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Kiva Team Viewer

http://jooskim.net/kivateamviewer/

Facilitating team choosing process

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Introduction:

Headquartered in San Francisco, CA, KIVA is a non-profit organization that allows people to lend money to different types of projects around the globe. The projects are mainly initiated by low income or underserved entrepreneurs across 70 countries. KIVA partners with microfinance institutions around the world to get help in posting profiles of qualified entrepreneurs who need help financing their loans. Lenders subsequently browse through these profiles and make decisions on which project(s) they wish to fund. Moreover, lenders are not entitled to any interest on the loan, they lend in goodwill.

Problem Addressed:

Borrowers in Kiva rely heavily on lenders to reach their funding goal. There are various aspects, which dictate a lenders' willingness to fund or not fund a project. For example - similarities in interest between lender and borrower, the country to which the project belongs, demographic information and type of project. The number of projects to fund and find it difficult to sort through may overwhelm individual lenders. Therefore, joining a team, which curates a list of projects to fund based on how well it matches their ideology, will simplify the lender's funding activities. However, the current solution to navigate through the team list is based on filters and ordering options. Our objective is to simplify the experience of choosing a team by visualizing different variables and allowing lenders to visually compare and contrast groups based on various parameters.

Target Audience:

After defining the problem we were interested in solving, we interviewed a few users and asked them their preferences in joining a team based on the country and/or the sector (sectors in KIVA are basically different areas like agriculture, retail, health etc. in which the projects are categorized). Although users were quite interested in the country they wanted to support, they expressed strong desire to know the 'cause' of the project. So initially we were in a dilemma as to what should the global variable be. However, if we had kept country as the global variable, there would have been several issues regarding the number of teams we would show on the scatterplot. Some countries like Kenya, Somalia, India, China etc. have a large number of projects being funded by multiple teams in each sector. Hence showing an aggregated data of teams for these countries on the scatterplot would mean that we would have to show around 500 teams which would've resulted in a lot of overlap and clutter. To avoid this, we decided to incorporate sector as our global variable and then provide options to the user to select country and see the total teams funding the projects in each country.

Design Rationale:

Summary:

The proposed visualization allows users to browse teams according to their lending activities per sector and country. Sectors and countries will be displayed in a map with varying color values depending on the number of projects funded in total. A scatterplot places all funding teams within a country and sector according to their number of team members and total amount of money lent. Hovering over a point will show the team's description while clicking it will store it in a right column for later comparison. The variables are explained in detail below:

World Map:

Sectors (Nominal):

Projects are divided into sectors such as agriculture, arts, clothing, etc. Sectors allow users to filter projects according to their own interests and filters the number of projects displayed in the map. We chose a world map to display all projects for each country because it is easy to establish visual link between the projects and the country in which they're being funded. Secondly, people are accustomed to seeing the world map quite often so they are able to relate to it easily.

Countries (Nominal) / Country Color (Categorical):

Number of projects funded by sector are grouped by countries and assigned different color values. Each country's real world location and political divisions determine location and shape of the groups. Furthermore, color values serve to further group countries into categories based on number of projects funded. Each color value represents a number interval or range (0-100, 100-200, …, 500+) of projects funded. There are 6 color values/ranges in total and are documented in a legend, the stronger the color, the larger the range it represents.

Number of Projects Funded (Discrete, Quantitative):

Each project may be funded once or multiple times by one team or several individuals across various teams. Therefore, this variable is the summation of all team contributions for a particular sector and country. As mentioned before, values in this variable are grouped into ranges with respective color values.

Scatter Plot:

$ Amount Lent (Continuous, Quantitative):

This is the total amount of capital lent per team within a sector. It determines the Y positioning of the scatterplot dots.

Number of Members (Discrete, Quantitative):

These are the total number of members for each team in the sector. It determines the X positioning of the scatterplot dots.

Walkthrough and Rationale:

Our users are mainly composed of lenders who seek to fund projects that relate to their own personal values. However, browsing through thousands of projects is time consuming, therefore joining a team, which curates and encourages a smaller list of projects to fund, saves time and energy. The question then becomes which teams to join and how to decide whether their values match with the users.

Figure 1: The stronger the color value, the larger number of projects funded

In order to filter down team numbers through their type of lending activities, these are first filtered by sector and then by country. A sector is selected in the top right-hand corner to update the map's country colors with their proper values. A legend is provided to show the ranges of color values. Since, we wanted to highlight the quantitative difference between the number of projects that are funded in each country, we decided to use these color values to represent differences in the data (Bertin, 1967). Next, to obtain precise values,

hovering over each country will display a dialog box with the exact number of funded projects *(Figure 1)*. Clicking the country opens up a scatterplot, which contains *"Amount Lent (USD)"* for y-axis and *"Number of Members"* for x-axis. We used the scatter plot because of the following reasons:

1. Outliers in the data are clearly visible. Suppose a team has very few members (1-2) and the contribution from the team is significant ($1.5-2 mi) or if the vice versa is true, i.e. a large number of members but less total contribution then the scatter plot would help users to identify those kinds of data and help them make decisions if they are interested in these outliers.
2. According to Bertin's "Level of Organization" people are able to make sense with position most readily. Hence a team with high member strength and more amounts lent will be clearly differentiated from the one that has either low members or has lent lower amounts.

Measures within each axis are grouped into ranges defined by logarithmic scale.
An option next to the title also allows the user to see all the teams investing within a sector, across all countries. This option allows teams who spread their investment across different countries to score higher in amount of capital lent, therefore making them more noticeable. Otherwise, their relatively low contribution per country will locate them low in the scatterplot.

Hovering over each dot displays a dialog box with the team's name and description as shown in the website. This includes team name, ideology, amount funded and number of members. If the user desires to compare multiple groups side by side, he/she can temporarily store them as entries in the right column by clicking on each dot. These will turn green after clicking to mark they have been selected. Furthermore, hovering over these green selections will also highlight their respective entry in the right comparison panel *(Figure 2)*. We're using different colors for the selected teams and are also making connection between the comparison panel and the selected dot via the same color so that user can do as much of pre-attentive processing as possible. (Ware, 2004)

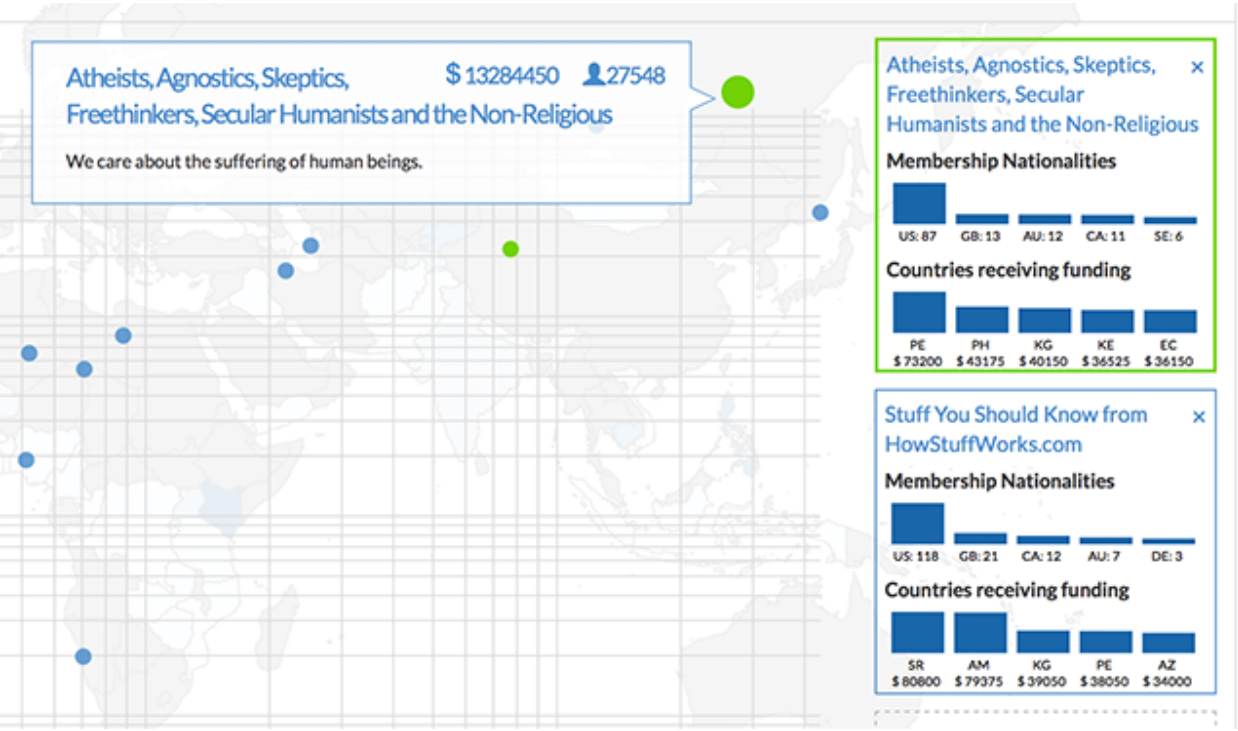

Figure 2: "Stuff You Should Know" group highlighted in both scatterplot and comparison panel

Right column entries in the comparison panel also display the group membership's top five-nationality composition as well as their top beneficiaries (funded countries). Having teams side by side allows easy comparison for the user. Also, within each comparison box we have used bar graph to demonstrate the top 5 in each section. Bar graphs are easy for comparison as the length has perfect correspondence between the actual and perceived (http://makingmaps.net/2007/08/28/perceptual-scaling-of-map-symbols/). Team nationality composition allow users to judge whether a team has a country of origin, based on majority of membership nationalities, or if they are truly international, having nationalities spread across multiple countries. Furthermore, combining membership nationalities with top benefiting countries allows the user to roughly track where money is coming from and where it goes. Such activities surface team curation dynamics such as geographical preference or attention to non-mainstream third-world countries such as *Tajikistan (Figure 3)*.

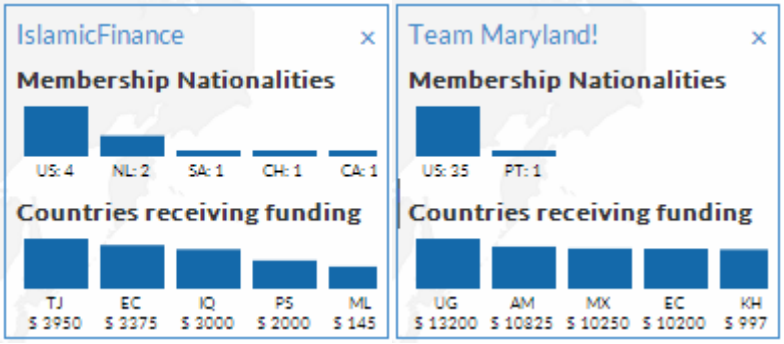

Figure 3: Both "*Islamic Finance*" and "*Team Maryland*" are mainly from the US, but their lending activities and project curation differ geographically

Implementation Details:

Issues with Data Collection

Given that KIVA already has a great API that we could take advantage of, our first plan was to use it extensively for our visualization. During the early stage in implementation, however, we encountered an issue with the API that the number of calls was strictly constrained to 60 calls per minute. Considering that heavy computations lying behind the graphics often triggered more than 60 API calls per minute, we instead used Python and retrieved a limited amount of results for several key dimensions such as teams information and loans information which were intertwined with each other complexly. Ultimately, this resulted in a limited number of teams and loans information that we displayed in our visualization and some discrepancies between loans entities and teams entities that were caused by the API's failure to support of reordering the results.

More on Country Filter

Selecting a country on the map basically looks through an array where teams are stored and removes some teams that have never invested in any project in that country. So it is likely that teams that are actively giving help to various countries will appear no matter what country is selected.

More on Logarithmic Scale

We were aware, at the beginning stage of the project, that the range of some measures such as number of team members and amount lent in USD would be too wide to be displayed in a conventional linear scale. This would very likely entail an issue where dots are overlapped making it hard to click on or interpret, and we actually confirmed that they overlapped significantly when initially testing with the linear scale. Although the log scale approach prevented dots on the scatter plot from being overlapped with each other, one downside is that some users would find it awkward and thus unintuitive. Using a zoom function would have made it possible both to avoid overlapping and to make the interface intuitive for users, but we could not make it there due to time constraint.

Figure 4: Logarithmic Scale

Evaluation plan:

After evaluating the visualizations ourselves and iterating it a few times, we conducted a cognitive walkthrough and usability testing in order to understand how users would go about exploring different features and navigate through the visualization. In order to do this, we asked the participants to do a few simple tasks which helped us evaluate the usability of our system. Here are the tasks:

1. Finding any team belonging to the agriculture sector which has invested in United States, has more than 500 members and the total team investment is more than $1 million. This is a fairly simple task since the users just have to select agriculture sector and then select US to show the scatter-plot and see the axes to find which team would satisfy the criteria. All the users were successfully able to complete this task.
2. Comparing four different teams who have invested in the Education sector in Cambodia: This is again a simple task. We wanted that the users should be able to compare teams by selecting a few of them and make decisions based on the data presented to them: membership composition of the team and top beneficiary countries.

Discussion:

The visualization does not offer multiple query choices to filter by global and local variables. Users are locked to a single team selection path that starts from sector and country to number of members and amount of capital lent. Moreover, the map does not support “AND” query selections for users interested in more than one sector or country. Locking the user into one browsing path also means it contradicts the exploratory nature activity that the visualization tries to serve. An alternative solution would have to incorporate multiple types of queries to support varying user interests.

As expected from the scatter plot, the larger the group, the larger amount of capital lent. There are some outliers where either single member are corporations lending a large sum of money or a small group of individuals are lending a relatively large sum of capital.
The decision to use log scales to fit scatter plot axis values ranging from 0 to 10 million has been constantly questioned by users. This was because users are used to evenly spaced incremental measures while the implemented log scale varies them as well as grouping in ranges *(Figure 4)*. Therefore, although log scales are efficient to plot large ranges of values, they are not easily comprehensible by common users.

Screen real estate limited many interactions within both world map and scatterplot. It is currently hard to select small countries due to their size and the inability to zoom in. For the scatter plot, screen space limited the ability to store more teams for comparison and displaying more information for each.

Finally, it has been also noted in a few design critiques that limiting searching results by first sectors and second countries is an arbitrary design choice. This problem was noted above, addressing that such choice structure limits the exploratory objective of the visualization. A better choice would be displaying both sectors and countries as first level global variables. Users can either choose one or multiple countries or sectors based on their own preference or exploratory choice.

Findings revealed after implementation:

It is clear from the world map that multiple countries do not have treaties with Kiva and sheds light into which third world countries Kiva has to market to. Moreover, recent natural disasters can also be connected to the activities in certain sectors. For example, due to the recent Haiyan Typhoon in the Philippines, it is no wonder why projects funded under the *Food* sector topped in the Philippines since the urgency of the situation demands immediate access to food rather than long-term food generating projects such as in the *Agriculture* sector.