HACETTEPE UNIVERSITY
ENGINEERING FACULTY
DEPARTMENT OF COMPUTER ENGINEERING

BBM 325
INTERNSHIP REPORT

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Performed at
Yapı Kredi Technology

01.07.2021 – 31.08.2021
35 Work Days

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1 Introduction

I completed my internship in Yapı Kredi Technology A.Ş. at the Management Information Systems Application Development department. Yapı Kredi Technology's main areas are Banking and Finance sectors. I chose this company for my internship because of their leadership in the financial tech in Turkey and Europe.

During the internship I got involved with the work of my team, as well as developed a product to be used in-house under the DevOps team.

This internship was done remotely.

2 Company Information

2.1 About the company

On October 1, 1980, Bilpa A.Ş was established by Yapı Kredi as a separate company. It had the privilege of being the first technology company established by a private bank in Turkey.
On November 14, 2000, its name was changed to Yapı Kredi Teknoloji Hizmetleri A.Ş.
On 1 June 2002, it has been incorporated into Yapı ve Kredi Bankası A.Ş.

Yapı Kredi Technology is a tech company, which delivers innovative, high quality and value-added solutions and products in finance industry. With more than 1.200 employees, Yapı Kredi Technology targets to bring in leading products to the sector for Yapı Kredi Bank and become a well-known leader in the industry by using cloud technologies and modern architecture designs.

Yapı Kredi Technology is operating in 2 different locations: Yapı Kredi Banking Base Çayırova/Kocaeli , İTÜ Technopole Maslak/İstanbul . The company contributes to the development of new and leading products with its R&D team by using natural language processing, machine learning, artificial intelligence and data mining technologies.

Its main subjects of activity are to produce and market all kinds of solutions in informatics and software development, to be engaged in R&D activities, to commercialize the knowledge produced, and to deliver innovative software products.

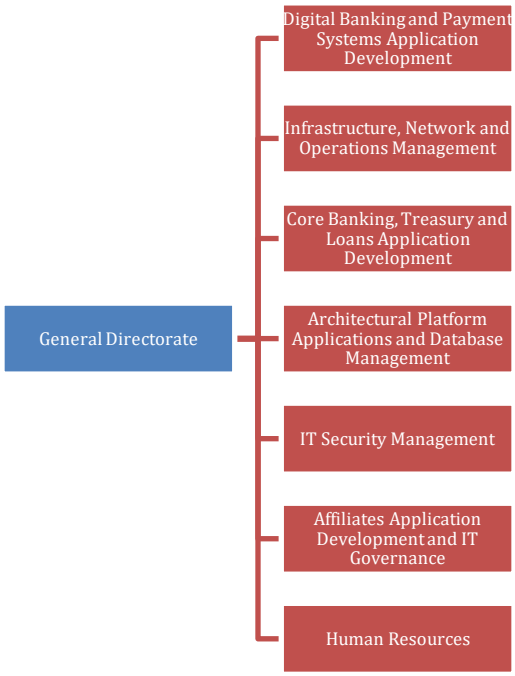

Figure 1: Organizational Chart

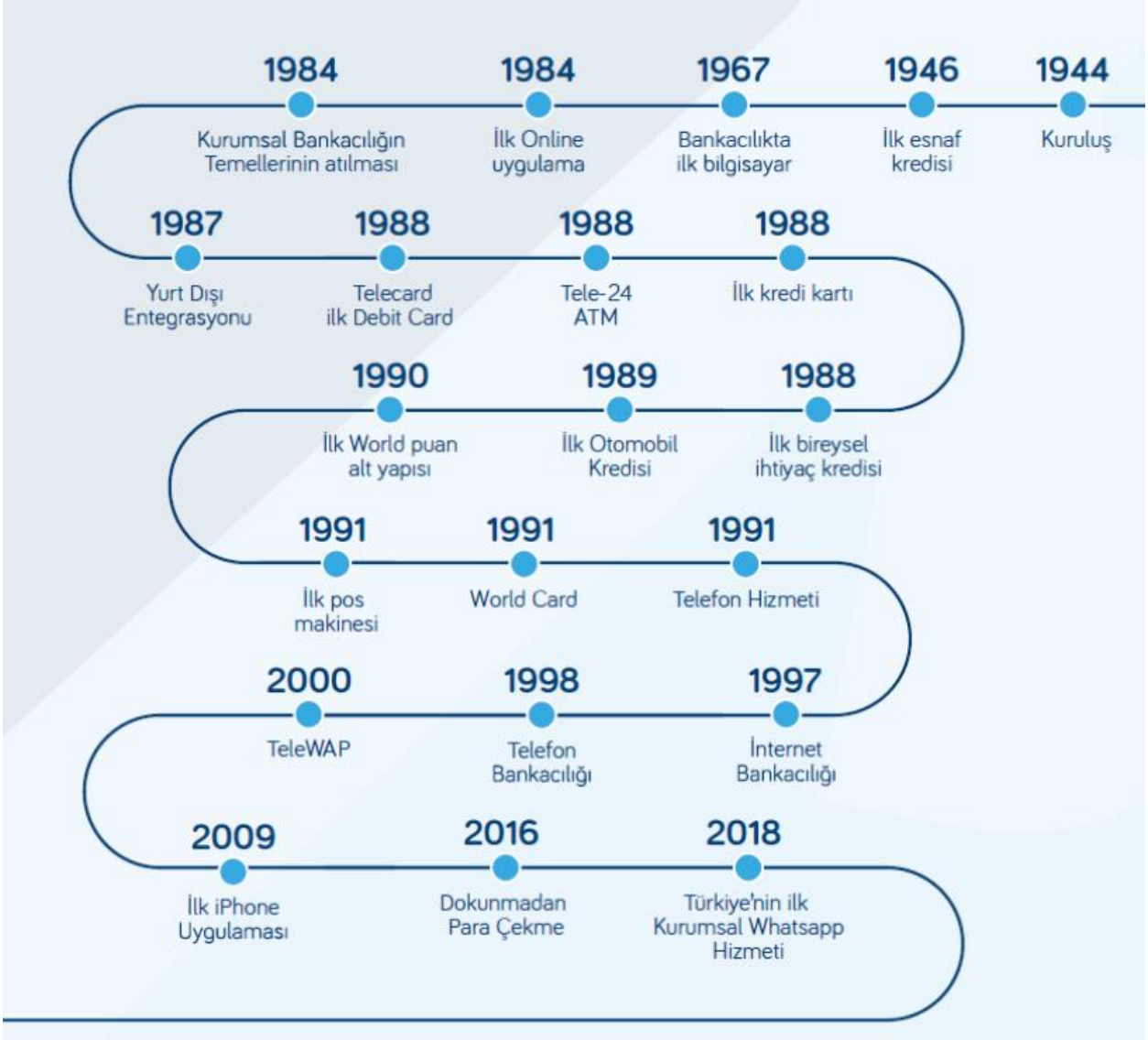

Figure 2: Timeline of use of technology within Yapı Kredi Bank

Yapı Kredi Technology is a Yapı Kredi Bank affiliate.

2.2 About your department

I was part of the Management Information System Application Development Team. MIS Team is responsible for MIS section inside of the branch bank application called “Harmoni”. Team’s missions are capturing and processing (sorting, classifying, making calculations etc.) client and transaction data, managing data flow.

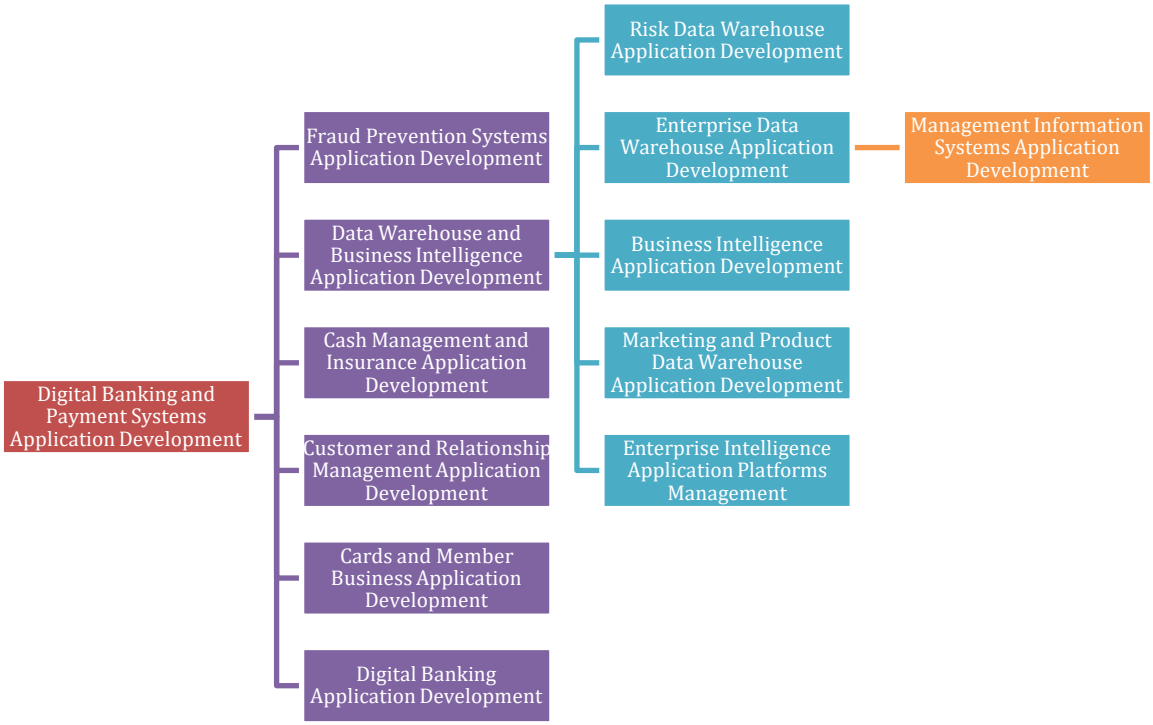

Figure 3: MIS Application Development's place in the organization

2.3 About the hardware and software systems

Management Information System Application Development Team uses tools such as PL/SQL, Oracle Database, UC4 Automation and Informatica.

2.4 About your supervisor

Provide the following information for the supervisor:

- Tolga Göksan,
- Yapı Kredi Bankacılık Üssü Rahmi Dibek Cad. No:275 Çayırova/Kocaeli,
- +90 533 635 09 98,
- tolga.goksan@ykteknoloji.com.tr
- Yıldız Technical University – Computer Engineering BSc., 2005

3 Work Done

3.1 Seminars

I attended to several seminars throughout my internship period. In the seminar titled "Core Banking Ecosystem and Concepts", I learned about the history of banking in Turkey and the history of Yapı Kredi Bank, as well as the logic of banking and the basic terminology used in banking. In the seminar called "Project Management", I learned about agile methodology and scrum methods, which are also used in Yapı Kredi Technology. I attended seminars held by the Business Analyst, Quality Assurance Engineer, Software Development Engineer and Research & Development Engineer teams within Yapı Kredi Technology on their roles, tools they use and the work they perform. Another seminar I attended was about SQL, I learned fundamental SQL usage. I also attended various other seminars such as "Presentation Skills" and "Self-Awareness".

3.2 Chatbot Project

With a team of interns and project mentors, I developed an in-house chatbot assistant. I applied the principles of agile methodology in the project planning. We conducted daily scrums to keep in touch with each other about the project.

3.2.1 About the project

The aim of the project is to develop a chatbot that can automatically answer questions that are constantly asked to the company's DevOps team that can be easily resolved. This will reduce the workload of the DevOps team. At the end of the project, a chatbot will be integrated into the Jira page, which is used by engineers and analysts within the company, which they can easily access.

3.2.2 Rasa Framework

Rasa is an open-source machine learning framework for automated text and voice-based conversations. It can understand messages, hold conversations, and connect to messaging channels and APIs. I used this framework in the project for NLU operations. The project was asked by the project mentors to be in Turkish. Because of that, Rasa was my first choice among other chatbot frameworks. Another plus is unlike other chatbot frameworks where manufacturers want you to use their own cloud solutions (Microsoft Luis, Amazon Alexa Conversations etc.), Rasa can be installed anywhere. This is a critical feature for a bank, where any data leakage is extremely crucial.

For storing and training the model with data, Rasa uses YAML files. NLU training data consists of example user utterances categorized by intent and listed under the examples key in nlu.yml file.

```
- intent: faq/ask_devOps
  examples: |
    - devops nedir?
    - devops ne demek
    - bana devops'tan bahseder misin?
    - devops'un tanımı nedir
    - devops hakkında bilgi alabilir miyim
    - devops
```

Figure 4: A training data example

With sufficient training examples, the model can understand the intent of the user input. After that Rasa returns pre-defined answers for these intents. Responses reside in domain.yml file.

```
responses:
  utter_faq/ask_devOps:
  - text: Geliştirme (Dev) ve operasyonların (Ops) birleşimi
          olan DevOps, müşterilere sürekli olarak değer sunmak
          için bir araya gelen kişiler, süreçler ve teknolojiler
          bütünüdür.
```

Figure 5: A response example

Besides basic FAQ operations, Rasa also can run custom actions. For this we can use Action Server feature of Rasa. Just like responses, intents can be associated with actions. When a certain confidence threshold was passed, Action Server calls the custom action. In our work we used this function for weather forecast.

```python
class ActionTellWeather(Action):

    def name(self) -> Text:
        return "tell_weather"

    def run(self, dispatcher: CollectingDispatcher,
            tracker: Tracker,
            domain: Dict[Text, Any]) -> List[Dict[Text, Any]]:
        def currentTemp(location, language, aqi = "no"):
            response = r.get(api , params = {"key": api_key, "q": location,
            "lang": language, "aqi": aqi,})
            response.encoding = 'utf-8'
            data = response.json()
            return data["current"]["temp_c"], data["current"]["condition"]["text"]

        myWeather, condition = currentTemp("Istanbul", "tr")
        dispatcher.utter_message(text="Bugün hava %s derece ve %s." % (myWeather,condition))
        return []
```

Figure 6: Custom action example

3.2.3 PostgreSQL

PostgreSQL is a powerful, open-source object-relational database system that uses and extends the SQL language combined with many features that safely store and scale the most complicated data workloads. For storing chatlogs and improving the chatbot with user input we used the PostgreSQL database.

id	sender_id	type_name	timestamp	intent_name	action_name	data
1	3aefab674cfd4dcfaafa8e29bfb53436	action	1629970816		action_session_start	{"event": "action", "timestamp": 1629970870.8238504, "name
2	3aefab674cfd4dcfaafa8e29bfb53436	session_started	1629970816			{"event": "session_started", "timestamp": 1629970870.823850
3	3aefab674cfd4dcfaafa8e29bfb53436	action	1629970816		action_listen	{"event": "action", "timestamp": 1629970870.8238504, "name
4	3aefab674cfd4dcfaafa8e29bfb53436	user	1629970816	qreet		{"event": "user", "timestamp": 1629970871.5894775, "text": "r
5	3aefab674cfd4dcfaafa8e29bfb53436	user_featurization	1629970816			{"event": "user_featurization", "timestamp": 1629970872.5011
6	3aefab674cfd4dcfaafa8e29bfb53436	action	1629970816		utter_welcome	{"event": "action", "timestamp": 1629970872.5011284, "name
7	3aefab674cfd4dcfaafa8e29bfb53436	bot	1629970816			{"event": "bot", "timestamp": 1629970872.5011284, "metadat
8	3aefab674cfd4dcfaafa8e29bfb53436	action	1629970816		action_listen	{"event": "action", "timestamp": 1629970872.5323806, "name
9	3aefab674cfd4dcfaafa8e29bfb53436	user	1629970816	PPM_no_alanı		{"event": "user", "timestamp": 1629970877.2796166, "text": "p
10	3aefab674cfd4dcfaafa8e29bfb53436	user_featurization	1629970816			{"event": "user_featurization", "timestamp": 1629970877.3264
11	3aefab674cfd4dcfaafa8e29bfb53436	action	1629970816		utter_PPM_no_alanı	{"event": "action", "timestamp": 1629970877.32648, "name":
12	3aefab674cfd4dcfaafa8e29bfb53436	bot	1629970816			{"event": "bot", "timestamp": 1629970877.32648, "metadata"
13	3aefab674cfd4dcfaafa8e29bfb53436	action	1629970816		action_listen	{"event": "action", "timestamp": 1629970877.3579962, "name
14	3aefab674cfd4dcfaafa8e29bfb53436	user	1629970944	ask_git_config		{"event": "user", "timestamp": 1629970883.021527, "text": "gi
15	3aefab674cfd4dcfaafa8e29bfb53436	user_featurization	1629970944			{"event": "user_featurization", "timestamp": 1629970883.0528
16	3aefab674cfd4dcfaafa8e29bfb53436	action	1629970944		utter_git_config	{"event": "action", "timestamp": 1629970883.0528095, "name
17	3aefab674cfd4dcfaafa8e29bfb53436	bot	1629970944			{"event": "bot", "timestamp": 1629970883.0528095, "metadat
18	3aefab674cfd4dcfaafa8e29bfb53436	action	1629970944		action_listen	{"event": "action", "timestamp": 1629970883.0684168, "name
19	3aefab674cfd4dcfaafa8e29bfb53436	user	1629970944	chitchat		{"event": "user", "timestamp": 1629970887.4629562, "text": "t

Figure 7: PostgreSQL stores valuable data

3.2.4 React.js

React (also known as **React.js** or **ReactJS**) is a free and open-source front-end JavaScript library for building user interfaces or UI components. The front-end of the project designed as a React component.

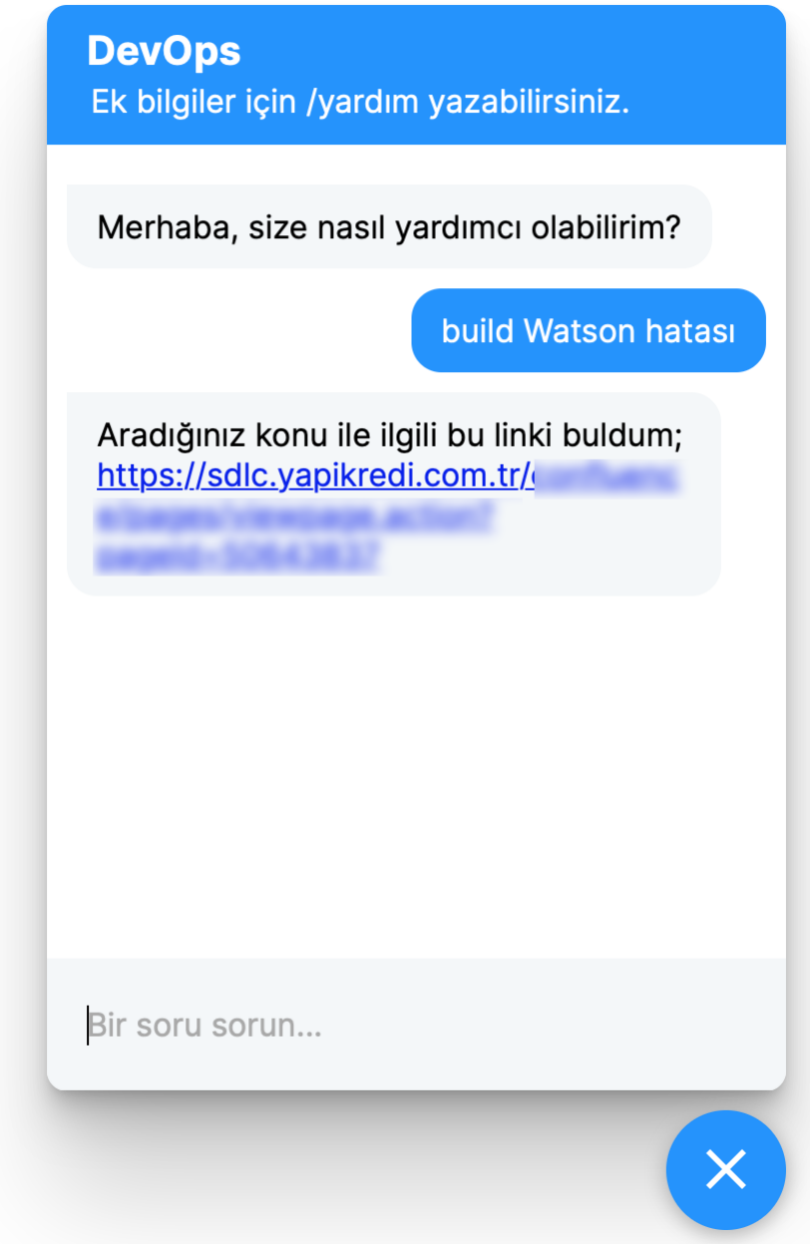

Figure 8: Final product

4 Performance and Outcomes

4.1 Applying Knowledge and Skills Learned at Hacettepe

Knowledge and skills that I gained from Hacettepe has made my internship process easier. I used the experience I gained from lab courses and given assignments while developing the project.

4.2 Solving Engineering Problems

I was able to use the concepts of software design and implementation that I learned at university in "solving engineering problems" at Yapı Kredi Technology.

4.3 Teamwork

Business analysts and software engineers work together in scrum teams created within Yapı Kredi Technology, I was able to gain experience in teamwork both in the MIS Application development team and in the chatbot assist project.

4.4 Multi-Disciplinary Work

As I mentioned in the Teamwork section, engineers and analysts work together in teams. In addition, meetings are held with customers (which is Yapı Kredi itself) on projects. Internal customers can have many different titles.

4.5 Professional and Ethical Issues

There were no professional and ethical issues when I was there. But in the trainings about banking, ethical problems that may arise in the bank and their solutions were discussed. Since Yapı Kredi and Yapı Kredi Technology employees can access customer data, the laws regarding KVKK and GDPR were reminded. In addition, information was given about bank and customer secrets within the scope of Banking Legislation.

4.6 Impact of Engineering Solutions

The products developed in the company enable Yapı Kredi Bank to serve its customers better and faster. In addition, products developed for internal use increase productivity and reduce the use of time and resources.

4.7 Locating Sources and Self-Learning

For the tools and languages I learned, I mostly used the documentation of the products on their own sites. While learning the Rasa framework, I used the Udemy course created by their developers and the forums contributed by their developers. Towards the middle of the internship period, we had access to a learning platform called Percipio. Here I took courses on Microservices, Data Warehousing and Agile Methodology.

4.8 Using New Tools and Technologies

Here I used Atlassian products for the first time. I used Bitbucket for git tracking, Jira for project management and Confluence for internal information sharing. It's the first time I've used PL/SQL and I've seen the use of Oracle Database for database management. I got familiar with Docker and container concepts and Jenkins for continuous integration, although we couldn't use it in our project.

5 Conclusions

I completed my 35-day internship at Yapı Kredi Technology. I have experienced working in a large and corporate company, and I also practiced remote work for the first time. I contributed to the development of an application to be used within the company. The "best practices" I learned at Hacettepe guided me.

References

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[6] Scrum, “A better way of building product.” https://www.scrum.org/resources/what-is-scrum.