

The integration of SNOMED CT into the OpenMRS electronic medical record system framework

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OPENMRS

- Open source framework implemented in Java using a MySQL database
- Enables the deployment of customisable systems to manage medical records
- Implemented in countries such as Kenya, Rwanda, South Africa, Uganda, Tanzania, Zimbabwe and Peru, with scope to extend the adoption in multiple other locations
- One implementation in Kenya (AMPATH) claims twelve million discrete observations collected for nearly 50 000 HIV patients with over 550 000 encounters.

OPENMRS CONCEPT DICTIONARY

OpenMRS uses a basic concept dictionary to drive its data model.

- The OpenMRS concept dictionary
 - a collection of unique, coded concepts used to generate forms and encode data that are captured within the system
 - collaboratively developed by the OpenMRS consortium
 - allows for the collection of coded, reusable data without requiring changes to the data model
 - customisable for specific OpenMRS implementations
 - can be regarded as a crude ontology.

ONTOLOGIES

- Facilitate the structuring of information and data in a specific domain in such a way that computer systems can reason over them
- Provide mechanisms that extend the representational and computational limits of traditional databases and other knowledge representation systems
- Ontologies have been applied successfully in the biomedical field, where the medical ontology SNOMED CT is used
- SNOMED CT is an ontology that addresses most areas of clinical information used for organising medical record content
- Provides a consistent mechanism to store, retrieve and use clinical data across medical specialities and sites of care
- Uses a representation language that allows for automated processing, i.e. programs can reason over the implications and consequences of statements made by a user
- Owned and administered by the International Health Terminology Standards Development Organisation: <http://www.thesdo.org/>.

Primitive example:

- An ontology such as SNOMED CT contains the statements:
 - Cornea is part of Eye
 - Keratoconus¹ is a Cornea Disorder

¹ Keratoconus is a disorder causing a progressive thinning of the cornea

- Therefore it can be automatically inferred that
 - any disease of the cornea is an ocular disease
 - special care for eye patients are therefore applicable to patients with Keratoconus.

PROPOSED PROJECT

- This poster introduces a research project that aims to extend OpenMRS and the OpenMRS concept dictionary by integrating SNOMED CT and related ontology technologies
- It aims to investigate beneficial outcomes of this integration, specifically aspects of methodology, enhanced functionality and reasoning
- It is a collaborative effort involving the following South African institutions:
 - Knowledge systems group at the Meraka Institute (CSIR)
 - South African Medical Research Council (MRC)
 - University of KwaZulu-Natal (UKZN)
 - University of South Africa (Unisa).

BENEFITS

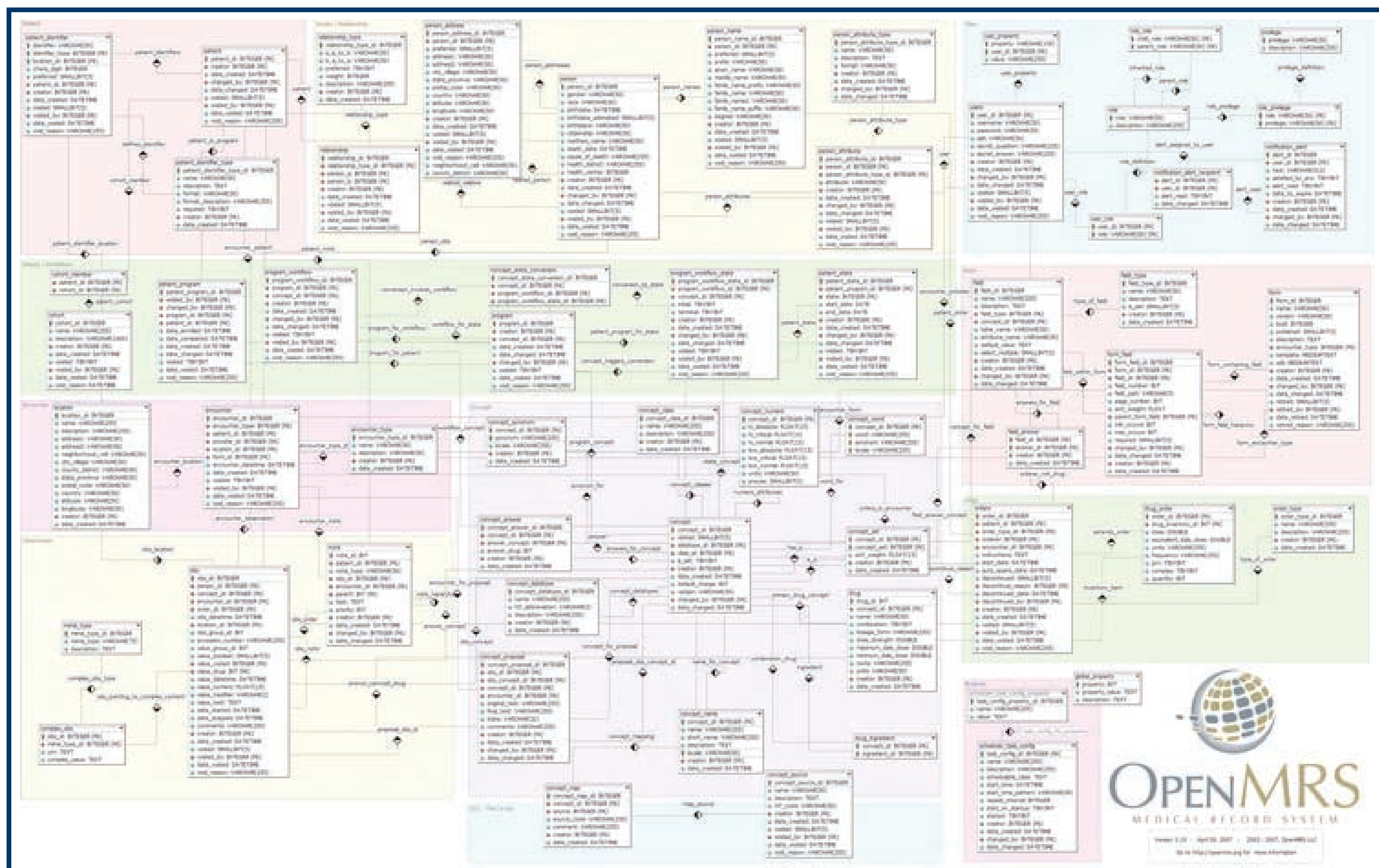
- Better standardisation of terminology across OpenMRS systems and other medical systems worldwide
- Semantic interoperability where standardisation is not feasible
- Enhanced data capturing
- Improved data management
- Better use and mining of captured data.

FUNCTIONALITY TO BE DEVELOPED

- Ontology-driven input-form generation for data capturing
- Ontology-driven report generation
- Ontology-driven controlled natural language user interfaces for capturing, reporting and querying
- Intelligent query processing using ontology-reasoning technologies.

PROJECT STATUS

- The project is in the conceptualisation and requirements investigation and analysis phase
- Contact information
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Integrating a mechanism to store, retrieve and use clinical data with a system to manage medical records enables better utilisation of medical data and improved healthcare.