Cecilia Chen

Objective：Algorithm Engineer

Gender：Female

Marital status：Unmarried

Service Year：5 years experience

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Education

Northeastern University(Sep 2017 – Jan 2020) **Computer Application Technology（Master)**

Academic Performance： Ranked in the top 5% of the major

Main Courses： Advanced Mathematics, Applied Mathematical Statistics, Advanced Algorithms and Data Structures, Data Mining, New Generation Internet Technology, Stochastic Processed, etc.

Awards： First-class Scholarship of Northeastern University(2017-2019), Outstanding Graduate of 2020, National Scholarship, First Prize in the National College Mathematics Competition, Frist Prize in the Mathematics Modeling Competition of Northeast China, etc.

Work Experience

REDnote(Apr 2020 – June 2024) **Search Algorithm Engineer**

Community Technology Department/Community Search Team

Responsibilities: Responsible for optimizing the algorithm and strategies for retrieval in general search. Responsible for optimizing algorithms and strategies in query recommendation.

1.Optimizing the Retrieval Algorithm for General Search

(1) By optimizing the algorithms and strategies related to inverted index retrieval and candidate scoring to improve the proportion of clicked queries.

(2) To accommodate the product and business requirements, complete the design and implementation of the retrieval module.

2.Query recommendation for 7 business scenarios：enhance search scale and optimize user experience.

The business scenarios are: Related Search, Search Filters, You May Like, Shaded Query, Homepage Search Box, Searches After Viewing, etc.

(1) Ranking model for various query recommendation scenarios: responsible for training the ranking model and managing sample data flow.

(2) Retrieval Optimization: Added various recall channels such ad search after clicking channel, Q2Q(query-to-query) note-based channel, note content-based channel, and Q2Q(query-to-query) vector-based recall channel, etc.

(3) User Experience Optimization: Reduce bad bases related to relevance, diversity, safety and other issues through algorithm refinements.

(4) New Business Scenarios: Participate in pipeline setup and distribution strategy formulation for new business(such as related search on detailed note pages).

(5) Engineering Level: Participate in migration and modularization of the query recommendation service architecture.

Zhihu(June 2024 - Present) **Search Algorithm Engineer**

Intelligent Algorithm Department/Search Team

Responsibilities: Responsible for optimizing general search ranking algorithms; Participate in optimizing query recommendation algorithms.

1.Search User Satisfaction Modeling: Establish a comprehensive satisfaction criteria system and collaborate with the team to formulate scientific annotation standards.This system covers multiple dimensions such as

relevance, content quality, timeliness and authority, providing a solid scientific basis for accurately evaluating the user experience.Complete the implementation of the initial version of LTR model for user satisfaction modeling.
2.User-name Ranking Model Optimization: Reconstruct user-name ranking module.
3.Blending Ranking Strategy Optimization: includes optimizing the search experience for core creators and improving the experience of question/topic cards.

Project Experience

Community Search Retrieval Optimization(May 2023-June 2024)

Project Introduction: Currently, RedNote's search system mainly consists of two parts: community search and product search.Community search handles approximately 400 million search queries per day.Through upgrades and iterations of algorithms, we aim to better meet user's search needs.
Personal Work: Through enhancements in term weight and term expansion within sparse retrieval and upgrading preliminary scoring capability, resulting in an accumulated increase of +0.23pt in the proportion of clicked queries and +0.26pt in proportion of clicked long-tail queries.

1.Enriched and upgraded signals used in retrieval on both the query and doc sides.Query side: Included Query term weight, synonyms.Doc side: Integrated multi-modal text extraction, doc search queries and doc generated queries.

2.Upgraded query reduction recall channel and query rewritten recall channel: upgraded strategy mechanism to fusion model and optimized features for query reduction channel, thus driving an increase in proportion of clicked long-tail queries.

3.Upgraded the preliminary scoring capability.For the rewritten channel, transitioning occurs from scoring between a document and a single query to scoring between a document and multiple queries.

4.Retrieval demands related to new business scenarios: POI localized recall channels, recency channels, large model service(Da Vinci) knowledge based recall channel.

5.Collaborated with the engineering team to transform retrieval service architecture and establish offline evaluation tools.

Ranking Model Optimization(July 2020-December 2020)

Project Introduction: Before optimization the query recommendation model was based on a linear formula with statistical features, lacking personalization and generalization and had weak performance in cold start new scenarios and long-tail queries.Through self-developing a multi-scene multi-task ranking model, it helped improved ctr and search scale.
Personal Work: Built a 0-1 multi-scene multi-task ranking model, increasing search scale by +840,000 per day. CTR of "You May Like" increased by +27.63%, CTR of "Search Filter" increased by +11.85%, and CTR of "Related Search" increased by +12.32%.This greatly reducing the training and maintenance costs, and simultaneously enhancing the scalability of business scenarios.

1.Data Flow and Training Samples: Designed the model feature system, developed the data flow.At feature level, comprehensive consideration was given to user basic features, user interaction behavior features, search term/recommended term semantic/statistical features and cross features.At label level, targets included click of recommended query for the first hop, and click of note for the second hop, and pagetime for the third hop.

2.Multi-scene multi-task Ranking Model: Designed the structure, offline training, online deployment, and incremental update mechanism for the model.

3.Implementation in Business Scenarios: Applied it to business scenarios such as "You May Like", "Search Filters" and "Related Search".

Optimization of Ranking Algorithm(June 2024 - Present)

Project Introduction: Through continuous upgrades of models and strategies within ranking module, the aim is to better meet user's search requirements.

Personal Work:

1.Search Satisfaction modeling: Collaborated in establishing the satisfaction standards and annotation system from scratch.Built a comprehensive satisfaction standard system and set up a robust and efficient feature collection pipeline.Utilized a professional annotation team to label the data and employed data augmentations technique.Successfully implemented the initial LTR model for satisfaction modeling.The GSB accuracy increased by +3.08%, the CTR of A5 content increased by +1.109%, the CTR increased by +0.351% and the daily search penetration rate increased by +0.113%.

2.Optimization of User-name Ranking model: Completed upgrade and reconstruction of user-name ranking module, including model structure, sample data flow, model features, training and inference, architecture migration.Model structure changed from GBDT to MMOE. Inference methods switched from local loading in online service to deployment on Zpredictor for online inference.For vertical search the ctr increased by +0.70% and top5 ctr increased by +1.16%.For general search the ctr increased by +1.25% and the proportion of clicked queries increased by +1.36%.The overall GSB ratio is 23:61:16, For C45 users the GSB ratio is 164:748:69.

3.Optimization of Blending Strategy: This includes optimizing the search experience for core creators and improving the user experience of question/topic cards,etc.the proportion of clicked queries increased by +0.046%, the ctr of top 3 results increased by +0.072%, the content consumption increased by +0.48%. The cumulative increase in GSB accuracy increased +2.25%.

Ranking Mechanism Optimization - Diversity(May 2020-Feb 2021)

Project Introduction: This project issues such as similar note / brand / cover-image clustering in general search scenarios.Additionally, it tackles the phenomenon of similar query aggregation in query recommended scenarios.

Personal Work:

1.General search: Using MMR algorithm to improve the diversity of search results.The bad case of diversity was reduced from 8.2% to 3.7%.The number of queries with CES(engagement) +0.4%. Average note clicks per user +0.74%, CES +0.66%, user retention +0.08%.

2.Query recommendation: Using MMR with sliding window, customized different strategies for different business scenarios."Related Search": diversity across cards. "You May Like": diversity cross different scenes on the same page.The proportion of diversity bad case was reduced from 9.1% to 3.6%,with an increase of 49,000 queries per day.

Query Recommendation-Related Search(Jan 2022-Dec 2022)

Project Introduction:"Related Search" on the search result page help users horizontally extend and vertically explore the current search query during browsing.It helps different users discover rich note contents.

Personal Work:

1.Added statistical recall channel Q2D2Q. Firstly mined high-value notes under query through big data statistics, then generated recommended query based on note content.This method increased passive search proportion by +0.44pt, increased average searches per user by +0.53%, increased impression pv by 11.92% and click pv by 16.91% and ctr by 4.46% in "Popular Searches", increased impression pv by 31.43% and click pv by 44.79% and ctr by 11.69% in "Related Searches".

2.Added Query Rewriting Recall channel. Enhanced coverage of long-tail queries.Increased passive search rate by +0.08pt. Increased click pv by 8.73%.Increased impression pv by 8.01%.

3.Added ANN vector recall channel. This including tasks such as collecting training samples, feature processing,DSSM offline model training, vector index deployment and online integration.Increased passive search rate by +0.39pt. Increased average searches per user by +0.35%.Increased click pv by 34.39%.

4.Optimized the real-time performance.Integrated real-time data streams to generate recommended query based on user interactions with notes.(e.g. clicks, likes, collects).

5.Relevance Optimization:Added coarse-grained(NER, Category) and fine-grained(query semantic similarity) relevance controls.

6.Engineering performance optimization: Implemented parallelization, batch processing and caching improvements.Optimized task dependency relationships and upstream rate-limiting mechanisms.Improved passive search rate by +0.37pt.Decreased average timeout rate from 2% to 0.3%.Decreased average response time from 109ms to 69ms.

Query Recommendation(Mar 2022- Apr 2023)

Project Introduction:
A new scene, "Related Searches On Note Detail Pages" was launched to better meet users' in-depth search needs.This led to an increase in search scale by 1.56 million per day, with a good experience rate of 89%. "Search Filters" is important to increase query scale.With retrieval optimization, coverage increased from 27% to 39%, daily search scale increased 2.56 million.
Personal Work:
1.Related searched on Note Detail Pages

(1)Added Note Content Extraction Recall Channel: For hundreds of millions of note on RedNote, through the process of extraction module(mining core words)->retrieval module(core-word based retrieval)->relevance control module, recommended query were finally generated.This effectively improved the coverage rate for new notes and notes with sparse behavior interactions.

(2)Optimization of Ranking Module: Through the construction of ranking module and strategy, 7-day fsau increased by +0.42pt, and the ctr increased by 12%.

(**3)Experience Optimization**: Managed low-quality words based on posterior consumption feedback signals and prior semantic signals(such as query NER, grammatical fluency, part-of-speech tagging,etc.).Supplemented high-quality words based on pattern rules.Bad cases rate dropped by 18%.

2.Search Filters

(1)Retrieval Optimization: An associated Tag mining recall channel was launched.The Query scale increased by 2.56 million per day, and the coverage rate improved from 27% to 39%.

(2)Experience Optimization: Through quality optimization, trigger optimization based on search query intent, geographical optimization, safety/ecological optimization.Reduced bad cases rate from 15% to 6%.

3.Summary:Through all optimization, the search pv increased from 5 million to 17.4 million.Passive search rate increased from 4% to 11%.

Certifications

- **Computer Skills:** National Software Technology Qualification - Software Designer Certificate / Programmer Certificate.
- **Language Skills:** CET6 Certificate, CET4 Certificate.

Self-evaluation

- Equipped with a Master's Degree in Computer Science backed by five years of practical experience in search algorithms, I posses a comprehensive understanding of the entire search system.
- My skill set includes proficiency in mainstream programming languages such as Python, Java and Go, etc.I am also well-versed in big data frameworks like Spark and Hive, as well as deep learning frameworks such as PyTorch and TensorFlow.Additionally, I am familiar with the Linux development environment.
- Positive, responsible, with self-learning capabilities, a dedicated work ethic, a strong sense of teamwork, and excellent team communication skills