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Representation of Biomedical Expertise in Ontologies: a Case Study about Knowledge Acquisition on HTLV viruses and their clinical manifestations

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Abstract

In this paper, we introduce a set of methodological steps for knowledge acquisition applied to the organization of biomedical information through ontologies. Those steps are tested in a real case involving Human T Cell Lymphotropic Virus (HTLV), which causes myriad infectious diseases. We hope to contribute to providing suitable knowledge representation of scientific domains.

Keywords:
Knowledge acquisition, Ontologies, Knowledge representation.

Introduction

This study investigates the activity of Knowledge Acquisition (KA) within the scope of biomedicine. In order to improve that activity, we propose procedures for knowledge acquisition, which adhere to some of the best practices found in the literature [1][2][3][4]. We systematize these procedures in a list of methodological steps with the aim of testing their feasibility in a real case.

Materials and Methods

The methodological steps are developed from a comprehensive literature review and tested in a real case of knowledge acquisition about HTLV.

Methodological steps for KA

The first phase is the *survey phase,* the second was called *elicitation phase*, consisting of interviews and applying KA techniques to experts. The three major stages that comprise that cycle are: *etiological process, course of disease* and *therapeutic response.* The first stage called *etiological process*, The *course of disease* phase starts with the clinical manifestation of a disease. At this moment, the disorder manifests itself through symptoms, which the patient is able to identify.

The clinical framework is composed of symptom representation records, as well as physical and laboratory exam results.

Results

After the preliminary organization of the terms, the results were presented to the main researcher, in order that she could validate them. In this step, the expert had to accept or not accept what was presented or suggest changes, which would be recorded for new future evaluations. All terms and definitions were accepted by the specialist.

Conclusion

The KA activity from experts as part of the process for developing ontologies can also be understood as a preliminary activity before automatic term extraction. Specialists are required to judge whether the extracted terms make sense in the domain. The biomedical vocabulary we come up with also has a relevant function: consensually define the meaning of terms used in medical practice and research. This is made possible by directly considering knowledge acquisition from experts.

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