The present invention relates to a system and a process for converting at least a portion of a semantically unencoded native CIS patient record into a validated semantically coded record.

The system of the present invention is configured to facilitate and automate the encoding of patient information in a data set that is not encoded to a particular terminology and structure.

In one embodiment, the system encodes the patient information semantically by using the semantic context maps (SCMs) used during deployment. This enables automating 100% validated semantic encoding. Alternative mechanisms using NLP would still require manual validation. The SCMs maintain semantic concepts from a standard clinical ontology or nomenclature (SNOMED CT or UMLS for example), or other terminologies.

In one embodiment, the system encodes the patient information semantically by using the semantic context maps (SCMs) used during deployment but augments this with alternative mechanisms using NLP where no SCM exists, e.g. when free form text fields were used for data entry thereby otherwise requiring manual validation. The NLP however is enriched to use the contexts in the SCMs and commonality analysis to determine applicability of the SCM to the particular patient record.

The system aims to provide an accelerated means to accurately encode unencoded clinical data relative to a clinical context for evaluation against a clinical indicator scenario such as a care plan or clinical study. Today, without the process or system of this invention, such studies involve manual case reviews over the course of months by a clinical researcher.

In one embodiment, there is provided a process, operating on an application server platform, for converting at least a portion of a natively encoded patient record into a validated semantically encoded patient record, the process comprising: i) semantically encoding, in a semantic coding viewer/editor of the application server platform, care assessments and care plans to create semantic context maps

comprising at least a semantic context record ii) semantically indexing, in a semantic indexer of the application server platform, data relatable to a patient ID from the patient record using the semantic context maps to produce a semantically encoded patient record in which every observation and intervention of the semantically encoded patient record is associated with a semantic context record.

Herein disclosed is, a process is provided for converting at least a portion of a natively encoded patient record into a validated semantically encoded patient record comprising:

a) semantically encoding patient care assessments and care plans to create semantic context maps comprising at least a semantic context record; and

b) semantically indexing data relatable to a patient ID from the patient record using the semantic context maps to produce a semantically encoded patient record in which every observation and intervention of the semantically encoded patient record is associated with a semantic context record.

In another embodiment, the process has the added step of comparing semantically encoded patient records to the semantic context records within a semantic analytic profile to provide another result which includes an evaluation summary of the semantically encoded patient record. In yet another embodiment, the process has an added step of comparing semantically encoded patent records to other semantically encoded patient records to create clusters of semantically encoded patient records associated by commonality as a precurser to the step added in the preceding sentence.

In yet another embodiment, there is an added step of comparing the semantic context records of semantically encoded patient records with a semantic context record of a semantic analytic profile. Similarly, in another embodiment, there is added the step of displaying the result of the match strength and explanation of a comparison of semantically encoded patient records to a semantic analytic profile.

In one embodiment, there is provided an application server platform for converting at least a portion of an unencoded patient record which patient record includes data relatable to a patient ID maintained in a clinical information system, the data comprising objects natively coded to suit the clinical information system - the objects being observations, interventions, problems, symptoms, care assessments, care plans, rules or other data - into a validated semantically coded record, the application server platform comprising the following components: i. a semantic indexer for semantically indexing some data relatable to a patient ID accessed from the clinical information system ii. a semantic contextualizer using semantic context maps to

identify the semantic equivalent to a natively coded object or groups of objects which form care assessments and care plans of the clinical information system and generate a semantically encoded patient record iii. a semantic comparator/evaluator for comparing some of the semantically indexed data relatable to a patient to some of the semantic context records within a semantic analytic profile.

Herein disclosed is a subsystem for use in relation to one or more CISs for converting at least a portion of an unencoded patient record which includes data relatable to a patient ID maintained in a CIS , the data comprising objects or elements natively coded to suit a CIS, the objects or elements being observations, interventions, problems, symptoms, rules or other data, into a validated semantically coded record, the sub-system itself having: a semantic indexer for semantically indexing some data relatable to a patient ID accessed from a CIS; a semantic contextualizer for semantically indexing objects or groups of objects or elements which form core assessments or care plans to generate a semantic context

WHAT IS CLAIMED IS:

1. A process, operating on an application server platform, for converting at least a portion of a natively encoded patient record into a validated semantically encoded patient record, the process comprising:

i) Semantically encoding, in a semantic coding viewer/editor of the application server platform, care assessments and care plans to create semantic context maps comprising at least a semantic context record

ii) Semantically indexing, in a semantic indexer of the application server platform, data relatable to a patient ID from the patient record using the semantic context maps to produce a semantically encoded patient record in which every observation and intervention of the semantically encoded patient record is associated with a semantic context record.

2. The process of claim 1, with the added step of comparing semantically encoded patient records to the semantic context records within a semantic analytic profile to provide another result which includes an evaluation summary of the semantically encoded patient record.

3. The process of claim 2, with the added step of comparing semantically encoded patient records to other semantically encoded patient records to create clusters of semantically encoded patient records associated by commonality.

4. The process of claim 2, with the added step of comparing the semantic context records of semantically encoded patient records with a semantic context record of a semantic analytic profile.

5. The process of claim 2, adding a step after step (ii) of displaying the result as the match strength and explanation of a comparison of semantically encoded patient records to a semantic analytic profile.

6. The process of claim 5, adding a step of receiving user input with respect to the match strength and explanation, and storing the user input.

7. An application server platform for converting at least a portion of an unencoded patient record which patient record includes data relatable to a patient ID maintained in a clinical information system, the data comprising objects natively coded to suit the clinical information system - the objects being observations, interventions, problems, symptoms, care assessments, care plans, rules or other data - into a validated semantically coded record, the application server platform comprising the following components:

i. A semantic indexer for semantically indexing some data relatable to a patient ID accessed from the clinical information system

ii. A semantic contextualizer using semantic context maps to identify the semantic equivalent to a natively coded object or groups of objects which form care assessments and care plans of the clinical information system and generate a semantically encoded patient record

iii. A semantic comparator/evaluator for comparing some of the semantically indexed data relatable to a patient to some of the semantic context records within a semantic analytic profile.

8. The application server platform of claim 7 with a compliance validator for generating an indication of match strength and an explanation of a comparison of semantically indexed data relatable to a patient to the core assessments and care plans in the semantic context record within a semantic analytic profile.

9. The application server platform of claim 7 where semantic context maps can be first determined for input to the semantic indexer by a performing a commonality comparison using native concepts in the comparison in another semantic commonality comparator

10. The application server platform of claim 7 with an added semantic rule evaluator where a result summary is produced for the result of an evaluation expression, said evaluation expression comprising rules involving semantic concepts as field and value symbols in the precedent:

i. Where the rule evaluator evaluates a precedent with logical and mathematical expressions, unit conversions, and functions and if the expression is true, perform a list of actions from a list of antecedent actions; and infer a plurality of conclusions which instantiate a new semantic value symbol; and

ii. Where the resolution of semantic symbols is done using lookup from an ontology for related concepts, either synonyms for equivalence, or ancestors and descendants along ontological relationships in a collocation index.

11. A component of the application server platform of claim 7 for comparing a semantic patient record to an analytic profile including:

i. A semantic patient record from the semantic patient data repository;

ii. A semantic analytic profile containing native concepts mapped to semantic concepts, evaluation expressions, and directives;

iii. An initial match based on commonality set comparison of concepts in the analytic profile to concepts in the semantic patient record for all candidate semantic patient records, use of a semantic rule evaluator to evaluate all rules in the semantic analytic profile and infer the conclusions.

12. A component of the application server platform of claim 7 for comparing a semantic context map to an analytic profile which is best-practice standards compliant with evidence-based quality measures, including:

i. A semantic analytic profile being a type of clinical knowledge model, containing native concepts mapped to semantic concepts forming a semantic context record, evaluation expressions, and directives;

ii. One or more semantic context maps from a library of semantic context maps;

iii. An initial match based on commonality set comparison of concepts in the analytic profile to concepts in the semantic context maps;

using a semantic rule evaluator to evaluate all rules in the analytic profile and infer the conclusions

13. In the application server platform of claim 7, a semantically encoded patient record is reviewed, validated, and corrected if necessary using a semantic patient record viewer.

14. In the application server platform of claim 13, the corrected validated semantic encoding of the patient record is compared using the semantic comparator, and produces details used by the semantic contextualizer and semantic indexers to refine matching and inference algorithms.

15. In the application server platform of claim 13, using cross maps from the semantic terminology to other standard or native system terminologies, a semantic patient record translator translates the semantically encoded patient record in the terminology of alternative standards supported by the cross map.