

Rectifying the Cold-Start Product Recommendation Problem by Connecting Social Media to E-Commerce by using User Embedding and Product Embedding Technique

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ABSTRACT

Nowadays social media is the perfect place for advertising the products. Peoples are using social media as connecting medium between people. So, many e-commerce sites are showing interest to publish their products on social media. Recent days every social media is asking their consumers to log in with the social media. There is a problem while connecting the social media to e-commerce that is cold start recommendation problem. To overcome this problem I proposed a technique called user and product embedding technique. In this technique, I use the linked users across the social media and e-commerce sites which are used as a bridge to map users' social networking sites features to another feature representation for the product recommendation. We at that point build up a feature-based framework factorization approach which can use the learned user embeddings for cold start product proposal.

Keywords:

INTRODUCTION:

SOCIAL MEDIA

Social media is any website that allows social interaction. Social media is growing rapidly throughout the world. More adults and teenagers are joining sites such as Facebook, MySpace, and Twitter to interact with friends, family, and strangers. The introduction of social media has changed the world in many ways. It affects each individual in different ways. Today it can be used as a very helpful tool in changing a person's life, the positives in communication all around, has made the world stronger and a better place to live in.



SOCIAL NETWORKING

The use of dedicated websites and applications to interact with other users, or to find people with similar interests to one's own.

E-COMMERCE

What is e-Commerce?

e-Commerce, also known as e-Business, or electronic business, is simply the sale and purchase of services and goods over an electronic medium, like the Internet. It also involves electronically transferring data and funds between two or more parties. Simply put, it is online shopping as we commonly know it.

What is an eCommerce website?

eCommerce websites are online portals that facilitate online transactions of goods and services through means of the transfer of information and funds over the Internet. In the early days, e-

Commerce was done partially through emails and phone calls. Now, with a single website, anything and everything that a transaction needs, can be executed online.

There are different e-Commerce websites for every field. The most common type is retail selling, but there are many others too, like auction websites, business-to-business services, music portals, consultancy websites, finance management websites

Importance of e-Commerce

With the use of mobile devices and laptops increasing every day, there are a lot of advantages of e-commerce like –

- Global market reach
- A global choice for consumers
- Short product/service distribution chain
- Lesser costs and pricing

Top e-commerce websites

These are some of the most popular examples of e-commerce websites across the world (in no particular order) –

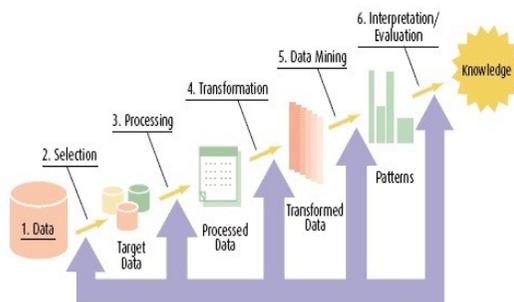
- [Amazon](#)
- [eBay](#)
- [Alibaba](#)
- [Walmart](#)
- [Taobao](#)
- [Etsy](#)



Aim

Our major aim is to connect the social media to ecommerce website for improve in recommendation system for the user with trusted friends

Data Mining:



Structure of Data mining

For the most part, information mining (now and again called information or Knowledge disclosure) is the way toward breaking down information from alternate points of view and abridging it into helpful data - data that can be utilized to build income, cuts costs, or both. Information mining programming is one of various diagnostic apparatuses for examining information. It enables clients to investigate information from a wide range of measurements or points, arrange it, and condense the connections distinguished. In

fact, information mining is the way toward discovering connections or examples among many fields in substantial social databases.

How Data Mining Works?

While vast scale data innovation has been advancing separate exchange and systematic frameworks, information mining gives the connection between the two. Information mining programming examines connections and examples in put away exchange information in light of open-finished client questions. A few kinds of systematic programming are accessible: factual, machine learning, and neural systems. By and large, any of four sorts of connections are looked for:

- **Classes:** Stored information is utilized to find information in foreordained gatherings. For instance, an eatery network could mine client buy information to decide when clients visit and what they regularly arrange. This data could be utilized to build movement by having day by day specials.
- **Clusters:** Data things are assembled by consistent connections or buyer inclinations. For instance, information can be mined to recognize advertise fragments or shopper affinities.
- **Associations:** Data can be mined to distinguish affiliations. The brew diaper illustration is a case of cooperative mining.
- **Sequential designs:** Data is mined to envision standards of conduct and patterns. For instance, an open air gear retailer could anticipate the probability of a rucksack being acquired in light of a customer's buy of dozing sacks and climbing shoes.

Data mining comprises of five noteworthy components:

- Extract, change, and load exchange information onto the information stockroom framework.
- Store and deal with the information in a multidimensional database framework.
- Provide information access to business investigators and data innovation experts.
- Analyze the information by application programming.
- Present the information in a helpful arrangement, for example, a chart or table.

Distinctive levels of examination are accessible:

- **Artificial neural systems:** Non-direct prescient models that learn through preparing and look like natural neural systems in structure.
- **Genetic calculations:** Optimization systems that utilization procedure, for example, hereditary blend, transformation, and normal choice in an outline in view of the ideas of characteristic advancement.
- **Decision trees:** Tree-formed structures that speak to sets of choices. These choices produce rules for the arrangement of a dataset. Particular choice tree strategies incorporate Classification and Regression Trees (CART) and Chi Square Automatic Interaction Detection (CHAID). Truck and CHAID are choice tree methods utilized for grouping of a dataset. They give an arrangement of tenets that you can apply to another (unclassified) dataset to foresee which records will have a given result. Truck sections a dataset by making 2-way parts while CHAID fragments utilizing chi square tests to make multi-way parts. Truck normally requires less information planning than CHAID.
- **Nearest neighbor strategy:** A system that orders each record in a dataset in view of a mix of the classes of the k record(s) most like it in a chronicled dataset (where $k=1$). Now and then called the k-closest neighbor system.
- **Rule enlistment:** The extraction of helpful if-then guidelines from information in light of measurable essentialness.
- **Data representation:** The visual understanding of complex connections in multidimensional information. Designs instruments are utilized to delineate information connections.

Attributes of Data Mining:

- **Large amounts of information:** The volume of information so extraordinary it must be examined via computerized strategies e.g. satellite data, Mastercard exchanges and so forth.
- **Noisy, deficient information:** Imprecise information is the normal for all information gathering.
- **Complex information structure:** customary measurable examination impractical
- **Heterogeneous information put away in inheritance frameworks**

Advantages of Data Mining:

1. It's a standout amongst the best administrations that are accessible today. With the assistance of information mining, one can find valuable data about the clients and their conduct for a particular arrangement of items and assess and break down, store, mine and load information identified with them

2. An systematic CRM demonstrate and vital business related choices can be made with the assistance of information mining as it helps in giving an entire summation of clients
3. An perpetual number of associations have introduced information mining activities and it has helped them see their own particular organizations make an extraordinary change in their showcasing techniques (Campaigns)
4. Data mining is for the most part utilized by associations with a strong client center. For its adaptable nature to the extent materialness is concerned is being utilized eagerly in applications to anticipate pivotal information including industry investigation and shopper purchasing practices.

Preferences of Data Mining:

Marketing/Retail:
 Finance/Banking
 Manufacturing
 Governments
 Law authorization

FORMULATING THE PROBLEM



PROPOSED SYSTEM:

In this paper, we examine an intriguing issue of product recommendation from online business sites (e-commerce sites) to clients at social networking sites destinations who don't have verifiable buy records, i.e., in "cool start" circumstances. We called this issue cross-site cold-start product recommendation.

In our concern setting here, just the clients' person to person communication data is accessible and it is a testing assignment to change the social networking data into inactive client highlights which can be viably utilized for item suggestion. To address this test, we propose to utilize the connected clients crosswise over social networking sites and e-commerce sites (clients who have long range informal communication accounts and have made buys on e-commerce sites) as an extension to delineates person to person communication highlights to idle highlights for item suggestion.

In particular, we propose learning the two clients' and items' feature portrayals (called user or client embeddings and product or item embeddings, separately) from information gathered from e-commerce sites utilizing intermittent neural systems and after that apply a changed slope boosting trees technique to change clients' long range interpersonal communication highlights into client embeddings.

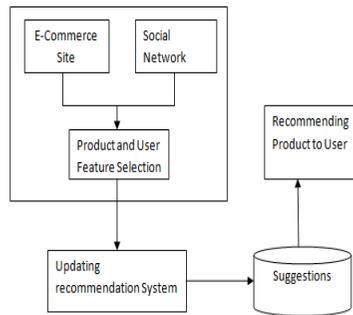
We at that point build up a component based framework factorization approach which can use the learnt client embeddings for cool begin item proposal.

Advantages OF PROPOSED SYSTEM:

- Our proposed structure is undoubtedly successful in tending to the cross-site cold start product recommendation issue.
- We trust that our investigation will have significant effect on both research and industry networks.
- We detail a novel issue of suggesting items from a e-commerce site to long range interpersonal communication clients in "chilly begin" circumstances.
- To the best of our insight, it has been once in a while considered previously.

- We propose to apply the intermittent neural systems for learning associated highlight portrayals for the two clients and items from information gathered from an e-commerce site.
- We propose an adjusted slope boosting trees technique to change clients' microblogging credits to inert component portrayal which can be effortlessly consolidated for item suggestion.
- We propose and instantiate an element based network factorization approach by joining client and item includes for cold-start product recommendation.

SYSTEM ARCHITECTURE:



System Architecture

SYSTEM ANALYSIS :

Social media is a powerful tool for ecommerce websites. The ability to not only direct shoppers toward a new product or an attractive deal, but to engage with them and create a sense of community, is incredibly useful. A complete social media presence also includes direct sales through some networks, as well as having the back-end tools in place to let customers share products and recent purchases with friends and followers through just a single click.

While it's sometimes hard to measure concrete returns on the indirect aspects of using social networks, such as asking questions and engaging in conversation with followers, these components help to build brand loyalty and a sense of community. When it comes to dealing with consumer care issues, these social media interactions are important in retaining customers and demonstrating a commitment to resolving problems.

2 basic considerations

Just as social media promotes an ecommerce storefront, the storefront needs to highlight a social presence. Spending valuable time crafting posts for one or many networks isn't effective if shoppers aren't directed toward and encouraged to follow these pages. Use social media icons at the bottom of each webpage and provide links for sharing specific products.

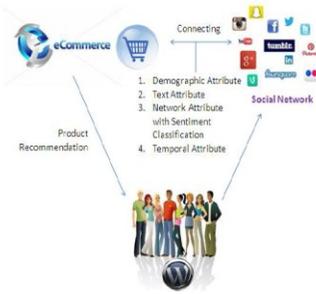
It's also important to have a strategy before diving into social media. Starting off with just a few channels is preferable for new businesses, in fact. Creating a consistent tone that reflects the attitude of the business also helps. Research and intuition both play a part in social media strategy because posts are based primarily around conversations. Determine where the time and effort that goes into social media will be the most effective. Taking the time to add high-quality product photographs and a business logo to the picture and background fields of social media accounts will also help to unify branding and craft a consistent presence.

Increasing friends and followers

Increasing the number of people following a page or social media account has to be a priority. The more people that see posts, the more effective they are. Offering content that's useful, exciting or both helps to grow a follower base, as people share posts that they find engaging. Occasionally asking current followers to share content can also help, as long as the requests aren't too frequent or pushy. Offering current and potential customers an incentive to follow your accounts is another useful strategy, and one that is easily put into effect with the right tools.

Promotional posts

One of the most basic - and crucial- questions that needs to be asked is why the promotion is being conducted and what the end goal is. A sale that's geared toward clearing out stagnant inventory will have a different approach, and different goals, than one that is oriented toward growing sales or rewarding loyal customers with a small incentive.



IMPLEMENTATION:

Social Networking Construction Module

In the primary module, we build up the Online Social Networking (OSN) framework module. We develop the framework with the element of Online Social Networking. Where, this module is utilized for new client enrollments and after enlistments the clients can login with their confirmation. Where after the current clients can send messages to secretly and openly, choices are constructed. Clients can likewise impart post to others. The client can ready to look through the other client profiles and open posts. In this module clients can likewise acknowledge and send companion demands. With all the fundamental element of Online Social Networking System modules is develop in the underlying module, to demonstrate and assess our framework highlights. Given a web based business site, with an arrangement of its clients, an arrangement of items and buy record framework, every passage of which is a parallel esteem demonstrating whether has acquired item. Every client is related with an arrangement of obtained items with the buy timestamps. Besides, a little subset of clients can be connected to their microblogging accounts (or other informal community accounts).

User and Product Feature Selection

In this module, we build up the Microblogging Feature Selection. Set up a rundown of possibly helpful microblogging properties and develop the microblogging highlight vector for each connected client. Create appropriated include portrayals utilizing the data from every one of the clients on the online business site through profound learning. Take in the mapping capacity, which changes the microblogging credit data au to the circulated include portrayals in the second step. It uses the component portrayal sets of all the connected clients as preparing information. A demographic profile (frequently abbreviated as "a statistic") of a client, for example, sex, age and instruction can be utilized by internet business organizations to give better customized administrations. We remove clients' statistic characteristics from their open profiles. Statistic ascribes have been appeared to be vital in advertising, particularly in item reception for purchasers

Demographic based Product Embeddings

In the past module, we build up the component choice, yet it isn't clear to set up associations amongst clients and items. Instinctively, clients and items ought to be spoken to in a similar element space with the goal that a client is nearer to the items that he/she has acquired contrasted with those he/she has not. Roused by the as of late proposed strategies in learning word embeddings, we propose to learn client embeddings or appropriated portrayal of client comparatively. Given an arrangement of image successions, a settled length vector portrayal for every image can be learned in an idle space by abusing the setting data among images, in which "comparable" images will be mapped to close-by positions. In the event that we regard every item ID as a word token, and change over the verifiable buy records of a client into a timestamped arrangement, we would then be able to utilize similar strategies to learn item embeddings. Not at all like network factorization, the request of recorded buys from a client can be normally caught.

Cold Start Product Recommendation

We utilized a nearby host based web based business dataset, which contains some client exchange records. Every exchange record comprises of a client ID, an item ID and the buy timestamp. We first gathering exchange records by client IDs and after that acquire a rundown of bought items for every client.

CONCLUSION:

In this paper we study about the problem of cross site cold start product recommendation in e-commerce sites. Recommendation of a product for users is very important activity in the e-commerce sites. Our main thought is that on the e-commerce sites, clients and items can be represented to in the same inert feature space through feature learning with the intermittent neural systems. Utilizing an group of connected

clients crosswise over both online business sites and social networking sites as a channel or a bridge, we can learn highlight mapping capacities utilizing a gradient boosting trees technique, which maps clients' properties removed from person to person communication locales onto include portrayals gained from e-commerce sites. The mapped client highlights can be viably consolidated into a component based grid factorization approach for cold start product recommendation.

REFERENCES

- [1]. J. Wang and Y. Zhang, "Opportunity model for E-commerce recommendation: Right product; right time," in Proc. 36th Int. ACM SIGIR Conf. Res. Develop. Inf. Retrieval, 2013, pp. 303-312.
- [2]. M. Giering, "Retail sales prediction and item recommendations using customer demographics at store level," SIGKDD Explor. Newsl., vol. 10, no. 2, pp. 84-89, Dec. 2008.
- [3]. G. Linden, B. Smith, and J. York, "Amazon.com recommendations: Item-to-item collaborative filtering," IEEE Internet Comput., vol. 7, no. 1, pp. 76-80, Jan./Feb. 2003.
- [4]. V. A. Zeithaml, "The new demographics and market fragmentation," J. Marketing, vol. 49, pp. 64-75, 1985.
- [5]. W. X. Zhao, Y. Guo, Y. He, H. Jiang, Y. Wu, and X. Li, "We know what you want to buy: A demographic-based system for product recommendation on microblogs," in Proc. 20th ACM SIGKDD Int. Conf. Knowl. Discovery Data Mining, 2014, pp. 1935-1944.
- [6]. J. Wang, W. X. Zhao, Y. He, and X. Li, "Leveraging product adopter information from online reviews for product recommendation," in Proc. 9th Int. AAAI Conf. Web Social Media, 2015, pp. 464-472.
- [7]. Y. Seroussi, F. Bohnert, and I. Zukerman, "Personalised rating prediction for new users using latent factor models," in Proc. 22nd ACM Conf. Hypertext Hypermedia, 2011, pp. 47-56.
- [8]. T. Mikolov, I. Sutskever, K. Chen, G. S. Corrado, and J. Dean, "Distributed representations of words and phrases and their compositionality," in Proc. Adv. Neural Inf. Process. Syst., 2013, pp. 3111-3119.
- [9]. Q. V. Le and T. Mikolov, "Distributed representations of sentences and documents," CoRR, vol. abs/1405.4053, 2014.
- [10]. J. Lin, K. Sugiyama, M. Kan, and T. Chua, "Addressing cold-start in app recommendation: Latent user models constructed from twitter followers," in Proc. 36th Annu. Int. ACM SIGIR Conf. Res. Develop. Inf. Retrieval, 2013, pp. 283-292.