

Canada-Japan Co-op Program Experiential Report

Internship period: June 2019 to March 2020

Advanced Telecommunications Research Institute International (ATR)

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https://www.atr.jp/index_e.html

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1. Introduction

At the beginning of this report, I would like to express my gratitude and appreciation to the CJCP program and the Advanced Telecommunications Research Institute International for providing this wonderful internship opportunity. My experience with this internship exceeded my wildest expectations. Prior to going to Japan, I have been excited for Japanese television dramas and food since high school. Hence, when friend of mine informed me of this opportunity, I was very excited to work there and wanted to experience the culture over there.

In this report, I shall summarize my personal experience with ATR (Advanced Telecommunications Research Institute International) and lifestyle in Japan. In detail, I shall introduce the background and the daily life in ATR. Followed by my travelling experiences in Japan, and I will wrap it up with my conclusion and some recommendations for future students.

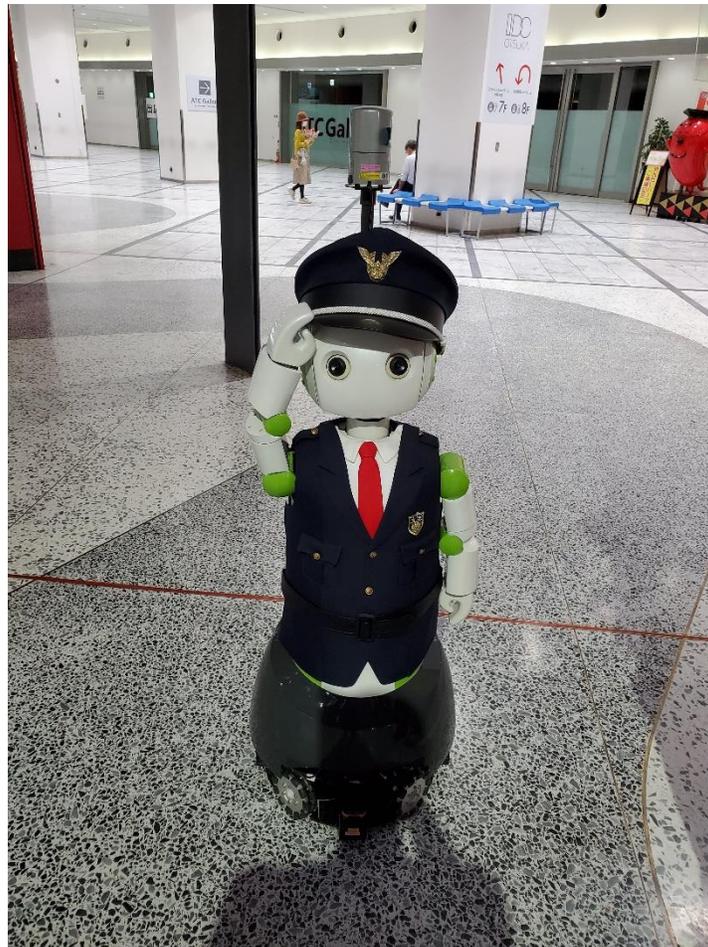


Figure 1. My lovely robot

2. My work in the Advanced Telecommunications Research Institute International (ATR)

2.1 Background of ATR

ATR was established in 1986 and it was moved to the current location, located in Kansai Science City, Keihanna, in 1989 [1]. The company was founded through the broad support of industry, government and academia [1]. The purpose of the company was to promote research on information and communication-related fields and contribute to the welfare of society and humanity [2]. To fulfill these purposes, the ATR group conducted research on computational neuroscience, life supporting robots, wireless communications, and life science [2]. To further contribute to society, ATR commercialized their research outcomes [2]. For example, they provided research outcomes and technical support to venture companies through the Keihanna ATR Fund [2]. Business affiliates were also established to commercialize products and services based on ATR's research outcome [2].

ATR is very active on the international scope. ATR has established many collaborations and research exchanges and accepted researchers, including engineers and internship students like myself. There have been collaboration efforts with around 40 different research institutes and universities around the world [3]. So far, ATR have been joined by 2571 people from 66 countries. ATR's network is truly widely spread across the globe [3].



Figure 2. Front view of the ATR

2.2 My department at ATR

I worked in the Human Robot Interaction lab under the department of Deep Interaction Laboratory lead by Takayuki Kanda. With growing numbers of everyday applications for artificial intelligence and robotics (social robots, self-driving cars, and automated shops), we can expect that future society will be ubiquitous with various robots [4]. Towards such a robotized society, the main research direction of my lab focuses on studying ways that robots can interact with people and operate in harmony alongside them [4]. In more detail, my lab conducts fundamental research in intelligent robotics, human interaction, sensor networks, and artificial intelligence (AI) [4]. Such research can be applied in the service industry, elderly care, health care, collaborative workplaces, and learning. For human robot interaction, which is the lab I was in, the ways for robots to interact with people in a natural manner was the main focus[4]. For instance, the lab uses gaze and gesture to reproduce human-like interaction. The current project is related to human robot interactions in public spaces within the city [4].

2.3 My work at ATR

My work focused on developing software tools for supporting the development of mobile social robots [1]. This includes developing the software for robot behaviors and object detection modules using sensor data. The first project that I got involved with was to make application programming interfaces (API) between their old robot controlling software to their new robot driver. This got me working with the Robot Operating System interface which the robot driver was using. The first project is related basic robot movement, such as approaching the human, driving to a specified point on the map, and manual controlling the velocity of the robot. Since the purpose of the research was focused on the human – robot interaction, there was no way to finish the research just in an office cubical. Hence, even though the early development of the software took place in ATR, the actual experiment and testing was usually done in a mall called the Asia-Pacific Trade Center (ATC) in Osaka. For example, during August 2019, an experiment conducted was the admonishment of humans parking their bicycle at illegal areas at ATC. This experiment displayed how robots can correct human behavior effectively, by approaching them and reminding them the rules of the mall. Another experiment that I assisted in developing was a service robot in a shop. The role of the robot was to provide assistance to the customers. The robot was supposed to guide the customers to the item that they were seeking, in the meantime, it also checked if the merchandise on the shelves were incorrectly placed or not. The task I was given was to develop software for merchandise detection with Kinect V2 sensors. A little side story from my internship was I

got the opportunity to attend an exhibit. The exhibit is called “NEDO AI & ROBOT NEXT Symposium” hosted by NEDO. NEDO is an organization that provides funding for the technology development. The exhibit was organized for the purpose of reviewing the research and development(R&D) results and considering the future prospects for two NEDO projects [5]. The first project, Development of Core Technologies for Next-Generation AI and Robotics, promotes both R&D for innovative basic technologies that are not merely extensions of existing AI and robotics technologies as well as the social implementation of AI technologies [5]. The second project, Realization of Smart Society by Applying Artificial Intelligence Technologies, is pursuing R&D and demonstrations that make use of current R&D infrastructure, sensor technologies developed for data acquisition, and AI modules [5]. For example, for my labs, we developed simulations for robot behavior, which could be used for improving the development of the robotics technologies. It was a very special experience to attend such technical exhibits, even as a presenter. I was able to see the current direction of AI and robot research, and other technologies that could be used for everyday life in the future.

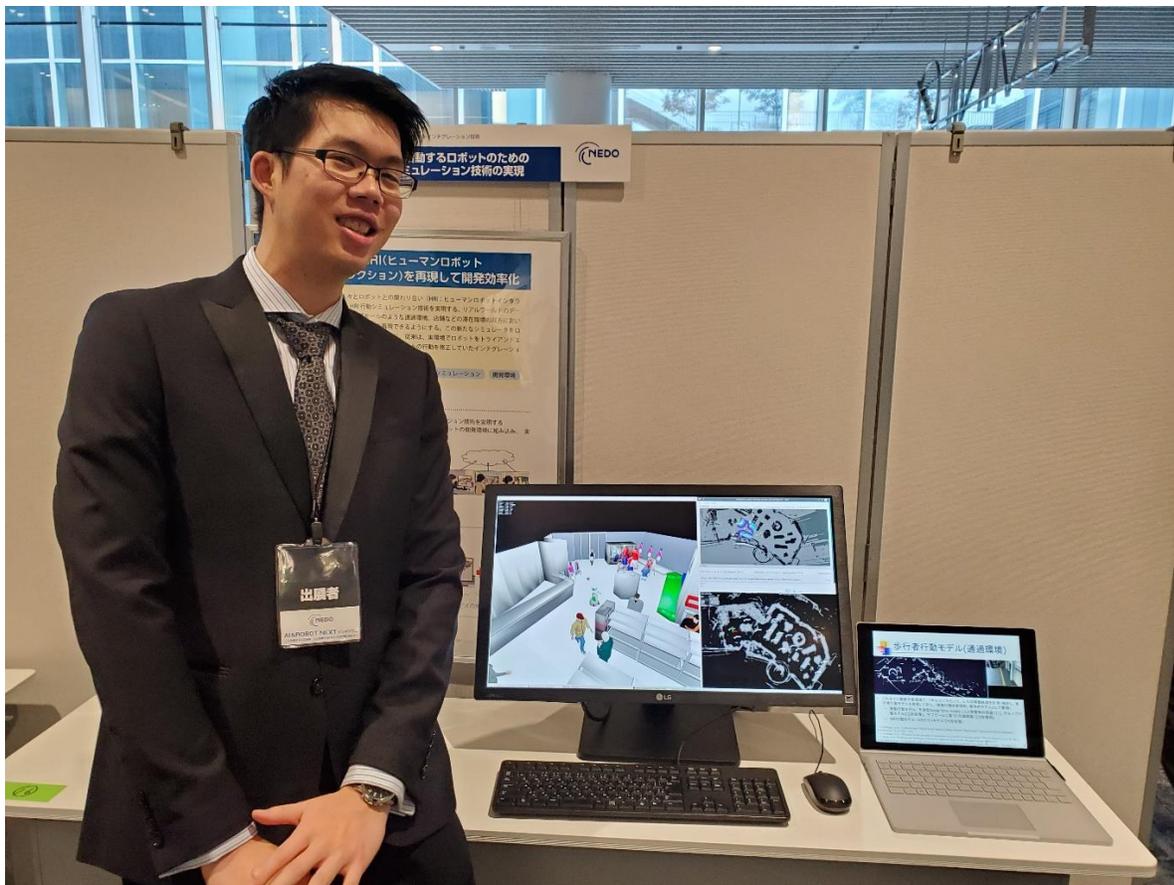


Figure 3: Presenting at NEDO AI & ROBOT NEXT Symposium for simulation work

2.4 Working environment at ATR

The working culture at ATR was surprisingly westernized. The working hours were generally flexible, also unlike other CJCP related Japanese companies, there was not much of a dress code at ATR. Flexible working hours were great for dodging rush hours train. On a typical day, I usually got to ATR around 10:00 am, or 11:00 am if I was working at ATC. The commute was not bad on the way to ATR, it took around 40 minutes by public transport, 50 minutes on foot, or 20 minutes by bicycle. Typical public transport takes one and a half hours to ATC. For lunch, ATR had a designated cafeteria that provided food during lunch time. The typical meal set cost 500 yen and included a small side dish, rice, main dish, and soup. In addition, there were usually three to four choices to choose from as shown in figure 4. The cafeteria also provided other options such as udon, soba, ramen, small onigiri, and curry rice. Lunch time was probably the only time that is available for socializing with other colleagues or other intern students. I usually got useful information for traveling and received tips and tricks from their experience.

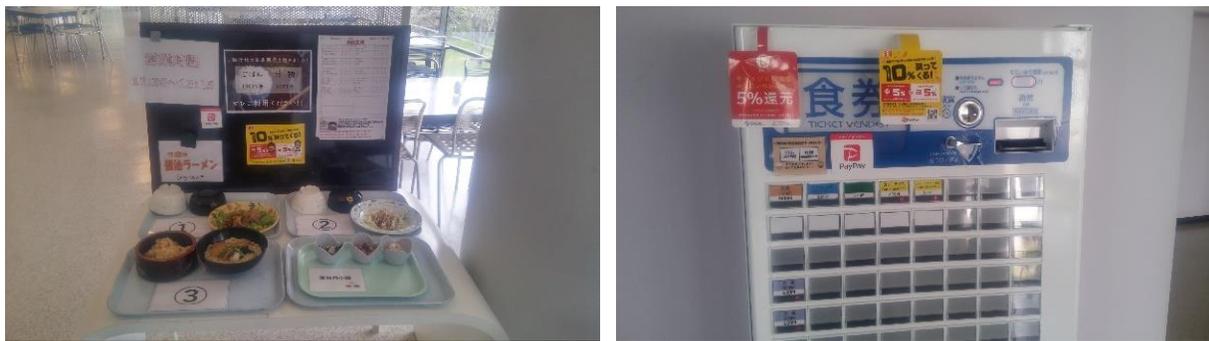


Figure 4 & 5: Ticket vending machine and cafeteria menu options at ATR

3. Personal life

3.1 Accommodation

With this internship, it was the first time that I lived by myself. With a lot of uncertainty and having no clue what to expect, I would like to give a big thanks to ATR for making accommodation easier than ever. The housing was provided by ATR with an apartment on the first floor in a city called Kizugawa, Kyoto. The apartment that I got was around 41 m², in which my opinion was way more than enough for one person if not 2 people. The housing was fully furnished by the company, in which they provided a fridge, air conditioner, washer, etc. ATR also lend out other basic goods such as forks, knives, pans, and kettles, which got me started and set right after I moved in. The place was surprisingly accessible. There was an Aeon mall with a cinema 5 minutes away, which I gratefully loved the fact that they opened until 11:00 pm. There was also a small shopping mall around that area also around 6 minutes walk away. But best after all, the train station was 8 minutes walk away from my house, which can be later connected to Kansai's main city such as Kyoto, Osaka, Nara.

3.2 Japanese Language

Although Japanese was not required for work, I figure it would be a great idea to improve my Japanese in Japan. With friend's recommendation, I attended a weekly 2 hours local Japanese class held in Seika City Hall. The class not only taught us Japanese, it also exposed us to the Japanese tradition. Usually, the class started at 7:00pm and ended at 9:00 pm. Instead of traditional class with one teacher teaching multiple students, this class was conducted by one on one lessons with a local volunteer. I was very lucky to be paired with a university volunteer who was the same age as myself.

Since during my work there was not that many chances for speaking Japanese, I also pursued other opportunities for practice. A way that I found out to be particularly useful was an app called "Meetup". As the name suggested, people host events for group meet up for various purposes such as international language exchange. These events provided opportunities to meet with the locals and people were generally open to teach me Japanese, of course, I would teach them English or Chinese in return. Most events for language exchange were usually not expensive with participation fee of 500 yen or even free sometime. Hence, if anyone was interested in meeting up with new people while learning some Japanese at the same time, I definitely recommend giving this app a try!



Figure 6: Meetup app icon

3.3 Travel

3.3.1 Destinations

One of the biggest advantages when it came to the CJCP was that it was easy to find people of similar interests and background. During the 10 months of my internship, the people I traveled together were usually from the CJCP. As my internship was supposed to be 12 months, my frequency of traveling was a lot less compared to other CJCP students. However, I did manage to travel to decent amount of the places during the 10 months I was in Japan. Figure 7 shows the destinations that I traveled over the courses of 10 months.

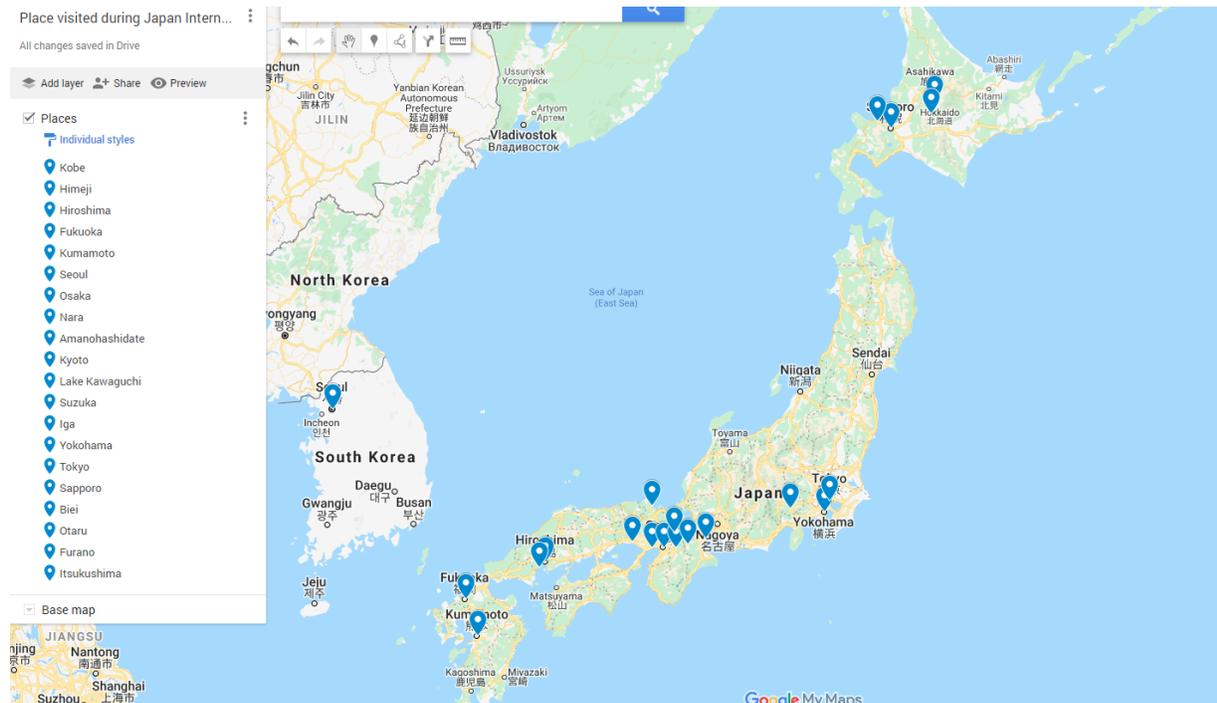


Figure 7: Map of travel destinations

Similar to Canada, Japan has national holidays which makes it perfect for traveling to further places. In fact, Japan has more national holidays than Canada, a great amount of 16! For long distance trip, I traveled to Hokkaido, Tokyo, Fuji, Fukuoka, Kumamoto, Hiroshima, and Seoul. I also visited most prefectures around my place, such as Nara, Kyoto, Osaka, Mei, Kobe, and Himeji. I shall summarize some of my favorite trips that I done, which includes Hokkaido, ninja trip, and automotive trip.

3.3.2 Hokkaido



During August Obon week, ATR has a long weekend of 9 days break. In which I used it for traveling to Hokkaido. Hokkaido is a great place for escaping the heat from the Kansai area, when Osaka is constantly 30 degrees, Hokkaido had a very pleasing temperature around 22 degrees. Thanks to this weather, I learned the word in Japanese for cooling down, which is “Suzushi”. Hokkaido also has other great places to explore. The flower farm located in Furano was amazing even though not all flowers were present in August. Also, not to forget all the alcohol breweries and factories over there, I visited the Asahi beer factory, Nikka distillery, and Sapporo Breweries.

Figure 8. Sapporo beer tour



Figure 9. Flower farm in Furano

3.3.3 Ninja trip



Figure 10. Me in blue ninja suits.



Figure 11. Practice shooting ninja stars

As a fan of Naruto Ninja Hattori-kun myself, I have a deep interest with ninja. Again, thanks to the geographic advantage to live Kyoto, it is very easy to gain access to the two of the most reputable areas of ninja, which are Iga and Koka. Ninja history can be traced back as early as 11th century, although gaining high popularity during the age of warring states in the 15th and 16th centuries, many warlords would hire the ninja as mercenaries for their victories in battles [6]. I went to visit Iga. For those who are interested to go there, Iga can be accessed by JR or Kintetsu train lines from nearby cities.

There was a ninja museum that displayed ninja tools, gadgets, costumes, and history. Also, a ninja house to demonstrate some tricks that ninja use in the old time. Such as hiding weapons or themselves when encounter threats. In Iga, you can change your outfit into a ninja outfit with a little price of 1000 yen like the one in figure 10. Once becoming a ninja, it is important to practice a little bit of my weaponry skill by throwing stars, shown in figure 11. Lastly, aside from the ninja, there is a castle in Iga called Ueno Castle. Which is the tallest castle in Japan. Inside the castle, it features some of the samurai armor from the 16th century and the history of that time.



3.3.1 Automotive trip

One of my interests is F1 and automotives in general. One of the most exciting events in Japan was the F1 Japanese Grand Prix. Personally, I am a great fan of the Red Bull Racing team. Even though the team was Austrian licenced, but because the team is officially using Honda engine starting 2019, the Japanese Grand Prix felt like a home race. The race was held in Suzuka, Mie, which was perfect as a person who lived near Nara when it was not that far away.

As a person who enjoy automotives, it was very easy to find events related to it in Japan. One of the events was the motor show. The theme of this year's Tokyo Motor Show was Open Future. The scope focused not only on the excitement of cars and motorcycles but on new themes such as "Homes of the future" and "Cities of the future".



Figure 12,13,14,15. Automotive trip from Suzuka Japanese Grands Prix and Tokyo Motor Show.

4. Recommendations

To other students who are interested to work in Japan, I strongly recommend going for this unbelievable and amazing opportunity. For future students, I recommend really stepping out of your comfort zone and try out new stuff, thinking as if you only have one shot at any upcoming events. As many opportunities might only happen to you once in your lifetime. There is much to explore in Japan, either the culture or food or anything else since the environment is very different from Canada. I also encourage future students to attend local classes or local meetup events. It is such an easy way to meet other foreigners and Japanese locals, but also learning new languages at the same time. I also recommend choosing longer work term if you can, since there is much to explore in the different seasons, such as the Sakura blossom in April and the red leaves in Fall.

5. Overall Reflections

Taking this internship opportunity was like a gamble. As this internship was my first ever internship and being independent in an environment that I am not familiar with. I honestly did not know what to expect or what would happen over my working term. However, now that I looked back and saw the changes that had been done, I must say the 10 months that I spent with this internship was one of the most rewarding time that I ever had. This internship has greatly contributed to my personal growth and my career development. Being exposed to a brand-new environment and culture had broadened my horizons. I was always amazed by the detailed and sensitive designs from the Japanese. For example, hot dog packaging that can dispense mustard and ketchup at the same time with ease. This reminds me that there will always be improvement toward any products. I would like to give a special thanks to my supervisor, Satoru Satake-san, for supporting and being patient towards the development of my progress despite me having a lack of experience with robotics in general. This internship has strengthened my technical knowledge in which introduced me to the world of robotics and gave me a view of a development cycle in a tech industry. Overall, I am grateful to have had this opportunity to work in Japan and to work at this amazing company. These memories are those that I will never forget.

6. References

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