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Brief Biography:

Dr. Hamido FUJITA, is a professor at Iwate Prefectural University (IPU), Iwate, Japan. He is director of ARISES (Advanced Research Institute on Software Strategies,) http://www.fujita.soft.iwate-pu.ac.jp/arises/index.htm
He is the director of Intelligent Software Systems

He is editor-in-Chief of Knowledge-based system, Elsevier.

He was associate Professor at the University de Montreal, Canada.
On 1997 he moved back to Japan to become an executive committee member to establish Iwate Prefectural University on 1997. Then after from April 1998, he joined Iwate Prefectural University (IPU), Faculty of Software and Information Science, as Professor and head of Information System, directing at IPU two laboratories, **Intelligent Software System Laboratory** and **Cognitive Systems Laboratory**. He was a committee of establishing the Graduate School of Software Science, of IPU from 2000 for new Master and Doctor Programs that used Software practices Approach (SPA) concept as it main educational system in education.
He has directed and led many project sponsored by the Ministry of Science, Education and Culture of Japan, and others from International sponsors and industry sponsors project on new software methodologies and intelligent systems.
He contributed in software related inventions and got several international industrial Patents on new

software methods on tableau related development.

He has founded the SOMET (Software Methodologies, Tools and Techniques) organization on year 2000 in Sorbonne Paris, France marched to its 10th Anniversary, and it is now in Saint Petersburg in Russia, http://www.somet.soft.iwate-pu.ac.jp/somet_11/

He was invited to many universities in EU, and North America. He has supervised Ph.D students jointly with University of Laval, (Canada) University Technology, Sydney (UTS) Australia, Paris_1 University, Sorbonne, Paris France. He is also Professor at the University of Laval, Quebec, Canada supervising Graduate Studies students, he was a visiting Professor at the University of Paris_1, Sorbonne, also, visiting professor at Stockholm University, Visiting Professor at Oregon State University, Corvallis, USUA. He worked as opponent for Ph.D student examination at Stockholm University, Sweden, and University Paris_1, Sorbonne. He edited several special issues in International Journals on many hot issues in related to Knowledge based system and software technologies. He is currently heading a project on Intelligent HCI, and a project related to Mental Cloning as an intelligent user interface between human user and computers, supported by MEXT (Ministry of Education, Culture, Sports, Science and Technology), and SCOPE project on Virtual Doctor Systems, supported by Ministry of Internal Affairs, and Communications of Japan. He also, has several joint industrial projects with Japanese industry, like the recent one with KDDI on building avatar based mobile services.

The title and outline of the Plenary Talk is:

Cognitive Computing Facets in Intelligent Interaction based on Ontology alignment

Short Outline: Human computer Interaction based on emotional modelling and physical views, collectively; has been investigated and reported in this paper. Two types of ontology have been presented to formalize a user with certain role (i.e., patient) state: *mental ontology* reflecting the user; role (patient) mental behavior due to certain disorder and *physical ontology* reflecting the observed physical collected exhibited consequences of such disorder situated due to user context. These two types of ontologies are aligned and collectively mapped on medical knowledge collected from different medical cases and scenarios.

The reasoning engine to produce an interaction based on the different scenarios for mental health based on mental health guidelines.

The implementation has done in OWL (Ontology Web Language) and patients case based data related properties are presented as restriction on individual in OWL constructs (i.e., patient cases) represented in concepts articulated on merged ontology mapped (aligned) on medical ontology which is implemented in OWL-DL constructs (DL: Description logic) and reasoned on using Bayesian Network applied on simple patient cases. The diagnostician knowledge is utilized through simple case provided by the two medical doctors working in different hospitals in our city. Each doctor's integrated mapping of the two ontological views been represented through OWL-DL framework for reasoning. The Bayesian belief network has been used to do casual reasoning based on case-data provided by these medical doctors. The reasoning instances are articulated as responses to queries provided by the system through. Two ontologies have been rendered (binded) and aligned on Medical Ontology for diagnosis on what is called "simple cases" through reasoners (Pellet) (also, Racer is tested for evaluation purposes) connected with Netica API guided by VDS generated scenarios through, built-in menu activated by the patient through touch panel for patient interaction.

The system is tested and evaluated in medical hospital where one of these doctors is practicing medical services.

Long Outline:

Cognitive Computing Facets in Intelligent Interaction based on Ontology alignment

Hamido FUJITA, Director of Intelligent Software Systems, Iwate Prefetural University,

In Plenary talk, I am presented our research project. We have established a system that can use a human mental model as an engagement for interfacing between man and machine. The user emotion as subjective is analyzed based on collecting features points that in collective manner reason on human face based on six modes that is called Ekmann universal emotional model. The face emotion is also aligned with voice of the user based on pitch and power reasoning templates. These are reasoned in collective manner to articulate on the user mental cognitive state (i.e., emotion). The mental state reasoning of the user is based on physiological concepts and situational concepts that reflected through on user role through preferences. We have used several physiological based computation models, like transactional analysis state model. These computations and reasoning related estimation are articulated to collect information on the user emotion that is defining the type of engagement that he/she is enrolling through, with the system. The system is also, enrolled as an avatar resembling to the application (e.g., medical doctor avatar or other objects) that the user would engage through to achieve goal oriented mutual engagement. The goal could be a task to do entrainment or have a service (e.g., medical) through this avatar. The test we have used the system for was a copy of several human medical doctors' mental models. This was to build an avatar, or an animated mask that create in real time animated facial images generated in real time and according to the mental state of the user, such that to achieve the best engagement having a positive or negative harmony between the human user and the system. That is to have the user role be as patient and the system role as doctor. Integrating the mental cloning concept in interaction has participated in establishing an effective engagement that can measure the metal state of the patient aligned with the physical state. This is essential step to have human computer interaction that integrates the knowledge base with other issues that can be used to tune the knowledge retrieval to the mental state of the user. Integrating user profile, in reasoning process as evident through this project; is to have user situation awareness and his/her cognitive behavior as binding specializing different knowledge being aligned and attributed according to the user cognitive situation, based on similarity computation. The situation is computed on profiles preferences reflected as schemata that are of two types: global prototype (or genotype)

schemata and local state-specific schemata (or phenotype schemata). These are specified as reasoning schemata to work as alignment algorithms (i.e., pairing) to utilize knowledge based of mental cloned experts like, medical doctors or artists that we want to have users interact with to achieve intelligent interaction services. The alignment was carried out using a Bayesian network on mapping of application cases, (e.g., medical diagnosis cases) to achieve decision making. The procedure is based on fusion mining that is to bind together type formalized ontologies: namely mental ontology, and physical ontology. The binding (union blending) process is ontology fusion on the service provider layer (i.e., medical service). We think this approach would participate to bring a situated service provided that is blended by the user mental states and bounded situation. The system would compute the mental situation of by fusing the knowledge base with related expert knowledge on ontology alignment and Bayesian network reasoning. The API interface has been constructed based on medical cases using Bayesian network as recommender for diagnosis outcome. The mask of objective system resembling a medical doctor is created, and animated emotional images generated in real-time are synchronized with read-out scenarios resembling medical cases or story telling are used as to provide a context-aware engagement with a subject user, whose profile, and emotional image face gestures, and voice emotional feature extract are in collective manner measure the emotion state of the subject user. The user cognitive feature is computed based on several feature points that are categorized to compute the cognitive mental state of the user. The system resembling the object: medical doctor or artists, would reason on these subjective states of the user and create a situation scenario generated in a manner that reflecting the tuned engaged state, computed on transactional analysis model. The generated narrative scenario is read-out to the user with real-time constructs animated image and voice articulated on the subject state objectified by the object avatar. This is achieving best engagement based on context-aware situational-cognitive reasoning.

For future research we want to establish such mechanism for mental diagnosis application and other user oriented mental health by expanding more test cases and integrate to align different knowledge in dynamic fashion to achieve suitable and situation fitting mental diagnosis services. Also, other mission of the system is to expand it to mobile services. This based on estimating the user profile discovery based on context sensitive situation. That is to collect data on situation and integrate them on user preference such that to provide best services recommender system, on three invariants: communication, environments, location. This would participate to produce different action scenarios that are context-aware recommendation.