GoCom – a Guideline-based Goal-oriented Methodology for Treating Patients with Multimorbidity and Its Preliminary Evaluation
Alexandra Kogan a, Mor Peleg a, Samson W. Tu b, Raviv Allon c, Natanel Khaitov c, Irit Hochberg c, d

a Department of Information Systems, University of Haifa, Haifa 3498838, Israel
b Center for BioMedical Informatics Research, Stanford University, Stanford, CA 94305, USA
c Bruce Rappaport Faculty of Medicine, Technion - Israel Institute of Technology, Haifa, Israel
d Institute of Endocrinology, Diabetes and Metabolism, Rambam Medical Center, Haifa, Israel

Abstract
Physicians are burdened with vast amounts of information when treating multimorbidity patients—a common situation with the aging population. We developed a goal-oriented methodology—“GoCom” (Goal-Comorbidities)[1] for continuous management of multimorbidity patients that aims to imitate the thought process of physicians by detecting and mitigating interactions among patients’ diseases and treatments. GoCom utilizes standardized medical ontologies (NDF-RT), terminologies (MedDRA) and patient-information standards (HL7-FHIR). When a diagnosis or treatment are registered, GoCom retrieves patient-specific recommendations from Computer-Interpretable Guidelines modeled in PROforma (a Task Network Model). The recommendations are converted into hierarchical goal-oriented forest structures, with goal-trees for each morbidity, where high-level goals are tree nodes and low-level treatment goals are leaf-nodes. The algorithm uses behavioral patterns to generate explanations, satisfy as many goals in the patient-forest as possible, and minimize negative effects. GoCom was evaluated with 6 complex multimorbidity case-studies and was shown to increase completeness and correctness of patient management by medical students with statistical significance.

Figure 1. System architecture