REPORT to IAESTE Japan

Reference No:	JP-2018-22-OIT
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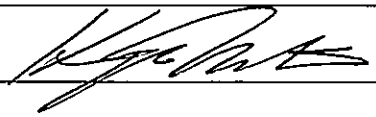
Employer's name:	Professor Kenji Matsui, Ph.D; Professor Sigeru Omatu, Ph.D
Working place/division:	OIT, Umeda Campus
Internship period (day/month/year):	2 months (02/07/2018 to 31/08/2018)
Signature:	

Please answer the following questions.

A) Internship

1. Was your internship in accordance with the experience offered? (Excellent, Good, Fair, Poor)
If your answer is "Fair" or "Poor", please explain why.

Excellent

2. Did you have any influence on the training programme? (Yes/No)
If your answer is "Yes", please explain what.

Yes. I was regularly attending consultations with prof. Omatu and the given tasks were given to me according to my progress and current abilities.

3. How do you describe your relations with people in your workplace?

My colleagues and supervisors offered me help, kindness, generosity, knowledge and guidance during my training. I have nothing to complain about.

4. Was your knowledge in the required language good enough? (Excellent, Good, Fair, Poor)

It is always difficult to judge oneself. My knowledge in the required language was sufficient.

5. Did you complete a special project during your training? (Yes/No)
If your answer is "Yes", please give us more details regarding the project.

No, the project is still ongoing.

6. Please give an outline of the training you experienced with the company.

Outline is provided with this document and marked as 'Summary of the training'.

7. If you completed a technical report for the employer, please provide us mainly concerning the technical part of your work experience. However, when you intend to submit it to us, **its content must be checked by the employer** before submission.

More information provided in section marked as 'Summary of the training'.

8. How much was the total payment you received in JPY per week and what was included? Was this sufficient to cover the cost of living? (Yes/No)

Yes, it covered my cost. The payment was 80 000 JPY per month for 2 months, 20 000 JPY per week.

9. Please give an outline of your accommodation during your training. Also, give us your opinion of the city or town where you were accommodated.

My room consisted with everything I needed for living. I liked the city especially the restaurants but unfortunately Osaka miss some green parks. Apart of that I am more than glad I had the opportunity to experience it.

Social Life

10. How did you spend your free time after working and days off?

I read some books, visited restaurants, went to the beach, had a tour in the city and enjoyed time with my colleagues as well as foreign students accommodated at the dormitory.

11. Did you join any events of our "Summer Programme"? (Yes/No)
If yes, which events did you join and what did you think about the programme provide by IAESTE Japan?

I did not attend any events of the Summer Programme.

12. Did you try any Japanese cultural activities? (Yes/No)
If yes, what did you try and what was your impression?

I tried onsen and I consider it as refreshing experience.

13. Please tell us your overall impression of Japan.

Absolutely brilliant experience.

B) IAESTE Committees

1. Did the overall performance of your sending country satisfy you? (Excellent, Good, Fair, Poor)
If your answer is "Fair" or "Poor", please explain why.

Excellent.

2. Was the information provided by IAESTE Japan (including our website) before your arrival sufficient enough? (Excellent, Good, Fair, Poor)
If your answer is "Fair" or "Poor", please indicate what kind of information was not provided and give us your suggestions to improve our website and good contact between trainees and IAESTE Japan.

Excellent.

3. Did the overall performance of your receiving country satisfy you? (Yes/No)
If yes, tell us why.

Yes, it did satisfy me. The communication was flawless.

If no, tell us why you were not satisfied and give us your suggestions for improvement.

4. If you have any further positive and/or negative comments, please feel free to let us know.

I hope I expressed it all above.

C) Others

1. Will you be accredited for this training from your university or college? (Yes/No)
   If yes, is this a part of your compulsory courses?

No.

2. Was your air fare paid (by yourself / by your university / by other ;)

By myself.

3. Would you recommend this offer for next year's exchange? (Yes/No)
   If yes, tell us why.

Yes, I would. As I mentioned above it was brilliant and unforgettable experience with very kind and professional people around me plus the culture of Japan is beautiful and worth to explore.

   If no, tell us why (please provide us with reasons in detail).

4. Do you think your attitude of mind to your study and international understanding etc. has been changed through
   the internship? How has it been changed?

My attitude to my study has indeed changed in a manner that this internship provided me with clarification of my future steps. With regards to international understanding my mind has not changed since I am used to be around people from foreign countries.

5. Would you like to come back to Japan as an international (exchange) student in the future? (Yes/No)
   If yes, tell us why.

Yes, if I am allowed. As I thought two months is not sufficient time to explore all the perks Japan is able to offer.

   If no, tell us why and what would be a problem.

6. Would you recommend future trainees in your country to have training in Japan? (Yes/No)
If no, explain why.

Yes, of course.

Thank you very much for your time and cooperation!

Summary of the training

- My first task was to acquaint with NAO Robot and framework provided by this platform. I got knowledge about NAO architecture, Blocking and Non-blocking calls, NAOqi API and its Modules, especially the one used for motion. To demonstrate my experience with NAOqi API I chose joint control and simulated short dance in simulation software Choreographe. During these studies I proposed some communication options – Bluetooth board and Bluetooth USB key with an option to implant it in a head of NAO Robot or Wi-fi communication.
- This demonstration was followed by simple program which secured asynchronous communication between client (possible remote computer) and server side (NAO Robot, at that time simulated in Choreographe) using *socket,* in-build Python library and *naoqi* provided by NAO SDK and performed virtually on my notebook. Everything was programmed in Python 2.7 as was required by NAOqi framework.
- This task was followed by XOR classification problem. This problem was designed to get knowledge about machine learning fundamentals and thus introduce me to this field and build a solid background. I applied information gathered mainly by professor Omatu and his book – Neuro-Control and its Applications.
- At first my solution struggled by many issues - namely slow convergence, many iterations required, and has not always found solution – global minima. This problem was partly solved by applying momentum but still struggled in majority of the cases. After professor Omatu proposal of learning rate change during training I eventually found solution. The problem was that sometimes the algorithm got stuck in local minima. This was solved by Adam optimization algorithm mentioned by my colleagues and after reading paper Adam: A Method for Stochastic Optimization. Algorithm applied in a paper I replicated in Python code. My program afterwards did not converge only in 17 cases out of 1000 tested, required approximately less than 1000 training epochs which was fraction of previous solution and the result was significantly more accurate.
- Next, I applied Gradient check to my solution, but the correspondent results were not satisfying probably due to simplicity of the problem and higher learning rate for faster convergence.
- As I finished these tasks I decided to move to widely used Keras machine learning library which uses TensorFlow as backend. I decided to move from lower level implementation to very high-end library since in the future I am going to work with real life solutions which require rapid, practical and flexible solutions and only in some cases lower-level modifications. As source of practice and information I chose book *Deep Learning with Python* by *Francois Chollet*, the author of Keras wrapper.
- Introduction chapters refreshed my knowledge about fundamentals of machine learning and showed some practical approaches to certain problems, e.g. binary classification of movie reviews on IMDB dataset, single-label multiclass classification on Reuters dataset and eventually a regression example on predicting house prices on The Boston Housing price dataset. These examples are provided with built-in datasets and snippets of the code and some best practices followed with explanation to every approach. These chapters also introduced me with concepts of hyperparameters, information leaks, overfitting and underfitting and some techniques to counter these phenomenon, evaluation protocols in case of insufficient data as k-fold cross-validation and overall workflow of machine learning problems.
- Following chapter focus on Convolutional Networks and explains the use and characteristics of such networks. After finishing the chapter, I felt some more space for fully understanding and practical uses outside of image processing are necessary to fulfill hence I made some notes from Stanford University lectures on this topic.

- Next, I was introduced to time series classification problem by dataset provided by professor Omatu. Dataset consists of 3 samples per 3 smell classes – body, perfume and tobacco. Each sample consists of 5 relevant features from 5 sensors recorded for 10 minutes period. Period is represented in 770 rows of data.
- In the time of writing this summary my goal was to figure out solution for this classification problem with help of Keras and guideline described in a chapter *Deep Learning for text and sequences* from the book mentioned above and an attempt to apply such techniques and architectures described in other available literature and sources.