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RDF-Based Form for Recording Fractures in Suspected Child Abuse Cases

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Abstract

This project aims to create a tool that helps gather and save information about fractures in kids, especially when there's a concern about child abuse. This tool is part of a larger system called ELECTRICA, which uses data to help protect children. It offers easy-to-use forms for recording family history and fracture details of kids who might be abused. This information is then turned into a special format called RDF and linked with the ELECTRICA system for better understanding. The tool mainly helps with collecting data and finding information using SPARQL. It also prepares for future connections with tools that can predict the chances of child abuse. This project lays the groundwork for possible future improvements, like using the data to make smarter guesses based on the ELECTRICA system.

Chapter 1

Introduction

Child maltreatment constitutes a significant worldwide concern, exhibiting profound and enduring implications for physical and the psychosocial well-being of the affected children. In the United Kingdom, The National Society for the Prevention of Cruelty to Children, NSPCC, is a major organization committed to the protection of children. In 2021/22, the NSPCC helpline recorded concerns about physical abuse in 6,441 children [16]. These shocking statistics emphasise the need for efficient measures and procedures for identifying, recording, and responding to suspected child abuse more efficiently. This dissertation is intended to develop a semantically enriched tool that collects information about the fracturesand any other relevant injuries of the children, and in particular suspected cases of child abuse. This tool will facilitate clinicians, researchers, and trainers by providing them witha systematic record of critical incidents, which complements the wider work of pervasive Computing Group and the associated ecosystem of tools under the ELEctronic tool for The Clinicians, Trainers, and Researchers In Child Abuse - ELECTRICA [3].

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1.1 Motivation and Objectives

The motivation for this research program is given by the increasing emphasis on improving data collection and processing concerning incidents of child abuse. Having well-defined database is basically important for developing prediction models that determine the likelihood of child abuse in order to enable timely and appropriate interventions. In most cases, the current methods of data collection show a minimal unification and semantic consistency, resulting in heterogeneous and unreliable datasets. This work provides for this deficiency through the use of semantic web standards, incorporating them into the ELECTRICA ontology. The main objectives include:

1. Intuitive forms: Easy and simple webpages will be created where healthcare professionals can report a variety of fractures and their related injuries.

2. RDF Data Conversion: Data typed in the form needs to be converted into RDF

data, using great semantic care in conformance with standards established by theELECTRICA ontology.

3. Ontology Integration: The process of integrating the form with the ELECTRICA ontology is essential for upholding semantic consistency and improving data interoperability.

4. Data Acquisition and Validation: SPARQL-based query framework is used for extractingand representing RDF data for verification.

The stretch goals include:

1. It is remarked that adding reasoning capabilities will enable the drawing of more advanced inferences about the ontology, but this should be an optional capability in the framework of the tool.

1.2 Overview of the Report

This tool is foreseen to achieve significantly higher levels of data acquisition in cases related toalleged child abuse. The implemented tool will allow for increased sharing and interoperability of the collected RDF data to the parties involved in child protection through a standardized and semantically enhanced means of entry and storage of information. Accordingly, this will eventually allow the development of more and more accurate predictive models and alsoeffective interventions that, ultimately, will help to promote the child welfare system.

This project thus represents a fundamental step forward in the technology-based struggle against the abuse of children. The proposed semantically enhanced online form is supposed toconstitute an important contribution to the researchers' and healthcare practitioners' toolkit for the protection of abused children.