Lyee Internet Information

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Interview with
Prof. Remigijus Gustas and Mrs. Prima Gustiene
at Karlstad University, Sweden

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Moderator: Hamid Fujita   Professor at Iwate Prefectural University
        Fumio Negoro President of ICBMT

Prof. Gustas   Mrs. Gustiene

Brief CV
[Remigijus Gustas]
1956   Born in Lithuania

1986	Doctor of Technical Sciences, Kaunas University of Technology, Lithuania
1991	Docent, Area: Informatics
1999	Habil. Doctor, Area: Information Engineering, Kaunas University of Technology, Lithuania and Karlstad University, Sweden

2000-
present   Information System Department
                 Karlstad University, Sweden
                 full professor

[Prima Gustiene]
1955   Born in Lithuania
1978   Diploma, Vilnius Teachers Training
                         Institute, Lithuania
2000   Diploma, Karlstad University, Sweden

2001- present   Information System Department, Karlstad University,
                         Sweden, Lecturer

Prof. Fujita   I would like you to tell us about your background, research interest, and what you expect in Lyee.

Prof. Gustas   I am working as a professor in Sweden, at Karlstad University. I'm stemming from Lithuania where I got my degree. It was a doctoral degree in 1996 with the topic of knowledge representation for information system development. After some years, I got another degree that is called a Habilitation doctoral degree in the area of semantic and pragmatic modeling or so called enterprise modeling. It is about viewing information systems as enterprises with their business processes, which can be used for information system development. This work has to do with semantics, pragmatics, modeling and information system development. The last degree was awarded to me for my work on the special enterprise models. I would like to emphasize that I have not succeeded in a way like Mr. Negoro succeeded. He has created a company, which is already using his ideas. My models are theoretical. We are also using them, but in a very small scale. We do not have any company, which is making software or doing system development work based on such models.

Prof. Fujita   Could you explain what Habilitation is?

Prof. Gustas   Habilitation in Germany or other countries is

equivalent to a professor's position but as you know a professor is not a degree, it is just a position. Sometimes you can get a professor's position without a Habilitation degree. In Sweden, some people count a Habilitation degree as an equivalent to four Ph.D. degrees.

Prima Gustiene   **I am from Lithuania too. I was working as an English teacher for many years. When we came to Sweden, I changed the profession. I began to study linguistics. I was interested in semantic roles. My thesis at Karlstad University was about semantic roles and relativity of semantic roles. When I started to study information systems, I was interested in computational linguisticsand in semantic problems of communication between system designers and system users. After the second graduation, I began to work at Karlstad University. Currently, I am teaching object-oriented approach. My interests are in the area of electronic business process and enterprise modeling.**

Prof. Fujita   Now, I would like you to move onto the question on Lyee. You heard the presentation on Lyee in Sweden and you are here now to look for a possibility of project collaboration. You are here to share a new experience with us. So, I would like to have your vision on collaboration. From the point of Lyee, it is a new innovation of software science and new paradigm in computer science. I would like both of you to give a vision so that we can discuss.

Prof. Gustas   **It is not so easy to present a vision at this moment. What Lyee does is very important step and it is very difficult to foresee all consequences in the future, because our our thinking often is quite restrictive and humans are not able to foresee everything. During this visit my vision has changed dramatically , because when the Lyee team has presented their ideas at Karlstad University, I was assuming that the approach is more or less a method for software generation, but I realized now that it is wrong to see it in this way. . The most important property that Lyee is able to achieve is system integration. As you know, system integration is extremely difficult in information system area. So, from that point of view, Lyee is extremely important. In order to express systems with conventional method such as OOA, the designers have to use different diagrams. They represent various aspects of their vision by defining the diagrams in different ways. The system analysts**

do not know whether these diagrams are integrated, because of the difficulty to trace requirement changes from one diagram to another. By using Lyee, you can achieve system integration. It is very important, because you get one system, not many unrelated sub-systems.

Mrs. Gustiene   At first, it was difficult to understand. I got some papers about Lyee from Prof. Gustas. I appreciate that we are given an opportunity to be here and to understand more about Lyee. Now, we can develop a vision for the future. The very important thing is that we now understand better the Lyee way of interpretation of what an intention is. People speak about goals and intentions very much. The approach to solve a problem of integration is really revolutionary. Of course, it takes time for us to fully understand the distinction between semantics and pragmatics. It is completelychanging the way of our thinking. Prof. Fujita   I think that you felt that there is something new, there is something challenging in Lyee. From that point of view, I would like to see possibility of involving in the collaboration project. So, I would like to see the vision, not necessarily the details but some outlines.

Prof. Gustas   I think that it is important at this moment to find a bridge between Lyee approach and so called conventional methods. If we can find a link , then Lyee can be accessible for people who have been using the conventional methods. I expect that by using the enterprise modelling we can visualize semantics of a partial objectified intention, not a global intention. Intentions of every single user can be converted by using the enterprise modelling approach into the screen, message and file structures. These graphical structures can be used as an input for Lyee. For the reason that Lyee approach is currently starting software requirements engineering by using a natural language, it may create problems. A dream of the people involved in system development is to design software products like architects design houses. If we could use a graphical language to define various objectified intentions, which are owned by different people, and then, we could feed them into the Lyee method and integrate them through Lyee, then it should lead us to a completely new way of system engineering.

Prof. Fujita   I think that the graphical description as Lyee input is very important to make Lyee more fruitful. In order to make objectified intention using graphical notation, you need some kind of tool in some sense

but it is not really related to Lyee. With Lyee, you are objectifying and revising an intention through Scenario Function(SF). What you mentioned could be intentional engineering. I think graphical representation enhances the capability of SF in order to objectify an intention.

Prof. Gustas **As we understood from the lectures, currently, Lyee uses natural language as an input. From natural language descriptionone can objectify an intension of a single user that would serve as a Lyee input. Then, we can go on in order to reach the goals you just mentioned. People are used to express their own ideas by using graphical or natural language descriptions. These descriptions have to communicate ideas clearly. In some cases, system developers have to cope with the ambiguity. For instance, it may result in a screen layout design mistake that has to be found in the future and it has to be dealt with. We asked the people in Catena company and got a confirmation that this is a case. The graphical models can help them from the start to keep track of so-called inter dependencies among various layouts. Very often designers are not able to catch them by using a natural language description of requirements. So, why not to give people more assistance by analyzing the objectified intentional representations from various points of view in order to make them unambiguous, consistent and complete.**

Prof. Fujita How about you, Mrs. Gustiene? Prof. Gustas mentioned that graphical representation as input is needed.

Mrs. Gustiene **At the factory, we found out that people are doing design and analysis before they come to Lyee part. They analyze requirements. Sometimes they have problems with requirements and they have to come back to the user to validate them. So, if the designers could get a graphical support in this process, then it would save time for them. Prof. Gustas These problems are not so important if we are dealing with one objectified intention, which is defined from the point of view of one user. But if the designers are intended to build a complex system, then they have to cope with many similar requirements from different users. These users may call the same things in different ways or the same notion can be used for different concepts. This situation creates a headache for system developers. The enterprise modelling in combination with the Lyee approach might help us to solve**

most of these problems. Prof. Fujita   From my understanding of what you just said, as the system becomes complex, you need a way of finding accurate requirement, which is complete and consistent. You said that because ambiguity of natural language cannot bring a complete and consistent requirement, especially for a complex system. Different users using the same system can be overlapped or not correctly correlated so that is why we need a way to analyze that requirement. As you saw in the factory, people before doing requirement, they do polishing for a requirement to be integrated in a correct manner. Then, they go to Lyee to make software. It is not an easy problem for a complex system. You suggest that we should have graphical representation and input in order to help these people absorb conflicting requirement correctly especially for a complex system in order to enhance Lyee capability of software design.

Prof. Gustas   What you said is very important. Ideally, we would need to use this graphical approach for Lyee at the very early phase with a purpose of improving quality and integrity of requirements that are comming from different users.

Prof. Fujita   Through my acquaintance with Lyee, I think that it is a misunderstanding or confusion between requirement engineering and intentional engineering although I do not want to disappoint you. Requirement engineering itself is the way you mentioned. We have been accustomed to requirement engineering specification analysis because you mentioned that there is contradiction of requirement. Semantic representation or such a graphical representation component, we try to resolve such contradiction and this is done through the engineering aspect of a requirement. That means we modify a requirement on behalf of user intentions. I think that there is a very important point of Lyee, which should be emphasized. Lyee does not want to do this way because Lyee brings an intention as it is and engineers it in a way user wish to have it. There may be contradiction and iteration of the process helps to revise or engineer the intention in a positive way so that user can be happy with.

Prof. Gustas   I understand what Prof. Fujita is saying. When we talked about semantics before, we always got into a discussion and had different views about this issue. Of course, if users give a specific screen layout for designers, then this can be viewed as a non-negotiable part of their requirements. But I am talking about a little bit different

subset of the requirements that in this case you tend to hide. For instance, let us take a contradictory requirements. It is nothing wrong with the contradictions among employess of the same company. If people have different problems, then they want to reach different goals. But, if these goals are inconsistent, then they will cause conflicting requirements. If we would try to integrate such requirements, then we would never succeed in system integration.

Prof. Fujita   I think that it is a special system like an enterprise modeling or security system.

Prof. Gustas   We can have an interesting discussion on this issue. It could lead us to a new way of defining requirements, which are currently used as an input for Lyee. The enterprise modeling paradigm is just a new way of thinking about the world. It should be useful in many different aspects.

Prof. Fijita   If I try link what you mentioned and Lyee, maybe ontology will be helpful. What do you think of that?

Prof. Gustas   Maybe you can call it ontology, because enterprise modeling is one way of defining ontology. But at the same time, if you look at ontology in a broad sense, you have it also in Lyee, because you are defining various layout structures. Nevertheless, during this visit I saw few examples of screen layouts that are difficult to cope in the context of Lyee. I think that people who know in detail the Lyee approach, they would never fail, because they know the engine of Lyee. But, if you would like to involve people to work with this approach, who do not know much about the mechanism of Lyee, then it may cause problems. We have discussed a few issues such as a redundancy and a screen layout relevance in the examples, which were given during the lectures.   I would like to stress that our knowledge about the methodology is incomplete. Perhaps we do not know hidden aspects of Lyee. Lyee is an interesting achievement in dealing with the problem on software system integration. Nevertheless, in any methodology you can find an area for improvement.

Prof. Fujita   I agree with you about some points.   This collaboration project has come into existence in order to improve capability of software development and innovation. This is one of the objectives we have. So, we would be very happy if Lyee can be enhanced. The other issue

is that you mentioned about redundancy or extra thing that is unnecessary. Maybe you heard about the legacy project where programs are converted very easily. With Lyee, it is very easy to reestablish the program and it is very simple so that is not a problem. This is one of the big merits of Lyee. Regarding the requirements, for example, this requirement is wrong but the same requirement can be right from a different user's perspective. This is one issue for an intention. So I think when you feel this is wrong but other people say this is right, this is contradiction. This is how you represent an intention from one perspective and not directly related to Lyee. With that representation, one side is wrong and the other side is right. Lyee deals with an intention as it is. So, I would like to know about your involvement on this issue, how to enhance intentional engineering by using graphical representation.

Prof. Gustas   This is very important point and I will try to be very clear here. I agree with you: if user says that this is his requirement, then we cannot tell him that he should change the requirement. I am not going to argue about that. I am talking about the case where we saw an input screen layout structure with many irrelevant attributes. It happened in the presented examples with the multi-valued dependency case between attributes. It was not clear to me how and why the irrelevant screen layout design was taking place. I do not know whether the design was a result of a very strange user requirement or that was related to the Lyee methodology itself. Prof. Fujita   I think that we need requirement representation. Requirement representation and knowledge representation are very important, especially for the multi-valued dependency. With such a way of representation, you can understand what we are saying, what we are doing. That is not a problem of Lyee itself but a problem of whole software science. Because software science is dealing with problem-solving and we should use computation and computer technology to solve that. So, such a way of representation through natural language is not so easy. That is why we need enterprise modeling, knowledge representation, etc. This issue is still a hot topic in software science. Lyee came in existence in order to avoid this. From my understanding, modeling does not solve a lot because you add a lot of issues. The model cannot achieve everything. From that point, Lyee respects any intention regardless of its complicity and ambiguity. The

intention is reflected from natural language and still not enough. I think we still need enrichment for realization of an intention or requirement. I agree with you that such enrichment needs components such as graphical components and graphical enhancement to realize such a style of intentions. Negoro   Thank you very much for making such good comments on these issues. I think that software deals with ambiguity itself. In order to handle the ambiguity, many concepts were born. Many new concepts were created in software for last 50 years and this number is as many as that of concepts made in engineering field for last 100 years. The reason why so many concepts were created during such a short period is that there was no way to solve the problem. In order to overcome this problem, I think that the important thing is to establish a new concept, new methodology, which is universal and deterministic. The concepts themselves are already sufficient enough. So rather than dealing with these concepts, we need to find out principles. For example, there are so many ways to define one software. But the way of defining software is based on engineering perspectives, in general. With Lyee methodology, we take a different way to define software. In your discussion with Prof. Fujita, the issue of ambiguity was raised and it seems that is taken for granted. When you talked about integration of the system, I was very much interested in that. I tried to understand your comments by interpreting that there seems to be another class between two classes. Weather a new class should be added here is also a theme of integration. I listened to you from this stand point of view. My understanding may be wrong but I was very interested in your comments. I think that natural language is the most precise means to express requirements and we should pay attention to the fact that natural language can define requirements more precisely than mathematical means. Of course, there is always an issue of ambiguity in natural language. So I incorporated principles of Lyee to solve that level of ambiguity. To close, I would like to mention about the software factory you visited today. You comments on the visit to the factory were quite meaningful to me. SF of Lyee is not primarily meant to make programs. In fact, that is meant to capture an intention or a defined requirement unlike conventional methods. With conventional methods, they try to make programs based on a requirement. In this sense, SF is a new concept to define requirements. It is true that that is expressed in a programming language so that you may think that entire process is divided into two parts:

one is focused on capturing requirements and other is focused on making programs. But in fact, this is the one thing. Environment for software development at the factory is not fully developed yet and tools are not sufficient yet. So, workers may have a wrong impression about the methodology itself and this is my responsibility. Right now, we are making a lot of efforts to dramatically improve the situation and environment at the factory. I truly learned and enjoyed a lot today. Thank you very much.