

EU-JAPAN Exchange Pilot Project

DeMaMech

Exchange student report

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2. Executive Summary

I stayed in Berlin between 20 September, 2004 and 23 February, 2005 and studied at TU-Berlin as a DeMaMech exchange student. This is my first visit to Europe. Therefore everything was new and exciting for me. I couldn't speak German at all and had a hard time at first. But I had a "buddy" who is German and always helped me. I learned German later. So I could spend a good time in Berlin.

My research theme is the NLP in Japan. This is very different from the Mechanical Engineering. To realize the most possible synergies as the main research subject the topic of finding the way to support computer aided design with natural language was suggested. And I took three lectures. There were held in English. But it is hard to find them because most lectures are held in German. Finally I got knowledge about the product development through them.

Besides studies, I had a lot of experience in Germany. I present some of them.

Firstly, I learned German. I didn't have any knowledge of German. But classes are held in German. It was unbelievable for me at first. But I gradually found that it was the best way to acquire a language. It's a great experience for me.

Secondly, I played volleyball with German people. I couldn't make myself understood well in German. But it is universal to play sports. So I could communicate them through playing volleyball without words. I had a very nice time.

Lastly, there are a lot of cultural facilities like theaters, cinemas, museums and so on in Berlin. I could feel European culture through them. All of them are much cheaper than Japan. I could have a lot of opportunity to experience them.

I offer some suggestions about this exchange program. I hope that it's going to be better. Through my exchange life, I could get really a lot of things and realize myself again. My English ability is still not so good. But it is better than it was before stay in Berlin. Fortunately, I have another opportunity to stay in Delft as an exchange student. So I use my previous experience in Berlin to advantage. I believe I also have valuable experience in Delft.

3. Travel Schedule

20th September. 2004. - 23rd February. 2005. in Berlin

4. Research and Lectures

I belonged to the laboratory of Prof. Krause in TU-Berlin as an exchange student. In this laboratory they are doing applied research in the area of industrial product development. I have researched about the Natural Language Processing (NLP) in Japan. It is the aim of researching the NLP that you will be able to make approaches to your computer as you will be able to make approaches to another person. For that purpose, we really need to deal with the language processing, that is to analyze the natural language and to modeling the linguistic constraints and to find the statistical characters, and to apply these results for the applications. This is very basic oriented informatics research. So it is difficult to apply for the product development directly now. Then I was suggested the topic of supporting computer aided design with natural language. The main aspect of it is not to understand the human language but to find the way of combining it with CAD-Systems, both on a technical, an organizational and a social side. I haven't thought the Natural Language from such a point of view.

The product development has a tremendous impact on the economical success of industrial companies due to its responsibility for costs, time, quality and degree of innovation. An efficient product development process requires a goal-oriented planning of activities, from which all effects and states occurring within a process can be derived. This planning task has to be supported by appropriate methodologies and tools. The product development process is characterized by a high amount of activities, which are connected and strongly depending from each other. Product development processes are much more influenced by creative elements and uncertainly. So they can not be planned in detail but have to be handled flexibly.

To meet these requirements, an approach of a Design Process Language has been developed at the IPK-Berlin. The Design Process Language is an artificial language but intends to have some natural characteristics. Its syntax and grammar is intelligible described by the Backus Naur Form [BNF], an already existing meta-language for the specification of languages. The BNF is based on an alphabet, which basic elements are called terminal symbols. From the alphabet, non-terminal symbols can be generated by the use of production rules.

Following the Extended Backus Naur Form (EBNF), the Design Process Language is structured by words and links (Figure 1). If words and links are replaced by non-terminal symbols, representing a determined group of attributes, non-terminal expressions can be built, describing all process-building elements in a universally valid form. The connections of non-terminal symbols are defined and thus resulting in a general process

model. By the assignment of concrete attributes (terminal symbols), the non-terminal are changed into terminal expressions.

Backus Naur Form (EBNF)	<word>{<link><word>}	defined
non-terminal expression	<task><specification><time>	
terminal expression	pipe joint design, is described in, 2 days	

Figure 1: Syntax of the Design Process Language.

Thus the product development processes are described by the Design Process Language, based on quasi natural-linguistic terms. If real Natural Language is used for this purpose, it will be more flexible to be adapted to the specific demands and used for the development of optimization functionally.

Statistical values are often used in the area of Natural Language Processing. Quite a lot of data are needed to get more precise statistical value. If the aim of use them is wide range, it is very hard to get excellent statistical data. Moreover personal data always have bias. Therefore it is difficult to apply these data to other cases. But in this case, it is specified the product development. And all companies have huge quantities of their own data concerning the product development processes. So it is possible to get excellent statistical data. The data is analyzed syntactically and semantically. It makes many rules to represent new product development processes.

The EBNF is one of the languages that represent the syntax formally. But it doesn't provide semantics. For example one of the famous syntactical analyses is called "Chart Parsing" [2]. A chart is a form of well-formed sub-string table (wfst). It consists of a collection of vertices, one between each word of the input, connected by edges, labeled with grammatical information. Both of them are suited to describe the Context Free Grammar (CFG). The CFG is a formal grammar in which every production rule is of the form. It is composed of generation rules. "Chart Parsing" can describe any CFG. But in this case, EBNF is effective to describe the Design Process Language because EBNF is used to specify the syntax rules of the programming languages. The Design Process Language is not a programming language. But it also needs to describe the processes systematically. Then the semantic is represented in a general process model, where non-terminal symbols are connected with each other in a way, that process elements and their dependencies are described universally valid. In case of instantiation, the

semantic can be interpreted for instance for the generation of the course of activities. Furthermore, attributes can be connected with arithmetical links to complex expressions, representing evaluation and optimization algorithms. Semantic analyses take great deal of time even the area of the NLP. So this representation may be applied to the area of the NLP.

Thus it has high potential to combining the NLP with CAD-system not only the area of the product development but also the NLP. I studied about the product development wide range with searching this topic and lectures. I think it's just superficial. And I considered about combining the NLP with product development. The field of the NLP needs to apply universally. Therefore it's difficult to get high rate of collect answer. But if we use the NLP for the specific field like the product development, the results of applying the NLP is much better. I'll do my master's thesis in consideration for this topic.

Reference

- [1] F.-L. Krause; R. Heimann; C. Kind, 2001,
"An Approach towards a Design Process Language",
Proceedings of the 2001 CIRP Design Seminar,
KTH Stockholm, 6.-8.- June 2001, 7-12
- [2] Doug Arnold,
"Chart Parsing",
<http://www.cs.ualberta.ca/~lindek/650/papers/chartParsing.pdf>

I took three lectures, "Industrial Information technology II", "Systematic Product Development I" and "Supply Network Planning and Scheduling" because I wanted to get knowledge for the "product development". First two lecturers provided me with essential knowledge and the present condition of the product development. Last one gave me more concrete idea with some numerical expression and charts.

All of them were held in English. There are some lectures held in English at TU-Berlin. But of course, most lectures are held in German. It is very hard to find lectures held in English because the syllabus is also in German. Its thickness is about 3 cm. There are all lectures held during one semester. A syllabus of a lecture in English is also written in English. However it's not easy to find them. The syllabus provides information of a lecture, its name, schedule, place, professor and summary. But a schedule and place are sometimes changed or not indicated yet. So I have to check its website to confirm them. They also provide the syllabus on web site. But I couldn't use it properly because of German.

“Prof. Dr.-Ing. F.-L. Krause: Industrial Information technology II”

This lecture supplies knowledge, information and technology concerning the product development that reached widely. Its contents are CAD/CAE-Technology, Simulation, Use and selection of software systems, Information Technology for Quality management, Production Planning, Process Management and E-Business and so on. This lecture is based on industrial aspect. So it is very interesting to know not only German companies but other companies.

“Prof. Dr.-Ing. L. Blessing: Systematic Product Development I”

This lecture presents the product development from the systematic point of view. Its contents are structure and life-cycle phases of technical products, product development process, methods for product planning and task clarification, finding, evaluating and selecting solutions, size ranges and modular products, design for quality, design to standards, modular products and design for minimum cost and so on. The materials of this lecture are provided on website by PDF file. They are methodical. So they are really useful to prepare and review the contents of lectures.

The examination was an oral test. I had never experienced an oral test. Professor asked me some questions about the lecture. Prof. Blessing holds this lecture. This lecture lasts until summer semester. So there is usually no examination in winter semester. I really appreciate her kindness.

“Prof. Dr.-Ing. H. -O. Günther, Dr. Martin Grunow: Supply Network Planning and Scheduling”

This lecture offers the Supply Network Planning. Its contents are fundamentals of production planning and control (PPC) systems, Functional building blocks of PPC-Systems, Advanced planning systems, strategic network design and design planning and so on. There are many exercises to confirm the contents, e.g. coding the physical structure of items according to a network representation of the Bill of Material (BOM) database, the Winters Exponential Smoothing Procedure for Trend-Seasonal Demand that is one of the forecasting methods.

This lecture is active because teacher asks us many things to confirm whether we understand contents or not and students also often ask him questions without restraint. So it is really useful to understand them and recognize what is incomprehensible for other students.

The examination is the written test. The test questions are some explanations of the systems or functions and a little calculation.

5. Exchange student life

I stayed in Berlin from September, 2004 to February, 2005. I had never visited European countries before I stayed in Berlin. So it was greatly fantastic to stay in Berlin at first. Everything was new for me and completely different as compared with Japan. But I also had a really hard time to live in Berlin because I didn't know German at all at that time. I've heard in Japan that many young German people can speak English. Of course it's true. Most people, who are young and work at restaurants, hotels and post offices, can speak English. But quite a few people even some international students cannot speak English. It was much troublesome that many administrators of TU-Berlin offices and city-hall where I registered my stay in Berlin couldn't speak English. So it was really hard to progress my enrolment.

There are two institutions of language teaching at TU-Berlin. One is called SKB and the other ZEMS. SKB offered an intensive German lesson for foreigners before beginning a semester. I wanted to take it. I asked them by email whether I could take it or not though I hardly studied German. Their answer was "You should have knowledge of German as you studied it about 100 hours at least". I couldn't take it. But I should study German. So I went to the private German school during first one month. It was really useful for me. After that I took lessons held by SKB. Those lessons by SKB were not intensive and were held twice a week. I feel good that I could learn German in Germany. It was incredible at first. But it was reasonable to acquire the language fast.

TU-Berlin has a "buddy" system. The "buddy" helped and guided me. My buddy is a German man who studies computer science at TU-Berlin in those days. He really likes Japan and has learned Japanese for two years. So he can speak Japanese a little. We could exchange our language, culture and knowledge between Japan and Germany. This system was really good. At first I don't have any friends. But I had a buddy. He always helped me when I had a trouble even didn't have. I greatly appreciate his kindness.

There are a few lectures in English at TU-Berlin. But most of all are held in German. This situation is not so good for me. But Berlin is a truly big city. Therefore even international students can speak German. I was asked many times "why do you come to Germany though you cannot speak German?". When I took lectures, I felt that European people and other national people insist themselves. And they like debating on their problems. Japanese people don't do like that. But it's very important. We have to follow them.

There are some completely difference between Japan and German in my daily life. One of them is that European people greet very often even stranger. When I bought something in a supermarket in weekend, they said "Have a nice weekend!". It's really comfortable. In addition, I had some chances to be asked something. When they found me Japanese, they told me their knowledge about Japan. The other is that the transport is well arranged. I bought a season ticket called "semesterticket" for students at TU. It cost only about 150 euro for 6 months. It's really cheap. Then I could transfer anywhere in Berlin by bus, train, underground or tram. In weekend the trains run through the night. And it's not so crowded beside Japan. I could almost find a seat. It's so convenient.

In my exchange life in Berlin, it's very impressive to play volleyball with German people. There are many sports activities for everyone not only students by ZEH (central institution for sports at the university). It's very hard to communicate with my teammate at first because position names, technique names and the sense toward playing volleyball are completely different. Besides they speak German. But I could become used to these surroundings through playing volleyball. When I played volleyball one day, I realized I'm shortest in my team. As you know, the height is advantageous for playing volleyball. I'm not short in Japan. But all of my teammates are over 180cm. So I had to make up for the disadvantage of my height with my skill. It's really exciting for me.

Berlin has a lot of cultural facilities like theaters, cinemas, museums and so on. They are so interesting for me. I sometimes enjoyed listening to a concert, watching an Opera and visiting museum. They were much cheaper than Japan. The "BERLINALE" which is a big international film festival was especially spectacular. It held on 10. -20. 02. 2005. I watched various countries' films. I could also watch Japanese films. Most movies which are showed in cinemas are often dubbed into German in Germany. So I couldn't understand them. But there were many films which weren't dubbed and had subtitles in English. So I could enjoy them. And there were many directors and actors. Then they were often on the stage after their film was showed and they talked about it. It was a precious experience.

Thus I had gotten a lot of valuable experiences through my exchange student life in Berlin. I felt European culture, attitudes, custom, climate and so on. I also realized how Japan is. I could find Japan is closed again. It has both good aspect and bad one. And my English ability is not so good yet. But I got courage to speak English and a little German. So I believe I'll be able to spend my other exchange life more usefully in TU-Delft.

6. Suggestions to the Project

It is most big problem that I couldn't get a scholarship until end of October. I needed much money at first. Of course I prepared enough money to stay in Berlin. But I didn't know when I could start to get a scholarship. It made me anxious. That's why it is important to know when I can start to get a scholarship. And I can expect how much I have to prepare until I get a scholarship.

I appreciate the "buddy" system. My buddy always helped me. I couldn't often make myself understood in German. So he came with me and translated German into English. If I hadn't had any buddies, I wouldn't have succeeded my exchange life in Berlin.

I had to prove my health insurance in Germany. I join Japanese health insurance. But it isn't valid because it's not famous in Germany. So I had to join German health insurance. Next exchange students should be known which insurance companies, also exist in Japan, are valid in Germany.

I'd got many documents from TU-Berlin and the administration of my dormitory. Most of them are in German. I had trouble because I couldn't understand them exactly. So I hope we can get them in English.

7. Summary

I stayed in Berlin from September 20, 2004 to February 23, 2005 and studied at Technical University of Berlin. I had a lot of precious experience in Germany. Through studying, traveling and living in Germany, I felt European culture, attitudes, custom, climate and so on. I also recognized Japan and myself again. It is greatly useful for me.

As I mentioned above, I had a hard time in Germany because of the lack of my German knowledge. However, German people are warmly. When I just said "Hallo" or "Dank schön!", they gave me their smile. It made me happy. Then I think if I could speak German well, I had communicated with them and my exchange life in Germany would have been much more wonderful. If I had used only English, I have never thought like this. So I recommend for my junior to stay in Berlin without fear.