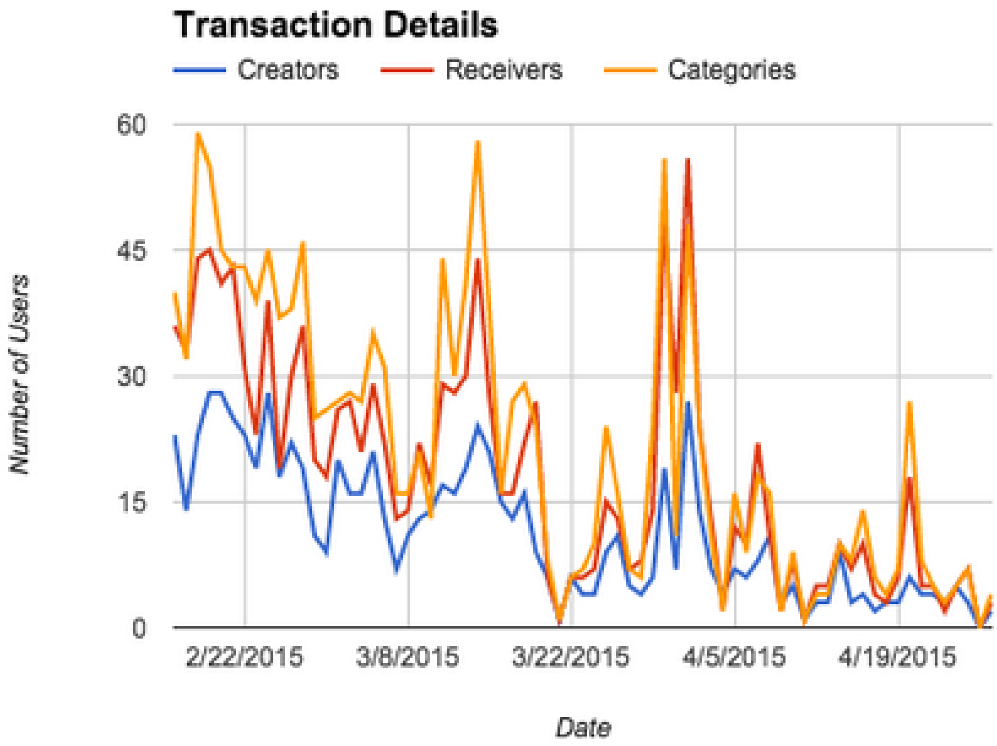

Figure 4.1: How surveyed users rated their overall experience on Repcoin.

have few reservations about betting on reputation and having their own measured. Further, it's shown that even a flawed market dynamic can produce interesting observations about how people value others' reputation.

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