A look at “Natural Intelligence”

IMMM
Interactive Medical Mind Maps

Open Source working group of the IsfTeH, International Society for Telemedicine

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Introduction

- Up to now many medical record softwares were not mach more than narrative reports of what did appen at some time in the past in some specific context.
- Student can find much static knowledge on internet, but have to learn a “medical methodology” about how to use this large amount of knowledge.

Objectives

- Evolution to a “task oriented model”, to help to solve patients health problems.
- Visual support of "Natural Intelligence". Focus on the relations between medical concepts.
- Intended for the training of students.
- Mind synchronisation between the members of care teams across Internet

Node types in the graph

- Observations: just the observed facts without any judgement.
- Health Issues: concerns requiring attention, as abnormal findings and hypothesis, as well diagnoses.
- Actions: decisions about what to do, either more explorations or treatments.
- Links to medical knowledge, also presented as graph navigations.

Attributes

- Degree of belief:
- Intensity, importance:
- Probability:
- Precision, range of probabilities:
- Handling of both positive and negative assertions:
- Completeness of information: if possible which kinds of information should be researched:
- Reliability of the sources:
- Current status of an Health Issues: Active, Chronic, History
- Expected utility of a recommendation.
- Costs: a multidimensional concept including risk, disagreement, delay before conclusion, money, availability of the resource.
- etc...

Attributes representation

- (A) Internally as numeric values, in order to allow valuable pattern recognition including weighting.
- (B) Rounded to free speech style (as for example "not to be excluded", "very probable", "obvious", etc...) in order to remain compatible with the traditional way of human spoken communication.
- (C) As visual graph, where the numeric values are converted to color, shape, size, thickness, etc... Visual representations are expected to provide easier and faster understanding of the patient situation by the other members of the Care Team of the patient. Several options to be experimented in function of the user preferences.

Navigation

- Click on a node and get the related topics. Again and again.
- Start from a problem and move to related:
  - Health Issues,
  - Observations,
  - Actions
  - Anatomical domain,
  - Related Medical Knowledge,
  - Etc…..

Training

- The student start from a few Observations.
- He has to try to build a graph with hypotheses and recommendations about what should be done.
- The teacher review quickly the graphs made by students and coordinates the discussions.
- The team try to improve the graph to a better and more realistic vision of the case, paying particular attention at probabilities, relative importance, degree of belief, risks, …. namely attributes of nodes and relations.

Telemedicine

- Graph can help to provide up to date common understanding between the members a care team across Internet.
- As a first step of migration from existing medical records, graphs may be used as a kind of “table of content”, where nodes can open traditional documents.

Seeking partners for a prototype

- Medical community: participation in experimental development and better representation of natural reasoning.
- Technical community: how to solve many technical challenges on gitHub.
- http://www.chos-wg.eu/Projects/IMMM/main-IMMM-Overview.html
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