AnamneVis: A Framework for the Visualization of Patient History and Medical Diagnostics Chains

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System Overview

The 5W Scheme

WHO and WHAT: the patient and the history, in terms of symptoms, tests and results, diagnosis, treatments and medications, etc. Encoded by ICD, ICD-procedure.

WHERE: locations (when appropriate) of the WHAT on the human body.

WHEN, WHY and HOW: show a case under (doctor) collaborative diagnosis/treatment, or an entire life span. Demonstrate for each node what, when, why, and how that node appears.

Identify the 5W’s Information Extraction

Natural Language Processing Engine (cTake) + Online Medical Ontology Server(SNOMED)

• Extract structured information and relationships.
• Formats the extraction results into the 5W model
• Passes it on to the visualization engine.

Hierarchical Display: Visualizing Who & Where

Data Model: Tree data structure to store the code hierarchy information based on ICD9 code.

Sequential (Causal) Display: Visualizing Why, When & How

Underlying Model

• The medical records are organized by an underlying graph data structure.
• Each node corresponds to one incident (medical primitive), which could be a doctor visit, symptom, test/data, diagnosis or treatment.
• Edges represent relationships.

Patient-centric:
• More radial space is dedicated for diagnoses/procedures the patient had activities in.
• Other nodes will be collapsed to save space for others

Hierarchy-centric:
• node is sized by how many sub-categories it has
• focuses more on the hierarchy information represented in the medical codes and serves as an illustration of the complexity of a sub-system and its composition
• Three default level filters are provided to support multi-scale visualization and to help users quickly explore these three levels.
• Users can expand and collapse the nodes interactively by their expertise.

Sequential Display
Hover on a node to see details and related nodes.

We thank Flare for providing the visualization toolkit.