Looking at the Demand of Bank Big Data Talents from the Perspective of Big Data

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Abstract. Big data is the foundation of artificial intelligence. In the financial field, as a very large and very convenient field for applying big data, there has been a lot of research on big data and artificial intelligence. From intelligent customer service to smart investment consultants to smart counters and unmanned banks, the penetration speed of big data and artificial intelligence in the financial field has reached an unimaginable level. We use big data to make money, and we use big data to understand the dynamics and trends of the bank. This article uses the reptile software Octopus to analyse the recruitment data of Zhonggong Financial Online to understand the needs of banks for big data talents, to explore its real dynamics and implementation in artificial intelligence, financial technology and big data.

1. Background and data
Most of the recruitment data of Zhonggong financial people are taken from the official websites of major banks and recruitment websites such as Zhaopin Recruitment, which are divided into two categories, one is campus recruitment, and the other is social recruitment. Campus recruitment includes both formal recruitment and intern recruitment. Social recruitment includes both the bank's own recruitment and the dispatch system. This article selects the recruitment information from January 1, 2015 to August 20, 2019 for analysis. Although many bank interns are recruited, it is possible to change to an official full-time employee and realize invisible official full-time employee recruitment. However, considering the consistency of data, each bank's practices are inconsistent, and there is also a big difference in the proportion of interns' enrollments. So the information on interns' recruitment is removed.

By the end of 2018, the number of banking financial institutions was about 4,500 in China, including three policy banks, namely, China Development Bank, The Export-Import Bank of China and Agricultural Development Bank of China, and six systemic banks including ICBC, China Construction Bank, Agricultural Bank of China, Bank of China, Bank of Communication, and Postal Savings Bank of China. There are 12 joint-stock banks and 134 city commercial banks. The rest include dozens of private banks, about 1,000 rural commercial banks, about 1,000 rural cooperative banks and credit cooperatives, about 1,600 new rural financial institutions, and other banking financial institutions. Through preliminary data observation, rural commercial banks, rural credit cooperatives and other rural banking financial institutions are still in the process of transition from credit unions to banks, recruiting almost all customer managers, tellers, and other business personnel to form a complete banking finance. They are learning and imitating the big banks. Therefore, from this large amount of data, we focus on the six major systemic banks and national large and medium-sized joint-
stock banks to understand their way of pursuing technology, big data, artificial intelligence and other Fintech.

2. Campus Recruitment Data Analysis
First of all, we analyze the campus recruitment. In the past five years, there are a total of 6645 job advertisements from 192 banks. The recruitments issued by each bank are analyzed on an annual basis. The recruitments information for key words such as big data, AI, artificial intelligence, deep learning, and machine learning will be screened. We screen out 15 recruitments from 4 banks, which are China Construction Bank, China Merchants Bank, Ping An Bank and China CITIC Bank. Each recruitment includes the recruitment of multiple positions, after breakdown, the four banks' demand for big data/artificial intelligence is as follows:

| Year | Dep. Description | Position | Work location | Headcount |
|------|------------------|----------|---------------|-----------|
| 2018 | Big Data Wisdom Center | Big Data Analysis | Shanghai | 10 |
| 2018 | Risk Measurement Center | Big Data and Risk Measurement | Shanghai | 20 |

The construction bank's academic qualifications for graduates are undergraduate or higher, and professionally require mathematics, statistics, big data, and information technology, and computer, economic and financial related majors. English requires Level 6 and above.

The demand for professionalism of China Merchants Bank is similar as that of the Construction Bank. It only requires mathematics, statistics, and computer, and communication, economic and financial related majors. China Merchants Bank began recruiting talents in this field from 2017. By 2019, in addition to software and programming, the required recruitment of college students has begun to consider more research on trend. The grasp of the big direction and the identification of risks are also more important. In terms of recruitment content, China Merchants Bank's recruitment is more specific than China Construction Bank, and it has more explanations on job responsibilities and bonus points. The latter has refined the recruitment content to highlight the core requirements.

| Year | Dep. Description | Position | Work location | Headcount | Requirement | Job Responsibility |
|------|------------------|----------|---------------|-----------|-------------|--------------------|
| 2019 | Credit Card Centre | Data analysis-risk quantification direction | Shanghai | 10 | Have development and programming foundation, and understand the underlying architecture of the system, Relevant experience with Hadoop | Risk quantification and identification, algorithm design and optimization of customer portrait |
| 2019 | Credit Card Centre | Data analysis-risk research direction | Shanghai | 10 | Find risk identification variables, complete quantitative analysis, program design, etc. Develop risk management standards | |
| 2019 | Credit Card Centre | Data analysis-business | Shanghai | 10 | Familiar with SAS/SQL/R/Python tools, relevant internship experience | Macro risk trend research |

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| Year | Position | Location | Education | Experience | Responsibilities |
|------|----------|----------|-----------|------------|-----------------|
| 2019 | IT-strategy is preferred | Shanghai | 10 | Familiar with Java and Python programming in Linux environment, with strong algorithm implementation ability | Enterprise-level algorithm platform system architecture planning, design, development and on-line project work |
| 2018 | IT class-data warehouse/big data direction | Shanghai | 10 | At least familiar with a database, such as DB2, Mysql or Oracle database, familiar with SQL and performance tuning. Ability to use Python for data processing, or familiar with other scripting languages such as Shell and Perl | Responsible for data warehouse construction, including metadata management, data quality management, ETL design development and optimization |
| 2018 | AI | Shanghai | 10 | Familiar with Java and Python programming in the Linux environment, with strong algorithm implementation capabilities | Responsible for semantic recognition, computer vision, image processing, speech recognition and other related algorithms |
| 2018 | Internet technology | Shenzhen, Hangzhou, Chengdu | 10 | A programming language with specific project design and development experience is preferred; an operating system | Responsible for the construction of China Merchants Bank Information System |
| 2017 | Shenzhen Branch | Shenzhen | 10 | Have strong application programming skills; Familiar with NoSQL products | Quasi-real-time processing platform and other large data cluster environment construction, system management and performance optimization; Responsible for the construction of GIS basic platform |
| 2017 | AS400 Development Engineer | Shenzhen | 10 | Master's degree or above; excellent grades | Study the academic research and development of NLP natural language processing, human-computer interaction, knowledge mapping, etc., and apply it |
| 2017 | Software Centre | Chengdu | 10 | At least familiar with a database, big data related open source products; Machine learning direction, require us graduate degree or above, proficient in Linux system, proficient in python, familiar with deep learning framework such as tensor flow | Responsible for image recognition, semantic understanding, speech recognition (one of them) algorithm research; Architecture design, development and testing of big data platforms; Develop/design data mining algorithms; Responsible for the construction, configuration, maintenance and performance tuning of the Hadoop cluster |
Ping An Bank, starting in 2018, has released only one campus recruitment requirement for big data/artificial intelligence. It is the JAVA development position of Ping An Bank. The working place is Shanghai. The core qualifications require excellent English in addition to related majors. CITIC Bank first released the campus recruitment requirements for big data/artificial intelligence in 2019. There are three positions. In addition to the general qualifications and professional relevance requirements, other requirements are as follows:

Table 3: Demand of China CITIC Bank for Big Data/Artificial Intelligence posts

| Release year | Dep. Position | Work location | Headcount | Requirement |
|--------------|---------------|---------------|-----------|-------------|
| 2019         | Hadoop developmnt | Shenzhen | 10 | Priorities for blogs with data analysis topics or systems that operate independently; Have a national programming contest or a robot contest experience Passed RHCSA, RHCE certification Developed by CDH and HDP |
| 2019         | Big data developmnt | Shenzhen | 10 | Understand one or more commonly used deep learning computing frameworks; Familiar with common programming languages such as Shell, Python, Java, etc., have good code habits; Experience in high-quality papers or data mining practical application projects is preferred Experience in programming competition such as ACM or machine learning competition such as Kaggle is preferred |
| 2019         | Data mining analysis | Shenzhen | 10 | |

3. Social recruitment data analysis

In the past five years, the social recruitment data has nearly 5,800 recruitment advisements and a total of 424 pieces of information related to the recruitment of big data/artificial intelligence have been searched, accounting for 7.3% of the total recruitment items. In descending order of the number of relevant recruitments in the full year of 2018, take the top 30 banks for analysis.

Table 4: Number of big data/ artificial intelligence recruitments released by major banks 2015-2019

| Bank                                  | 2015 | 2016 | 2017 | 2018 | 2019 |
|---------------------------------------|------|------|------|------|------|
| Shanghai Pudong Development Bank      | 1    | 1    | 1    | 9    | 5    |
| Industrial Bank                       | 6    | 3    | 3    | 8    | 4    |
| Agricultural Bank of China            |      |      |      |      |      |
| China Merchants Bank                  | 3    | 2    | 9    | 7    | 8    |
| Agricultural Development Bank of China|      |      |      |      |      |
| Guangzhou Development Bank            | 2    | 6    | 2    |      |      |
| Zhejiang Mintai                        | 25   | 18   | 28   | 5    | 2    |
Their needs, similar to campus recruitment, are more biased towards project operation experience, experience with big data applications, and mastering programming software.

4. Conclusion

By using the crawler software in big data mining technology and the recruitment information of major banks exposed through the network, this paper presents a panoramic view of the real needs of big banks for big data and artificial intelligence. Compare with campus recruitment, the demand of banks for talents such as big data and artificial intelligence has been more reflected through social recruitment, which also reflects the needs of for mature talents. In the campus recruitment, China Merchants Bank started earlier, followed by banks such as CITIC and Ping An. In social recruitment, the year-to-year changes in the demand for big data and artificial intelligence talents also reflect the competitiveness of various banks. In fact, we have seen that the vast majority of major banks are currently recruiting account managers, business development, and ordinary tellers, and this aspect tends to recruit localized talents to help local banks better in the local area to work.

However, we can also see that over time, there is more and more demand for big data and artificial intelligence, and it is more inclined to find mature talents. This is also the reason why the proportion of talents in this part of the campus recruitment is small. The current demand for big data and artificial intelligence talents is mainly in the credit card department of banks, which means that the application of big data and artificial intelligence in the financial field is gradually deepening from the personal consumption field to the entire banking financial system. To recruitment, professional requirements

|                | 1 | 1 | 4 | 8 |
|----------------|---|---|---|---|
| ICBC           |  10 | 2 | 9 | 4 |
| Bank of Jiangsu|  1 | 2 | 3 | 1 |
| Hua Xia Bank   |  2 | 1 | 7 | 3 | 2 |
| Jilin Bank     |  3 |
| China Construction Bank | 3 |
| Inner Mongolia Bank | 3 |
| Shanghai Bank  |  4 | 6 | 6 | 3 |
| Zheshang Bank  |  1 | 3 | 2 |
| Dalian Bank    |  1 | 2 |
| Everbright Bank|  2 | 2 |
| Huaxing Bank   |  2 |
| Jinzhou Bank   |  2 |
| Bank of Nanjing|  2 | 1 |
| Suzhou Bank    |  2 | 2 |
| Wuhai Bank     |  1 | 1 | 2 |
| Cangzhou Bank  |  1 |
| Guangzhou Bank |  1 | 1 |
| Guiyang Bank   |  1 | 1 |
| Guizhou Bank   |  1 | 5 |
| Hainan Bank    |  2 | 2 | 1 |
| HSBC           |  1 | 1 |
| Bank of Jiangxi|  1 | 3 |
| Bank of Communications | 1 | 1 |
are relatively broad, but the logic of information technology requirements, programming, data mining technology and other requirements are needed.

At the same time, the outsourcing business is generally infiltrated, technology belongs to technology, and finance belongs to finance. It may also be one of the reasons why the financial industry recruits artificial intelligence and big data talents are not as good as imagined.

5. Recommendations

The application of big data and artificial intelligence is increasing, which is the trend of the times. Obviously, compared with the Internet industry such as BAT, our banking industry still has a certain gap in consumer portraits, online marketing, information technology maintenance and application, big data mining, and artificial intelligence applications. Seeking cooperation with professional technology companies, especially big data and artificial intelligence companies, will be a good way to quickly keep up with the era of artificial intelligence. This is important for big banks, and it is also very meaningful for small and medium-sized banks that are not well funded.

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