

Thèse de Doctorat

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A PLM based approach for supporting collaboration and knowledge management in the medical domain: Application to the treatment process requiring prosthesis implantation

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Thèse de Doctorat

Thanh Nghi NGO

Une approche PLM pour supporter les collaborations et le partage des connaissances dans le secteur médical: Application aux processus de soins par implantation de prothèses.

A PLM based approach for supporting collaboration and knowledge management in the medical domain: Application to the treatment process requiring prosthesis implantation

Résumé

Le secteur médical est un domaine dynamique en constante évolution, nécessitant des améliorations continues de ses processus métier et une assistance intelligente aux acteurs impliqués. Ce travail de thèse se focalise sur le processus de soins nécessitant l'implantation d'une prothèse. La particularité de ce processus est qu'il met en interaction deux cycles de vie appartenant respectivement au domaine médical et celui de l'ingénierie. Ceci implique plusieurs actions de collaboration entre des acteurs métier très variés. Cependant, des problèmes de communication et de partage de connaissances peuvent exister en raison de l'hétérogénéité de la sémantique utilisée et des pratiques métiers propres à chaque domaine.

Dans ce contexte, ce travail de thèse s'intéresse aux apports des approches d'ingénierie des connaissances et de gestion du cycle de vie du produit pour répondre aux problématiques sous-jacentes au processus de soins médicaux nécessitant l'implantation d'une prothèse. Pour se faire, un cadre conceptuel est proposé pour analyser les connexions entre les cycles de vie de maladie (domaine Médical) et de la prothèse (domaine d'ingénierie). Sur la base de cette analyse, un modèle sémantique sous forme d'une ontologie pour le domaine médical est défini dans le cadre de la construction d'une approche PLM à base de connaissances. L'application de cette proposition est démontrée à travers l'implémentation de quelques fonctions utiles dans un outil PLM du marché nommé AUDROS.

Mots clés :

PLM, Processus de soins, Prothèse, Partage des données, réutilisation des connaissances, Audros.

Abstract

Medical sector is a dynamic domain that requires continuous improvement of its business processes and assistance to the actors involved. This research focuses on the medical treatment process requiring prosthesis implantation. The specificity of such a process is that it makes in connection two lifecycles belonging to medical and engineering domains respectively. This implies several collaborative actions between stakeholders from heterogeneous disciplines. However, several problems of communication and knowledge sharing may occur because of the variety of semantic used and the specific business practices in each domain.

In this context, this PhD work is interested in the potential of knowledge engineering and product lifecycle management approaches to cope with the above problems. To do so, a conceptual framework is proposed for the analysis of links between the disease (medical domain) and the prosthesis (engineering domain) lifecycles. Based on this analysis, a semantic ontology model for medical domain is defined as part of a global knowledge-based PLM approach proposition. The application of the proposition is demonstrated through an implementation of useful function in the AUDROS PLM software.

Key Words

PLM, Treatment process, Prosthesis, Data sharing, Knowledge reuse, Audros.