

# **Startup Financing**

CS 171 FINAL PROJECT PROCESS BOOK

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## Project Proposal

### ***Background and Motivation***

With continuous evolution in the mobile and web technology marketplace, the prevalence (and rise and fall) of startup businesses in the United States is undeniable and inescapable. Yet with so many companies raising money to fund their new ventures and with so few of these businesses actually succeeding, we are curious to better understand 1) whether or not investor capital is being allocated wisely, and 2) the financial trajectories of successful startup businesses, sectors within the tech industries, and investment firms. As three people who are interested in pursuing careers in startups and venture capital, it seems prudent to better understand trends in the market.

### ***Project Objectives***

Our series of visualizations will answer the following questions for the n largest tech firms:

- How much funding have they received and in how many rounds? From whom? When?
- How active has a particular venture capital firm been?
- What sectors within the tech industry receive the most attention?
- How large are different rounds of funding (both in absolute and relative terms)?

With our visualization, we hope to learn significantly more about funding patterns and trends in the industry.

### ***Data and Data Processing***

We will collect data on all venture deals completed by 20 top firms in the last 5 years from [CrunchBase's API](#). The data includes the company invested in, the firms involved in the deal, the size of the round raised, the company category, the company's founding year, and more. For the data collection and processing, we'll use Python. We

don't anticipate to have to clean the data substantially (since the API is made for easy data access), though some will certainly be required (converting strings like '\$50M' into 50000000, for example).

### ***Visualization and Features***

The basic visualization will be a large rectangle, broken (and colored) into sections to represent each company. The size of the section will correspond to the total amount of money raised by that company to date. Each company subsection will be further broken down into sections that represent the different rounds (series A, B, C, etc.) that the company has raised, again, size indicating the dollar amount of the round. Though the underlying data is different, the general design of the visualization will be similar to a [treemap](#). Below the large rectangle view will be a graph showing all 20 firms and some data on them (how much money they've invested over the last 5 years, how many companies they've invested in, etc.). Hovering over the bar of a firm in the bar graph will highlight all of the rounds they've participated in in the rectangle visualization. We may also include a feature allowing users to search for company, which, if found, would be highlighted in the rectangle visualization. Our must-have feature will be the rectangle chart; implementing that will be our top priority, though we also hope to show macro-level data represented in bar or pie charts below. The company search is also an "optional" feature.

### ***Project Schedule***

- Monday, March 24th
  - Data collected and cleaned
- Monday, March 31st
  - Prototype of the rectangle visualization done
- Friday, April 4th
  - Full prototype complete

# Overview and Motivation

The process of starting and financing a startup can be very difficult as it lacks much guidelines and structures. It is the duty of the founder to use their knowledge and ability to use their resources efficiently. In order to stay afloat, they must only explore routes that will accelerate their businesses and avoid wasting time and money pursuing those without sufficient outcomes.

One of the most important routes that a startup founder must consider is financing. This is a critical decision as the quality of investor and quantity of capital given by them can make or break a startup. But finding the right fit of investor is a very complex process. Some things that need to be considered are the industries that the venture capital fund invests in, the typical check size that they invest, typical rounds they participate in, and whether or not they have conflicts of interests. While some firms might be interested in the field your startup is investing in, they might not invest at as early stage as your company or have a conflict interest.

Most of the information about fit of venture capital to company can be obtained and inferred by previous companies that the firm has invested in. This data exists on crunchbase, but its user interface is designed for the user to look up venture capital funds and companies individually. Instead, we aim to use this information to create a visualization that aggregates and filters this information by user input, so that a user can compare venture capital funds side by side when making this decision.

As students who are passionate about the tech industry, and are interested in or have already pursued funding for their ventures, we thought this project was very pertinent. We believe we can make a visualization that would help any entrepreneur at any stage of development find out which venture capital firms they should pursue for funding based on which firms are a match.

## Related Work

Our approach is similar to the visualization made by the <http://newsmap.jp> visualization that was presented to us in class. We really enjoyed the idea of having a dynamic treemap where you can apply filters to get different make-ups of the “picture.” In this visualization, you can filter the most read articles by newspaper sections (World, National, Business, Entertainment, Sports etc) and also by country. This visualization is also naturally color coded by the sections.

We believed that this would be a good visualization to model after because our individual nodes in our dataset represent a part of the picture, or the pie. In our case, for example, the objective size of Dropbox’s Series A round is important, but more importantly is the relative size of it's Series A round to the rest of its funding and the rest of the industry. As we are trying to help the audience understand which venture capital fund is a fit based on their investments, relative area makes more sense for us to visualize significant investments of the fund than absolute area. Thus, we can know the relative size of the investments the venture capital funds give compared to other similar financing rounds and compared to the entire industry.

A treemap visualization by Mike Bostock was also very helpful in understanding how to build treemaps (<http://bl.ocks.org/mbostock/4063582>).

# Research Questions

The intended audience of this visualization is an entrepreneur or startup founder who is looking to find venture capital firms that fit their current funding needs based on the funding round and industry.

*Thus, the main question we are trying to answer is: Which venture capital firms would be good fit a company in a certain industry entering a certain round of funding?*

This question evolved since our project proposal as there were many interesting applications of the Crunchbase data. For example, the Crunchbase data can also give you an idea of the most wide-reaching companies in terms of funding. Through internal meetings, meetings with our TF, and our design studio, we decided to position the visualization so that included information mentioned above but included this information as to give context of the main question.

As a result our visualization answers other questions of the end user, some intentionally and others happenstance. They include but are not limited to the following:

- Which companies have raised the most amount of capital? Which companies have raised the most amount of capital in their industries?
- What is the breakdown of investments within each venture capital fund in each major industry (social, cloud storage, education, etc)?
- What is the breakdown of investments within each venture capital fund in each round (seed, series a, series b, series c, etc)?
- What is the timeline between funding rounds for major tech startups that have secured venture funding?
- What are the relative sizes of rounds of financing for startups?
- What are the relative sizes of rounds of financing for startups by industry?

# Data Specification

## Financial Orgs

- Array of financial org objects, each in the following form:

Key	Description	Sample Value
name	Short name of the financial organization.	Accel
full_name	Proper name of the financial organization.	Accel Partners
total_invested	Total capital invested. Note: this is just a sum of the amounts of <i>all</i> rounds the firm was involved in. So, this is a <b>very</b> inflated estimate (particularly for firms involved in later-stage investing).	9428541785
num_companies	Integer value, total number of companies invested in.	301
industries	Object with industries as keys and the number of companies of that industry in the financial org's portfolio as values	
round_codes	Object with round codes as keys and the number of rounds of that type the financial org's has invested in as values	

## Example JSON

```
{
  "name": "Accel",
  "full_name": "Accel Partners",
  "total_invested": 9428541785,
  "num_companies": 301
  "industries": {...},
  "round_codes": {...},
}
```

## Industries



- Array of industry objects, which hold arrays of company objects, which hold arrays of round objects each in the following form:

## Industries, industry objects

### Industries, industry objects

Key	Description	Sample Value
name	Industry name	network_hosting
children	Array of company objects (see below)	(see below)

### Industries, company objects

Key	Description	Sample Value
name	Company proper name	Dropbox
permalink	Company permalink, for lookup in other data, or from the Crunchbase API (sometimes this is different altogether from the plaintext name)	dropbox
founded	Integer value, year founded, may be null.	2007
industry	Industry category	network_hosting
tags	Comma-delimited list of tags describing the	techcrunch50, tc50, file-storage

	company. May be null .	
overview	Description of the company. May be null .	Dropbox was founded in 2007 by Drew Houston and Arash Ferdowsi. Frustrated by working from multiple computers, Drew was inspired to create a service [...]
city	City the company is located in. May be null .	San Francisco
state	State the company is located in (US postal code). May be null .	CA
country	Country the company is located in (abbreviation). May be null .	USA
twitter_handle	Company's Twitter handle. May be null .	Dropbox
crunchbase_url	URL to the company's Crunchbase profile.	<a href="http://www.crunchbase.com/company/dropbox">http://www.crunchbase.com/company/dropbox</a>
url	URL to the company's website. May be null .	<a href="http://www.dropbox.com/">http://www.dropbox.com/</a>
image_url	URL to the company's logo. May be null .	<a href="http://img.talkandroid.com/uploads/2012/12/Dropbox-Logo.png">http://img.talkandroid.com/uploads/2012/12/Dropbox-Logo.png</a>
	List of founders, co-founders, CEOs, etc.	

people	Array of <b>person</b> objects, which have two attributes, name and title. May be <b>null</b> .	
employees	Integer value, number of employees. May be <b>null</b> .	<b>642</b>
total_raised	Integer value, total amount raised (sum of all rounds)	<b>607200000</b>
children	Array of round objects, ordered by date (see below)	(see below)

## Industries, round objects

Key	Description	Sample Value
date	Date of the round as a string in form MM/DD/YY	02/05/13
amount	Integer value, total raised in the round (by all investors). May be <code>null</code> .	2500000
currency	Currency used in the <code>amount</code> value. Almost always USD.	USD
round_code	Type of round as a string.	seed
investors	Array of investor names (strings) that were involved in the round. These are their proper names, not permalinks.	['Acce1 Partners',]
source_url	URL to a news article about the round. May be <code>null</code>	http://techcrunch.com/2011/10/18/dropbox-raises-250m-in-funding-boasts-45-million-users/
source_title	Headline for the source article. May be <code>null</code>	Dropbox Raises \$250M In Funding, Boasts 45 Million Users

## Example JSON

```
{
  "name": "network_hosting",
  "children": [
    {
      "children": [
        {
          "amount": 1200000,
          "currency": "USD",
          "date": "09/04/08",
          "investors": [
            "Sequoia Capital"
          ],
          "name": "seed",
          "source_url":
            "http://www.techcrunch.com/2008/09/04/secretive-storage-company-dropbox-took-sequoia-funding-in-2007/",
          "source_title": null,

```

```

    },
  ],
  "city": "San Francisco",
  "company_permalink": "dropbox",
  "country": "USA",
  "crunchbase_url": "http://www.crunchbase.com/company/dropbox",
  "employees": 642,
  "image_url": "http://img.talkandroid.com/uploads/2012/12/Dropbox-
Logo.png",
  "industry": "network_hosting",
  "investors": [
    "T. Rowe Price",
    "Greylock Partners",
    "Institutional Venture Partners",
    "Goldman Sachs",
    "Sequoia Capital",
    "Valiant Capital Partners",
    "Glynn Capital Management",
    "Index Ventures",
    "Accel Partners",
    "RIT Capital Partners",
    "BlackRock",
    "SV Angel",
    "Benchmark"
  ],
  "name": "Dropbox",
  "overview": "Dropbox was founded in 2007 by Drew Houston and Arash
Ferdowsi. Frustrated by working from multiple computers, Drew was inspired to
create a service that would let people bring all their files anywhere, with no
need to email around attachments. Drew created a demo of Dropbox and showed it
to fellow MIT student Arash Ferdowsi, who dropped out with only one semester
left to help make Dropbox a reality. Guiding their decisions was a relentless
focus on crafting a simple and reliable experience across every computer and
phone. Drew and Arash moved to San Francisco in fall 2007, secured seed funding
from Y Combinator, and set about building a world-class engineering team. In
fall 2008, Sequoia Capital led a $7.2M Series A with Accel Partners to help
bring Dropbox to people everywhere.",
  "people": [
    {
      "name": "Drew Houston",
      "title": "Founder & CEO"
    },
    {
      "name": "Arash Ferdowsi",
      "title": "Founder & CTO"
    }
  ],
],

```

```
    "state": "CA",
    "tags": "techcrunch50, tc50, file-storage",
    "total_raised": 607200000,
    "twitter_handle": "Dropbox",
    "url": "http://www.dropbox.com",
  }
]
```

# Design Evolution and Implementation

Meeting Notes, Thursday, April 3<sup>rd</sup>, 2014

The three of us discussed the feedback we received on our project proposal and how we could effectively focus our implementation to answer these questions.

## ***Project Objectives***

We narrowed our project objective to better define terms. For example, our project looks at how “active” venture capital firms are in certain industries. We define this to be how much they have invested (in millions of dollars) in the last 5 years. We are interested in the percentage of the venture capital total investment expenditure in each market sector.

In terms of measuring performance, our visualization will not attempt to judge the value of a venture capital portfolio. This is because many startups do not have clear metrics on evaluations and these evaluations are often based on future value (instead of actual ROI). There is also much gray area in how to evaluate poor performance in venture capital as public evaluations are often only revealed in financing rounds. As a result, companies that are not performing might be evaluated at the last round of financing, but truly may be on their way to bankruptcy (and just not have public data to support). Instead our visualization, will look at performance as whether or not a venture capital firm chose to participate in future rounds of a company’s financing. This is a good indication if a firm believes the investment’s performance has met or exceeded expectations.

The intended audience of the data visualization would be someone who is looking to finance their startup or someone interested in the field. For the founder, the visualization should provide information on whether or not certain venture capital firms seem to be a fit as an investor. They can judge whether the firm’s preferred sectors/industries match theirs, whether their average investment size is comparable to

the amount of money they are raising, and whether the firm is a long term fit based on whether the firm has historically reinvested in many of their early round investments.

### ***Data***

At this point, we have successfully scraped the data from the Crunchbase API and parsed it into an actionable format for our visualization. As the data is quite expansive, we decided to download it locally and break it down into separate files to store and match information.

We parsed the API with python and converted the data into three JSON files. These JSON files focus the information around company (startup), financial organization (venture capital firm), and rounds (e.g. seed, series A, etc).

### ***Visualizations***

We continued to flesh out the structure of our visualization and talked about how to increase our scope through the interaction with our visualization and supporting graphs. We include the first visualization (Visualization 1) created, below:





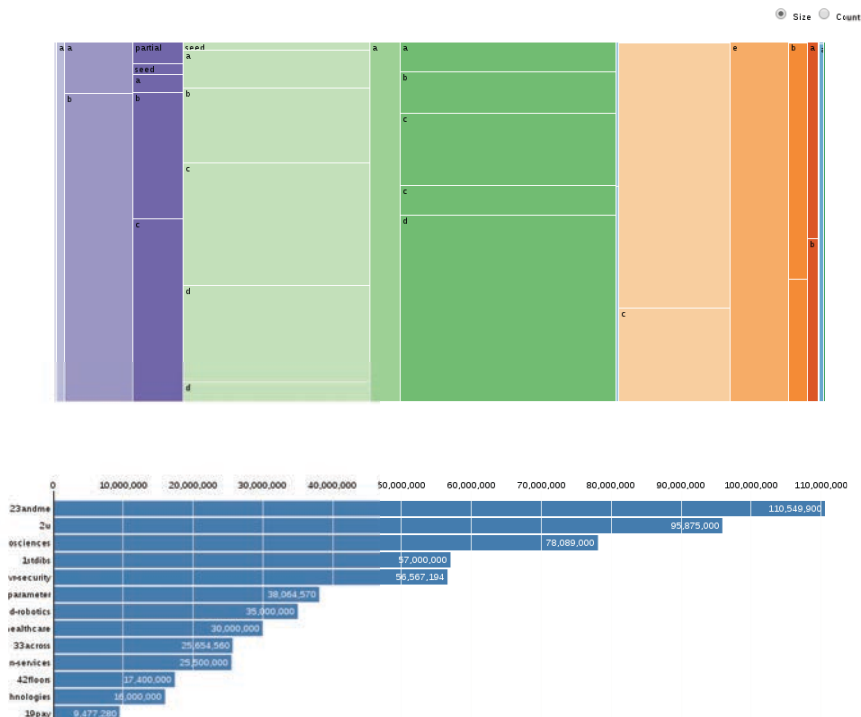
## Meeting Notes, Sunday, April 6<sup>th</sup>, 2014

At this meeting, we met as a group discuss the progress of the data scraping, process book, and visualization as a whole. We also had a skype call with Alain Ibrahim.

### Visualization

We had implemented our visualization based on the data structures described above, but the format was not exactly as we expected. Based on the way we obtained our data, a company in our visualization was represented by a column rectangle, instead of just a box. This is because we formatted our funding data in such a way that it only had one parent: the company. We realized that this visualization needed to be improved as the large lengths of the visualization often hid important information or made that information unreadable. This also obfuscated the relative size of rounds, as a company with only one or two rounds of funding filled an entire column

The visualization looked as followed:



We decided to restructure the data, so that it had two parents, industry, and company, and thus be 2-dimensional boxes, instead of columns. The new data structures are included in a separate document.

### ***User Interaction***

One of the major discussions of this meeting was how to handle user interaction with the visualization. At this point, we had scraped the data, and created a basic treemap, but we still need to interact with the data in such a way that it meets our end goal of helping the user decipher information about whether a certain venture capital fund is a fit.

While the sub-detail visualization above is informative, it made our visualization look like it is oriented such that we are trying to tell our audience about companies and not about venture capital firms.

As a result, we came up with a few detail graphs and interactions to help user flow and provide more detail to our user:

1. When you hover over a venture firm in the subdetail graphs in Visualization 1, it will highlight the specific rounds within the companies that this venture firm has participated in on the treemap
2. When you hover over a round on the treemap, a tooltip will appear that will display the size of each round and possibly the participants
3. A user has the ability to choose the industry to explore in a drop down menu
4. A user has the ability to choose multiple rounds to explore by checking them off. Thus giving the user the ability to see standalone round comparisons, or round comparisons relatives to other rounds

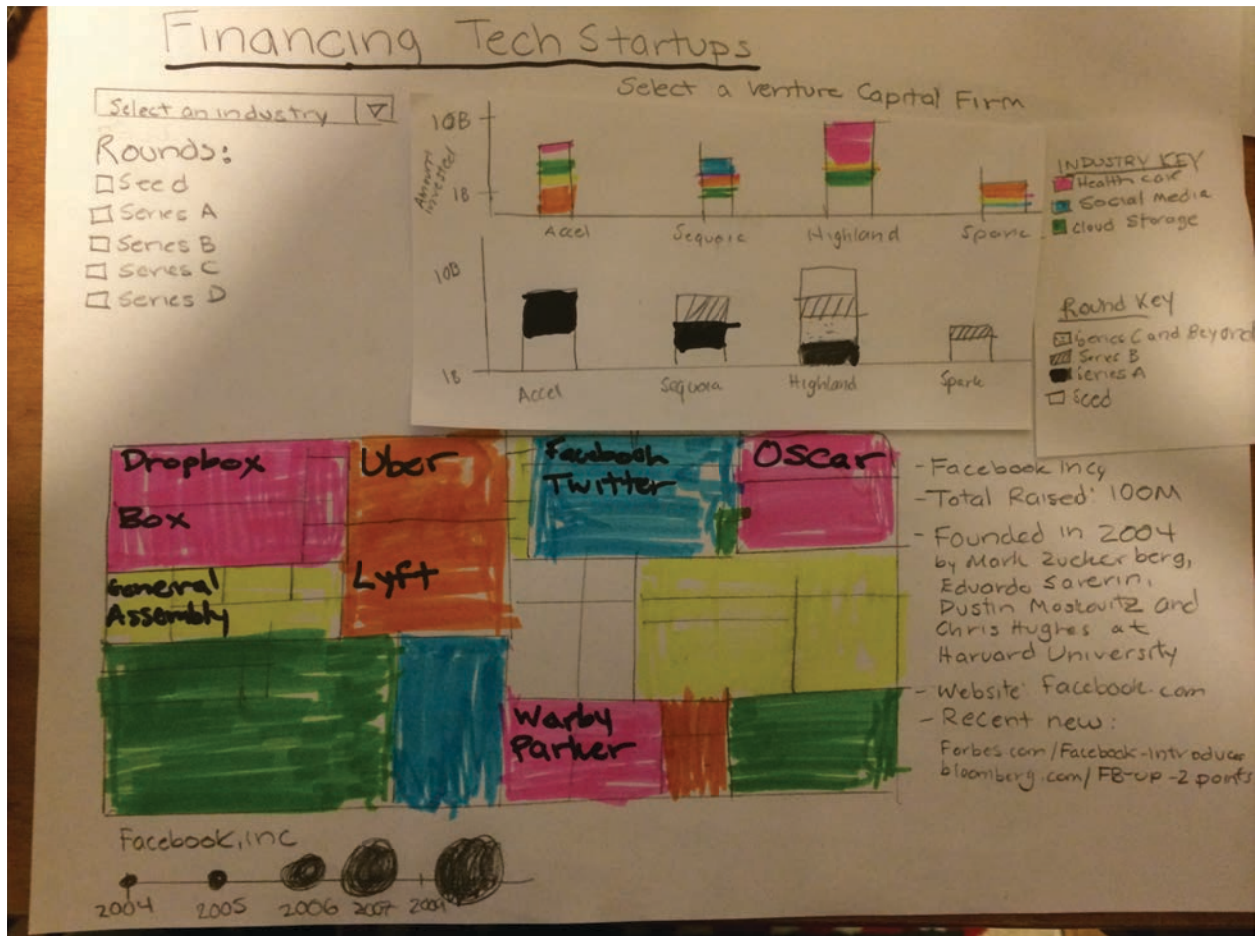
Design Studio, Tuesday, April 8<sup>th</sup>, 2014

See the design studio document to understand the reasoning behind the changes we decided to implement based on the feedback from our classmates.

As discussed, the most important visualization changes we have chose to make based on the feedback are as follows:

- Add Titles to Guide the User to Choose A Venture Capital Firm
- Include Venture Capital stacked bar charts before the treemap so that the user clicks on a venture capital firm and isolate portfolio companies on the tree map
- Include a timeline graph where size of the round (in millions of \$) is displayed in the radius of the circle.
- Include tooltips with additional details about the companies, such as recent financing events, founders, websites, founding date, other recent news, etc.

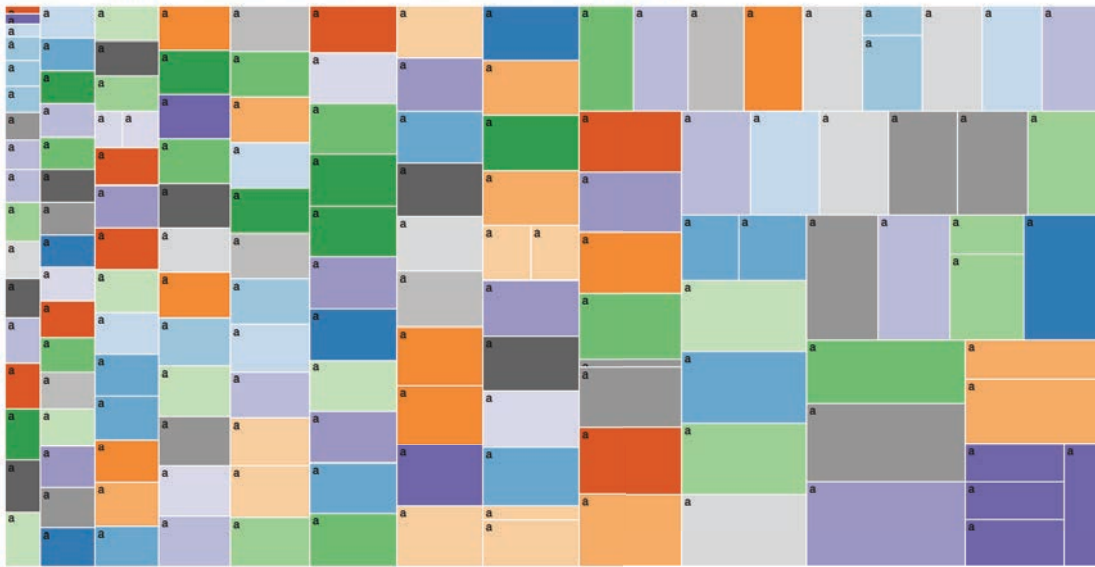
We sketched our new vision of our visualization based on these actionable items and have included it below:





Startup Financing, a CS171 Final Project

industries:  seed:  a:  b:  c:  debt\_round:  d:  [clear filters](#)



Then, you can get finer details on specific companies by hovering over those companies. When you hover over a company, a tooltip with the company name appears, the timeline of the rounds appear, along with founding date, city, and total capital raised to date.

Startup Financing, a CS171 Final Project

industries:  seed:  a:  b:  c:  debt\_round:  d:  [clear filters](#)



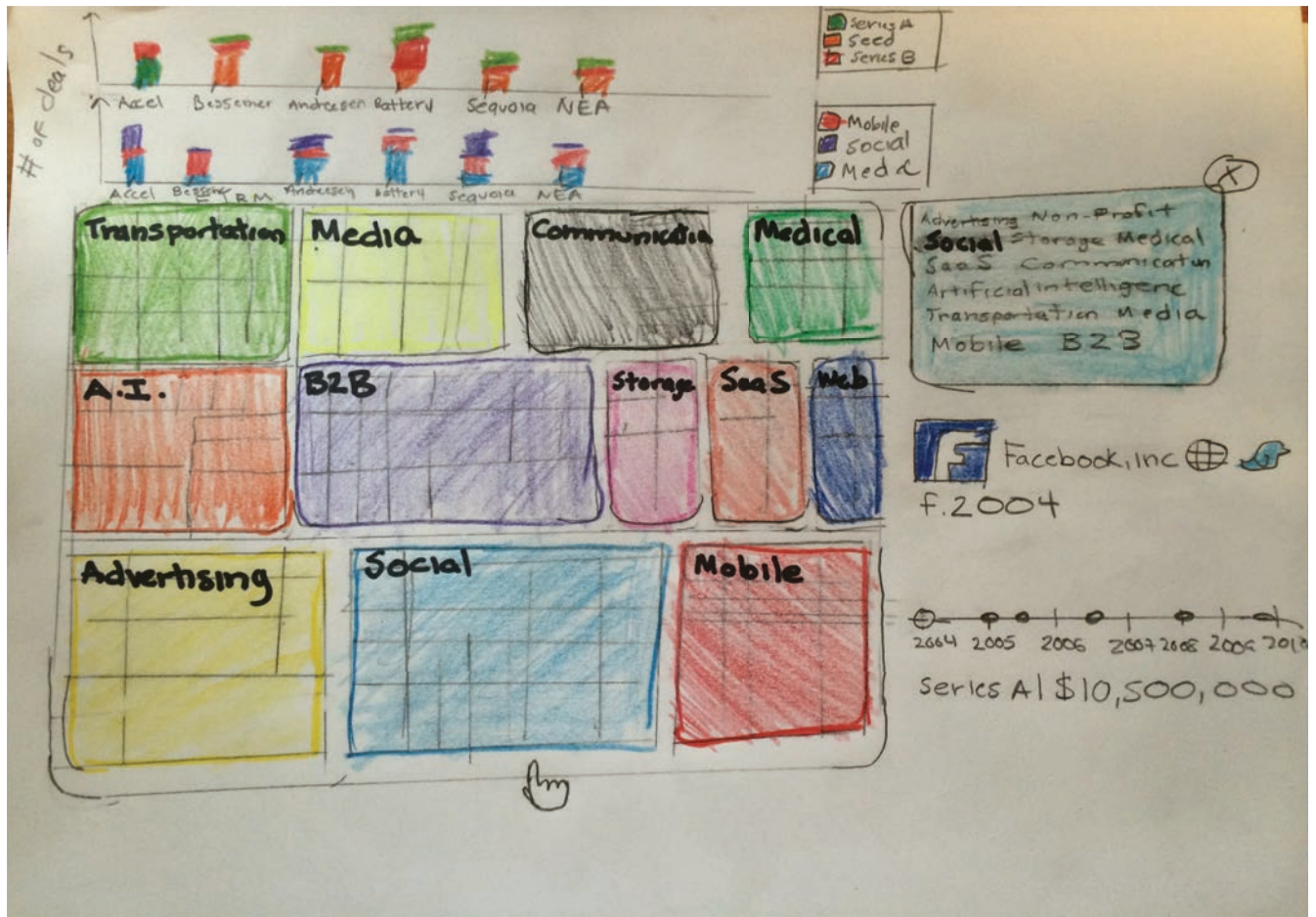
Millennial Media  
MD, USA  
\$240,245,382 raised in total



Meeting Notes, Thursday, April 17<sup>th</sup>, 2014

After the submission of our first milestone, we skyped again with Alain to discuss his feedback and determine which implementation features should be prioritized. Of the items that we discussed, we have highlighted a few that greatly altered the user interface and experience of our visualization.

We continued to draw a sketch of our new vision of the visualization and have chose to share this below:

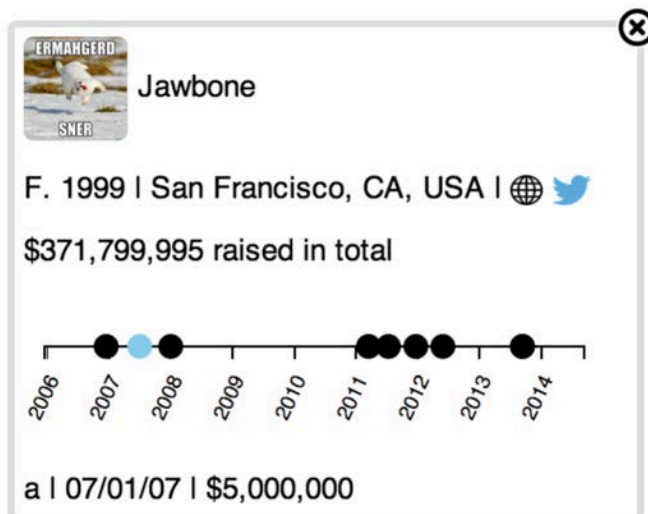


To give a better explanation of some of the visual decisions we made in this sketch, we have included our rationale behind adding/removing certain features in this design.

## Storytelling

We realized that our end audience is likely someone who is using the visualization to approach venture funding and startups in analytical fashion. While the visualization provides a great aggregation of the rounds and companies that have been venture-backed, our end user likely wants to dig a little deeper and find out if any specific deals mirror the back-story behind their company. Likewise, another end question is how much money a company should raise for their current round. While eyeballing the size of the series A round of a certain company might give the user a sense of how much a round raised, it does not provide any rationale behind why the round was that amount. Thus, we thought it was pertinent to add elements of story telling behind each company and deal so that the user can compare funding rounds on a more granular level.

We implemented this by first providing background details when you click on a certain company. For example, if you click on Facebook, you would see a logo of the company, the year it was founded (e.g. 2004), the timeline of its founding dates, a link to the company website, a link to the company twitter account, as well as the total amount of money raised to date. We believed that the providing an image like the company logo would make the visualization more palpable. This is all part of an effort to let the user be able to easily transition between aggregate data and granular details.





### ***Transitions/Animation***

Another drawback of the visualization was how static it was. The information came off as cut and dry because how stagnant and square it was. We decided to change this primarily by adding animation to the transition. Thus, when you select an industry or a company on the visualization, it appears as though the visualization is zooming into greater detail instead of loading another of visualization. We believed that this was particularly important because the user should not feel as if the details of the company or the industry is not related to entire venture-funded ecosystem. This situation was fairly precarious because the dimensions of the svg are constant, but the contents are changing. Thus, by adding the animation we have helped the user understand the scale of the rounds compared to the entire ecosystem.

### ***Timeline***

We received positive feedback of adding the timeline to our visualization, but wanted to further increase its interactivity so that it could portray details in ways that the visualization fails to do so. One major way we realized the timeline could do this was to provide textual counterparts to visual data. Most importantly, the relative size of a round can be seen for a company when you zoom into that company, but we lose perspective when the entire svg is of one company. To improve this, we allowed the user, to click on an event on the timeline, which highlights, the box of that round on the visualization and also provides text of how large the round was. By giving an actual number, we believe our end user regains its sense of perspective as most people can understand what it is a lot or a little money from a simple dollar value.

Another change we implemented was making the area of all the events on the circle the same size. We did this because we believe the visualization gave a better representation of the relative sizing of the rounds, and did not want to confuse the viewer with two different scales for the relative size of the funding rounds. This isolates scaling and a companies relationship to the entire ecosystem to the visualization and

keeps company specific details to the svg that appears when you click on a particular company.

### ***Selectors and Deselecting***

In trying to keep our transitions more seamless, we also got rid of the dropdown menu of industry and round selectors. The process of finding the right selector took many clicks and steps. Instead, we created a svg on the right of the image that allows the user to click on an industry, without having to first going to a drop down menu. This allows the user to quickly switch industries.



Another reason we made this change is because the amount of steps it took to change industries in the dropdown menu was far more than just selecting it in the visualization. But if we let the users act in this fashion, it would prioritize industries by size instead of weighing them equally, which would be a design flaw. Thus a user is not discouraged to click industries such as “non-profits”, or “sports” because they represent a smaller portion of the ecosystem.

The svg also gave an opportunity for the user to transition out of a zoomed-in state. When an industry is chosen, whether through the treemap or the svg text options, a circular X button appears on the svg with the industry options. When this occurs, the

other text options for industries in the svg are turned gray to emphasize the selection of that particular industry. We believed that having an exit option outside of the treemap was crucial because it is unclear how to zoom-out of a treemap. In the previous versions, we considered allowing the user to zoom out by clicking outside of the treemap, but this led to confusion when there are multiple levels of granularity. For example, when you are zoomed into a company after first zooming into an industry, does clicking outside of the treemap, lead to the industry ecosystem, or the entire ecosystem. There was also no way to do this inside of the ecosystem, because zooming in to more granular detail means completely occupying the treemap. The x'ing out buttons gave more intuition behind zooming out.

### ***Round Selector***

We also removed the option of choosing to isolate by round. This was a difficult decision to make because we care deeply about helping the user understand which firms participate in each type of round as well as understand the relative frequency of each type of round. In the end, there were many reasons why we did not include these but the main were practicality of the actual data, and user flow.

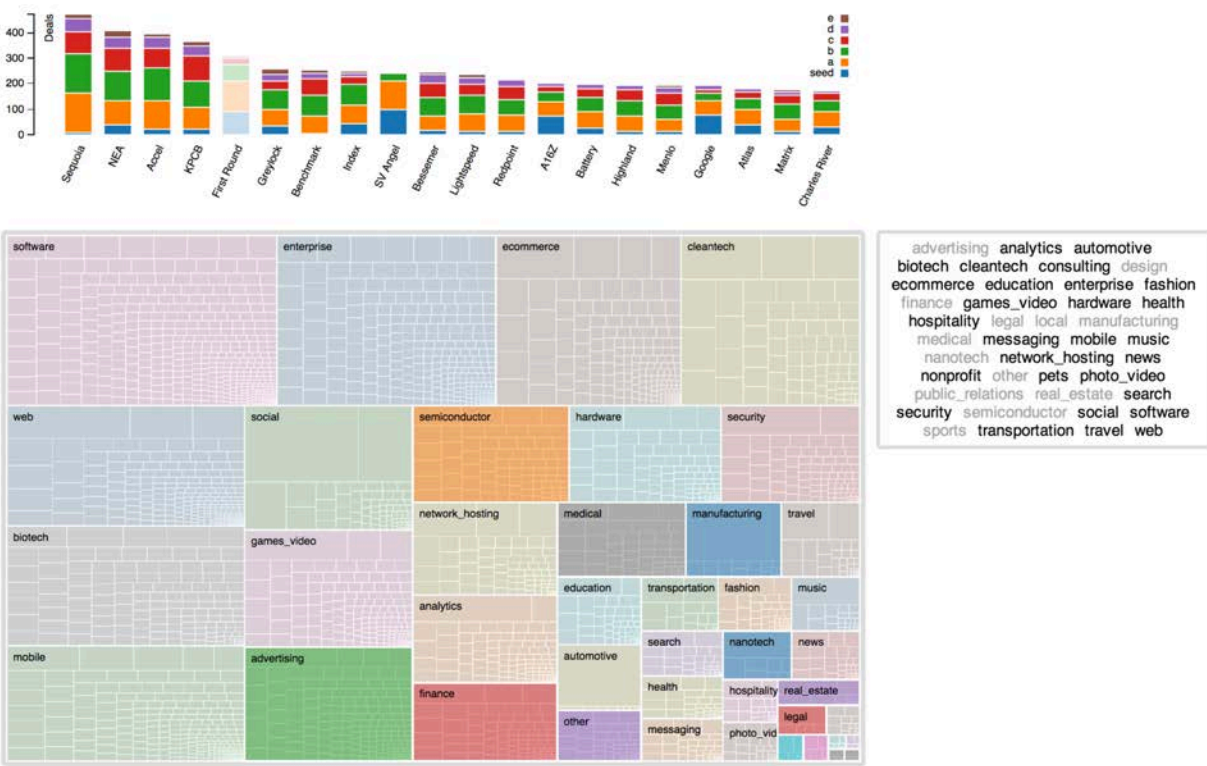
In terms of the data, we realized that it was very common for a venture capital fund to reinvest in a company if they had participated in an earlier round. Thus, almost all of the top firms participate in all types of rounds of financing. Highlighting particular rounds would likely not be much different than highlighting the entire box for a company because the firm had a high probability in participating in many of the rounds.

Additionally, creating a treemap that only showed a particular round confused the user flow. If you isolated all of the series A rounds within a company, clicking on that company would result in an svg that was not a logical zoom-in as it would then show details of all the rounds of funding (thus eliminating the logic of the treemap).

Alternatively, we could have not included those additional rounds upon zooming in, but

then this would have eliminated the functionality of the timeline of all of the rounds or led the user to believe that only one round had occurred for that company.

Instead, we made the bar chart with the percentage of deals in each round that each of top firms participate in be based on the number of deals in each round, not the dollar amount invested in each round. This in turn could isolate for the end user whether or not the firm could potentially participate in a certain type of round, without ruining the user flow of the rest of the treemap.



### Card outline

We wanted to also look beyond functionality, and start investigating whatever aesthetic details we could change to make the visualization more compelling. One thing we came up with was to make the boxes more rounded. Using card formatting, we decided to round the edges of the svgs. We believe that by removing the defined

edges, and instead outlining the svgs, we might make the images less obtuse and more visually appealing.

### ***Pointers***

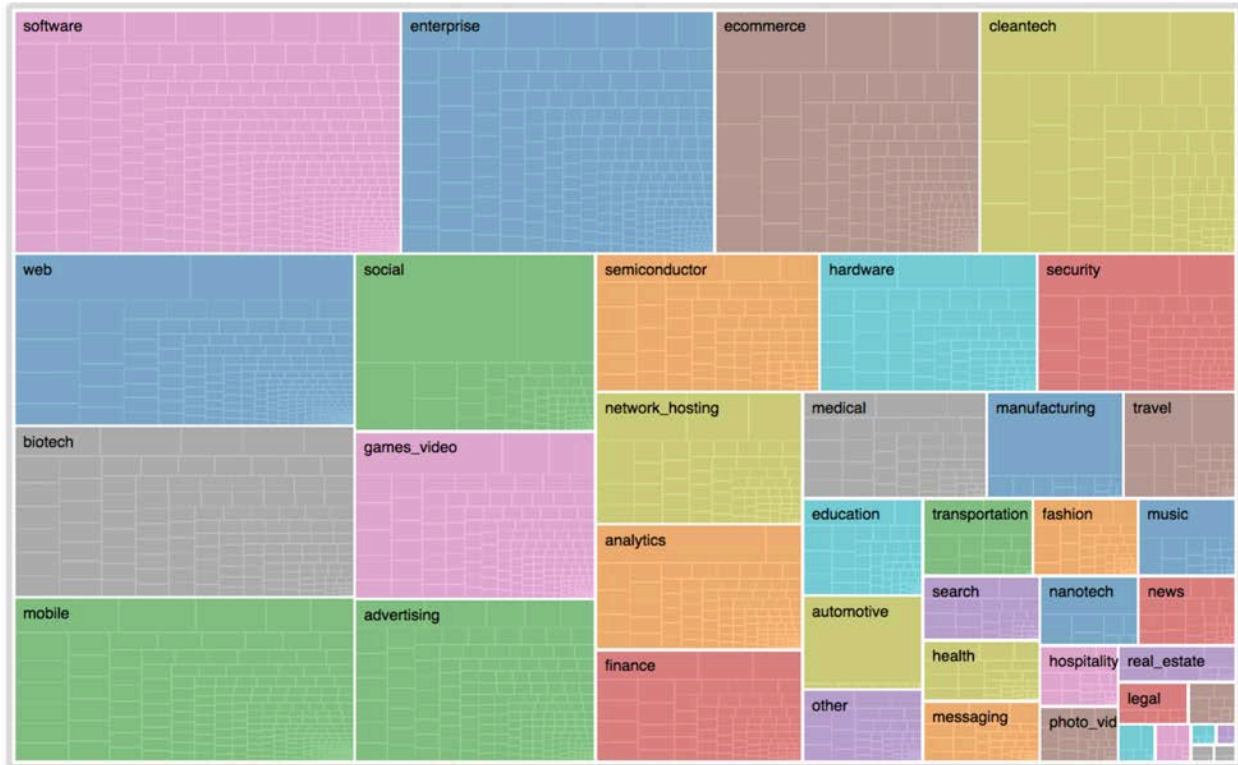
Another small but not unimportant change, was changing the image for the pointer on clickable images versus not. This is a design principle that is fairly standard across well designed consumer web products but also essential. There is quite a bit of color and information present in this visualization, thus guiding the user through the user flow is not a small task. By making it apparent what is clickable, we can guide the user to the next intended step or behavior, even when they are distracted by bright colors that serve for other purposes in displaying information.

### ***Visible Grouping***

Another problem we ran into in the previous design was providing an explanation for the meaning behind the coloration of the initial load of the treemap. Spacially, boxes/companies were organized by industry but visually they were not. This is because at the entire ecosystem level, each company was represented by a different color.

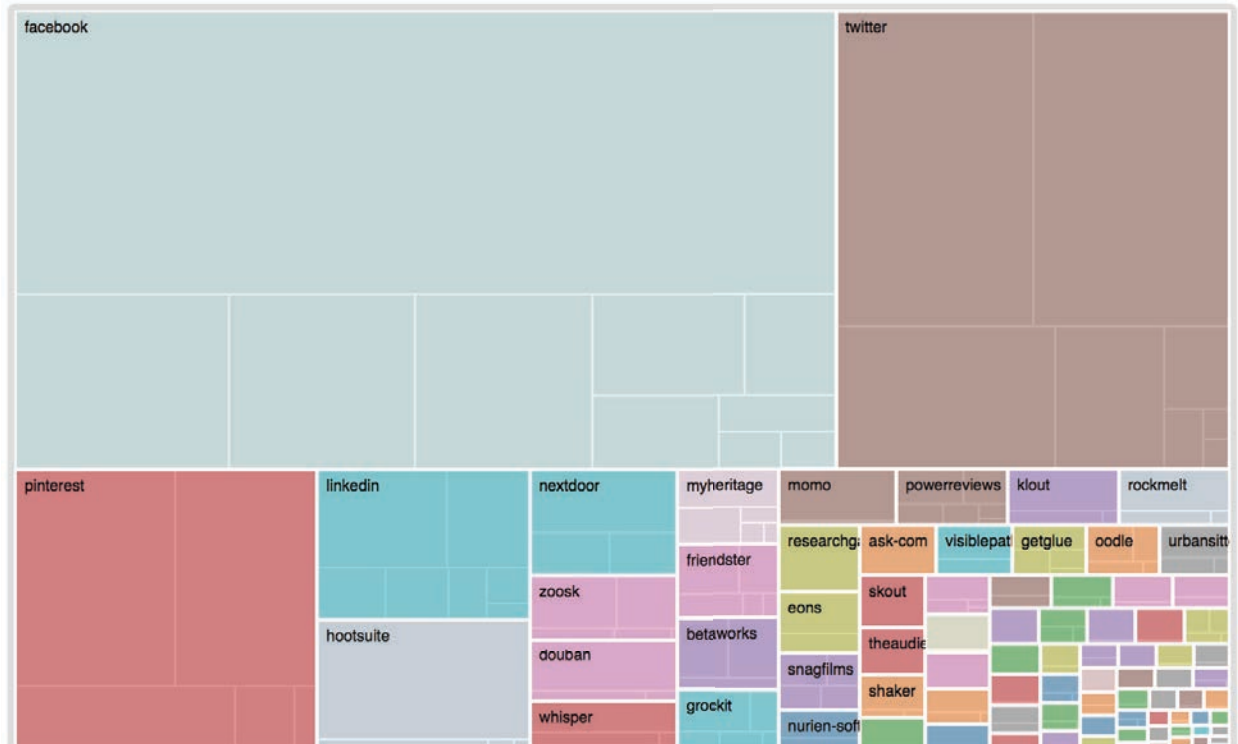
To make grouping more visual, we made all companies of a certain industry a certain color and separated conglomerate industry box of companies with a white outline. This made the grouping far more apparent because the companies are only separated by this white outline at a more granular level.

While the assignment of color is still random, the grouping allows the user to understand what this level of granularity is separating. At the initial level, it is separating by industry, the second level it is separating by company, and the final level is separating by type of round.



### ***Labels***

Closely related to the grouping was the labels that accompanied them. In our previous design, the box labels were consistently the type of round throughout each level of depth. When at the scope of the entire ecosystem, it was confusing to make sense of all the a's and c's and other rounds. Instead, we redesigned the labels so that they represented the greatest common factor among all of the boxes in the treemap. At the highest level, this was industry. One below, this was name of the company. And at the company level, this was round. Thus, unlike before, the labels changed at each level of scope.



Additionally, we had trouble with our tooltip labels when a user was hovering over companies in the last design. This is because it was unclear where the tooltip would appear and whether or not the tooltip would cover other important information. Instead, in this design, we included an svg with the same card formatting that appeared with the title of the company when one hovers over that company. This way the name of the company always appears in the same spot, for visual consistency.

✕

advertising analytics automotive  
 biotech cleantech consulting design  
 ecommerce **education** enterprise fashion  
 finance games\_video hardware health  
 hospitality legal local manufacturing  
 medical messaging mobile music  
 nanotech network\_hosting news nonprofit  
 other pets photo\_video public\_relations  
 real\_estate search security  
 semiconductor social software sports  
 transportation travel web

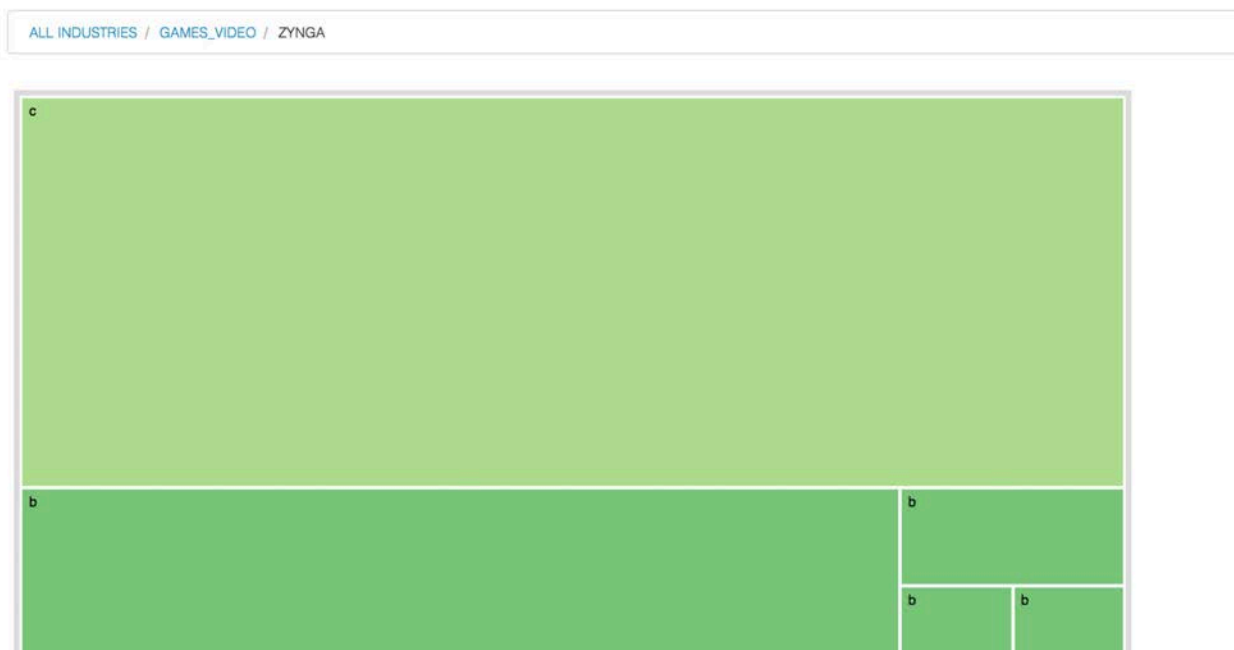
Chegg

## Meeting Notes, Sunday, April 27<sup>th</sup>, 2014

In this final implementation meeting, our team discussed the last steps needed to make our visualization as intuitive as possible for our end user. This required us to not just think of the steps needed to go through the visualization, but the steps needed to go through it many times.

### ***Cookie Crumbs/Path***

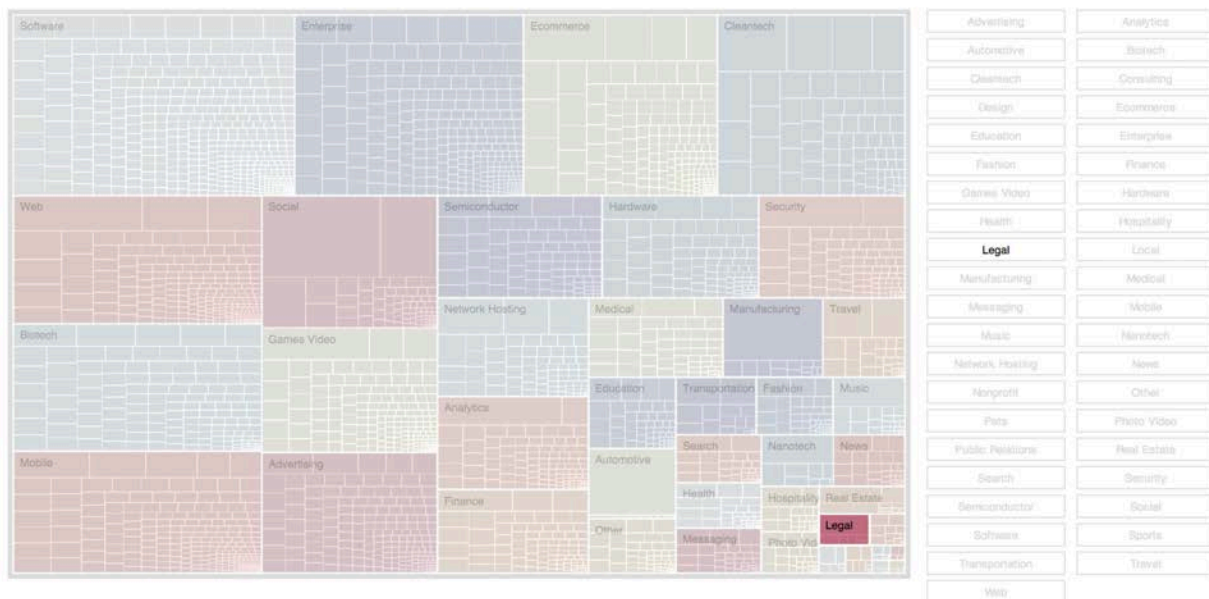
While adding the x's certainly helped the user navigate the visualization, we realized there were more intuitive ways of approaching this. Thinking of the end user, we realized in order to understand the financing of specific companies, they must be constantly reminded of their context and thus industry. We thus, decided to implement a path at the top of the visualization that allows the user to see what steps they took to reach their current view. Also, this path allows user to click on earlier steps to return to other layers of the visualization if they made a mistake.





## Industry Selector: List

This change is supplementary to the last one. By adding the cookie crumbs, we did not need to have a stagnant box of industry options to show the path to the user. We believed this was not intuitive to the user, because it seemed as though you could select an industry when you are in a company financing rounds view. Additionally, the previous blurb view did not necessarily prioritize all industries equally, as industries with longer names got more space. Our solution was to have each industry in equally sized boxes to the right of the visualization, and have this option disappear when you go a layer deeper. This made intuitive sense to us as you should not be able to choose another industry to zoom in when you are already in an industry.

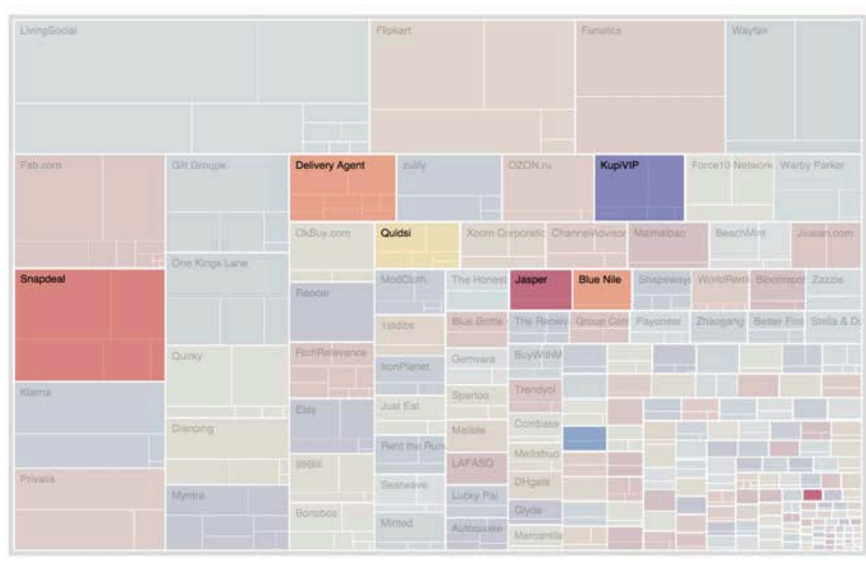


## Highlighting

Our final change was small but not insignificant. Previously, when you hovered over a company, it would gray that company and leave the other companies in normal color. Additionally, when you hovered over a venture capital firm, it would gray out its portfolio companies and leave non-portfolio companies in their normal colors. We wanted the selected/unselected to be consistent and it made more logical sense if bright colors meant on and grayscale meant unselected/off.



ALL INDUSTRIES / ECOMMERCE



Additionally, at the company level, if you hover over any of the rounds, it will highlight which, if any of the top 20 venture capital firms participated in the funding round.

Startup Funding Home Info Walkthrough Process Book



ALL INDUSTRIES / SOCIAL / TWITTER

**Twitter**  
 F, 2006 | San Francisco, CA |

\$1,160,166,511 raised in total

Twitter is an online social network and a microblogging service that enables users to send and read "tweets", which are text messages limited to 140 characters. Registered users of Twitter are able to read and post tweets via the web, SMS or mobile applications. Created in March 2006, Twitter is a global real-time communications platform with 400 million monthly visitors to twitter.com and more than 200 million monthly active users around the world. It

**Rounds**

- More Information On That Secretive Twitter Financing
- Twitter Announces Their Funding, Calls Itself A Communication Utility
- Twitter Raises \$35 Million Series C From Benchmark and IVP, Others
- Twitter
- <http://www.altassets.net/private-equity-news/article/h217642.html>

c | 02/13/09 | \$35,000,000

# Evaluation

We are very proud of the work we put into visualization. We learned a lot about startup financing and also got to explore a data structure, the treemap, that we did not cover in class. Our group worked effectively together and was able to efficiently divide tasks so that we could execute. As teammates, we met frequently and were able to communicate what we needed from the other members to get done to finish each of our tasks.

There are many areas of improvement, and other optimizations we could have explored to improve our visualization.

Some areas include:

- **Including Smaller, More Specialized Venture Capital Firms:** In our visualization, we only included only 20 firms but almost everyone of the companies on the treemap has a VC investor that is not included in our 20 top VC firms. Some of the limitations of this design is that these VC firms are mostly generalists that invest in almost all rounds and all industries. For companies that are more specialized and could use some value-added money from firms that only invest in early rounds or have industry expertise in a certain sector.

In addition, more firms would help clear up that there are certainly investors in every round of financing for every company. This confusion may arise from the fact that when you hover over a certain round within a company's financing, no firms are highlighted up top. If there were more firms, this would not occur.

- **Geographical Data (as some firms invest only in companies in nearby areas):** When approaching VC funding, there are other considerations except for round and industry that are important as well. Although we focused our visualization on industry and round because these are the two most important factors, another area that is important is geography. Venture capitalists tend to invest in companies that are near one of their offices and startups can have the most value-add from firms that nearby. Therefore, allowing the user to see which companies have raised money in certain cities would add another helpful dimension to our visualization. This could be implemented as a GeoJSON map that is additional view to our treemap.
- **Search bar:** The visualization does a very good job of providing layers to visualize generalized data and specific data as well. But in certain situations, the end user might want to compare their situation to a specific company and their story. Especially because we have links to news articles and other aspects of

story telling, a search bar to find specific companies could be a useful feature as well. In this situation, we would have to make sure you can only search for companies in the search bar.

- **Bar Chart by Industry instead of round:** This would be a small addition, but we could add a radio button that would change the breakdown of the stacked bar charts of the venture capital firms from its distribution of type of rounds it invests in to breakdown of industry it invests in. This would be helpful because the highlighting makes it seem that most of the top firms invest in all industries and without looking in the industry layer, a user might not realize that one investment in the industry does not necessarily imply that they invest heavily in that industry.

## ***Questions Answered***

### ***Which venture capital firms would be good fit for a specific round of financing within a certain industry?***

This is the main question of our project and the process book details what steps we took to optimize for this question, so we will summarize the features and activities that the visualization provides that answers this question. If a user has started a company, looking to start a company, or generally interested, they can gather more information by first selecting which industry the company is in by either clicking on a selector to the right of the treemap or selecting the industry within the treemap. In this layer, they can explore the different companies and prioritize them by them by the amount of funding they have the date. By hovering over the companies, it highlights which VCs have participated in funding those companies, thus giving the user a list of top VCs that might be related to their company or interest area.

Then, the user can dig deeper and get more details about these companies via storytelling to see if their companies are similar and thus indicate that the VC might be interested, or on the contrary, that the VC might find your company competitive because they have a similar investment. The description and links to the funding articles should give the user a good sense of the company.

Finally, to gauge if the VC that the user has come upon is the right fit for the round that they are raising, they can first look at the stacked bar chart and see the breakdown of investments by the firm in each round of financing, and then go into the companies that they have explored and hover over each round to see which VCs participated. This gives more information than just knowing that Accel invested in Facebook but rather that they participated in Facebook's series A investment.

***Which companies have raised the most amount of capital? Which companies have raised the most amount of capital in their industries?***

Each company's area in the treemap corresponds to the amount of money it has raised. It's easy to see which companies have raised the most money, just by looking at the size of their piece of the treemap. Companies are also grouped by industry, so one can easily see which how a company's capital stacks up against its peers.

***What is the breakdown of investments within each venture capital fund in each major industry (social, cloud storage, education, etc)?***

If the user wants to know more about the activity of a particular firm in a particular industry, he can simply click on the industry of interest, and then hover over the firm. This will highlight all of the companies in that industry that are in that firm's portfolio. This gives the user a general sense of the types of companies that firm invests in and, more generally, how active that firm is in the industry.

***What is the breakdown of investments within each venture capital fund in each round (seed, series a, series b, series c, etc)?***

Quite simply, the stacked bar chart allows the user to see the breakdown of top venture firms between different rounds (seed, series a, series b, etc). We decided to proportion its activity in each type of rounds by total number of deals in that type of round instead of total capital. We did this because later rounds require a lot more financing and thus would take up a lot more area in the bar chart, and thus would

prevent the user from understanding the firm had investments in earlier rounds with larger returns.

***What is the timeline between funding rounds for major tech startups that have secured venture funding?***

When the user dives down to view the rounds for an individual company, she is able to see a timeline that shows how the rounds were spaced over time. Since the timeline and treemap are interactively linked, the user is provided with a plethora of information about each round should she be interested in learning more. Indeed, not only do we answer this initial question about the spacing of rounds, but also by linking news stories we're able to provide some context for the user looking to better understand the funding trajectory of the company.

***What are the relative sizes of rounds of financing for startups by industry? What are the relative sizes of rounds of financing for startups?***

One of the most useful features of the treemap is that it leverages the visual variables of position and area to allow for quick comparisons between different components of the data set. For example, when you first load the visualization, you immediately notice that "Software" is the largest rectangle, and that "Enterprise," "Web," and "Social" are not far behind. Within a few moments, you're likely hovering over the bottom right corner and noticing that "Non Profit" is one of the smallest rectangles. Thus, right away you've already been able to gain a clearer picture of the startup landscape without worrying about some of the more nitty gritty details of the visualization that will appear once you dive further down into the company and round levels. In terms of comparing the relative sizes of companies within industries and rounds within a company, the treemap is similarly effective in allowing the user to understand within moments how large or small a company or round is.