



Kiva Analysis and Recommender System

Data Science for Good

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Problem Statement

The microloan crowdfunding organization Kiva has a website that links entrepreneurs and lenders throughout 77 countries. On their website they state an interest in working with the data science community on various machine learning projects, including the need for recommender systems. With the goal of increasing repeat lender participation and to develop a sense of community among lenders to increase user retention, we set out to develop two distinct recommender systems that would increase loan contributions, thereby improving quality of life for millions of people around the globe.

Background

What are Microloans?

- Microloans = Small lending.
- Has existed since the 1700s.
- Gained momentum beginning in the 1980s.

Who is Kiva?

- 501(c)3 U.S. nonprofit organization founded in 2005.
- Website for crowdsourcing microloans.
- Since 2005: 4.1 million borrowers and 2 million lenders.
- 96.3% repayment rate

The Data

Data collected from 2006 through September 2021



Kiva Snapshots / API - available on Kiva's [website](#)



lenders

Kiva lender profiles



loans/lenders

A list of loans and the contributing lenders



loans

Loans and their attributes

Cleaning / Feature Engineering / EDA

01

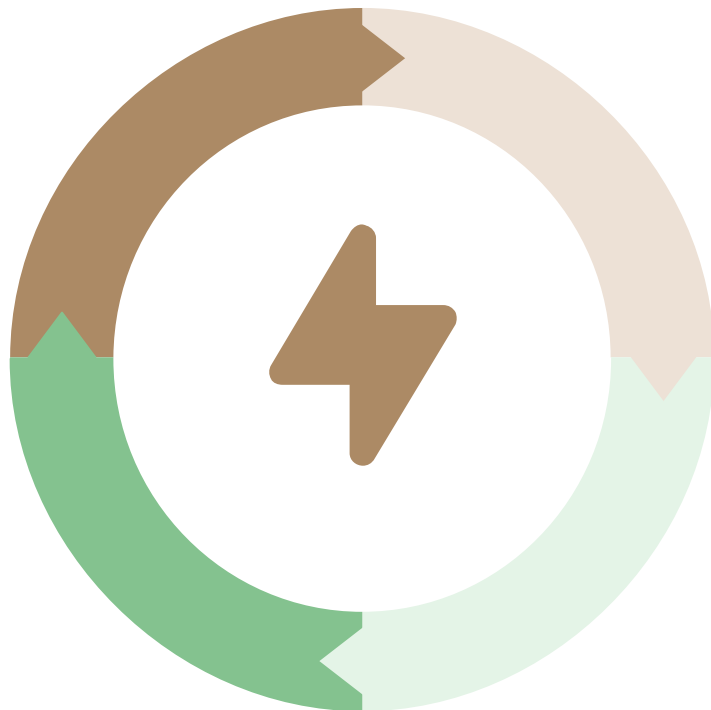
Missing Data

- Dense dataset
- Time bands
- Dropped nulls

02

New Features

- Borrower Gender
- Description
- Binarized for modeling



03

Merges & Filters

- DataFrame merges
- Size reduction

04

EDA

- Visualizations
- Feature Selection

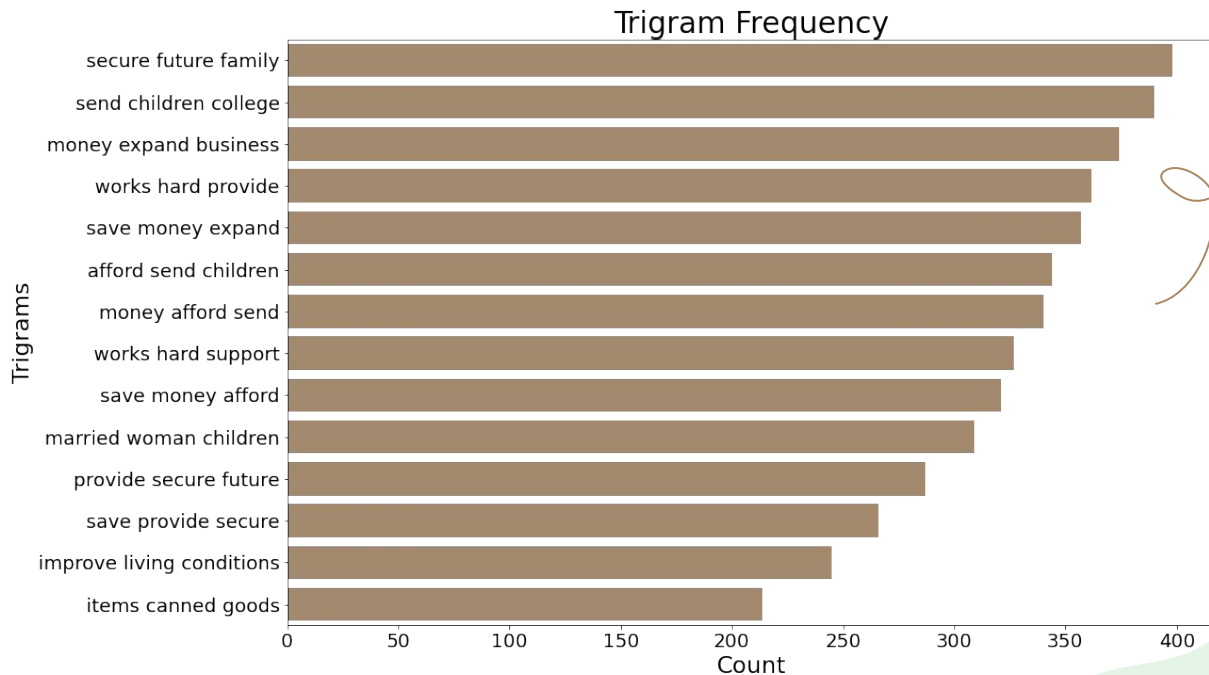
Understanding your Content

Recommendations based on interests and use

The current state of our recommendation filter utilizes key phrases in a loans text information.

This use of natural language allows us to process a representation of lender and entrepreneur.

Pipeline of captured text data creates a context of partners that is intangible to both parties.



Content-Based Filter

Our Primary Cold Start Issue: New Funders

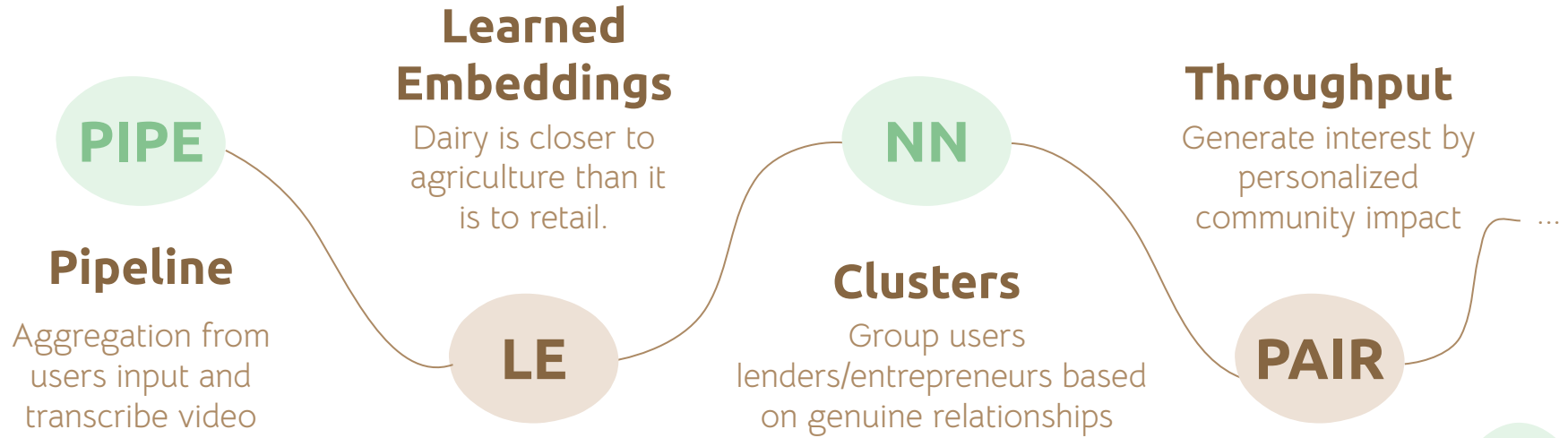
When a new funder/lender joins our platform they're an unknown quantity.

We approach this by initiating a quiz during signup.

The user effectively creates a synthetic loan to compare to existing loans in our system.

Items	Women Owned	Arts	Eco Friendly Agro	Vegan	...	Covid-19 Relief	Water Filtration
User Interests	1	0	1	1	...	1	0
Estrella De Luz	0	0	1	0	...	0	0
Grace	1	0	0	1	...	0	0
<input type="checkbox"/>	<input type="checkbox"/>						
Phorn Vann	1	0	0	0	...	0	1

The Road to Context



User Based Recommender System

01

Kiva Teams

Platform impact & building a social community

02

Data Transformation / System

Constructing Sparse Matrix / Distance Based

03

Output - API Data

Access Kiva's API to produce team information



Kiva Teams

Lending Teams

Connect with Kiva's lender community

Lending teams are self-organized groups built around common interests, school affiliation or location.

Join as many teams as you'd like, and rally around shared lending goals by counting each of your loans at checkout toward the team's impact.

<https://www.kiva.org/teams?category=Friends>



Colbert Nation

894 members have funded \$510,625 in loans

America | Category: Friends | Team since: Sep, 2008

We loan because: I am helping my fellow wealthy American friends lighten their swollen pockets to help the rest of the world prosper.

TEAM LEADERBOARDS

Amount funded

THIS MONTH

LAST MONTH

ALL TIME



Kiva Christians

\$65,415,550



(A+) Atheists, Agnostics, Skeptics,...

\$56,055,066



The Mindful Bunch

\$23,397,796



InsideFlyer

\$18,889,480



Nerdfighters

\$17,896,084



HP

\$13,667,607

Visualizing the Matrix

LOAN ID LENDERS	999870	999890	999894	999907	999925	999927
1904justin	0	0	0	0	1	1
2viljoens	0	1	1	0	0	0
gooddogg1	0	0	1	1	0	0
sean2136	0	0	0	1	1	1

LENDERS	1904justin	2viljoens	gooddogg1	sean2136	...	...
1904justin	0	0.92	0.95	1	...	...
2viljoens	0.92	0	1	0.96	...	...
gooddogg1	0.95	1	0	1	...	...
sean2136	1	0.96	1	0	...	...

Future Developments



Partnerships

Contacting Grameen Bank, Kiva, and Zidisha seeking partnerships.

Live Engine

Collaborative context-based system. Send weekly recommendations based on use.

Smart Contract Loans

True P2P Lending through ADA based De-fi Token.

Closing Remarks

Unique recommender system for social good.

Streamlit / GitHub



Sources

- NobelPrize.org:
<https://www.nobelprize.org/prizes/peace/2006/summary/>
- Muhammad Yunus biography:
<https://www.nobelprize.org/prizes/peace/2006/yunus/facts/>
- PBS Frontline:
<https://www.pbs.org/frontlineworld/stories/uganda601/history.html>
- Zidisha: <https://www.zidisha.org/how-it-works>
- Kiva: <https://www.kiva.org/>

Thanks

Do you have any questions?

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