Patient Condition Modeling in RPM systems: Heart Failure Hospitalization Prediction

Mykola Pechenizkiy, Ekaterina Vasilyeva, Evgeny Knutov, Sicco Verwer and Paul De Bra, Eindhoven University of Technology, The Netherlands
Aleksandra Tesanovic and Goran Manev, Philips Research Laboratories, The Netherlands

Remote patient management (RPM) systems enable:
- Monitoring of vital signs of patients at home (blood pressure, weight, etc)
- Providing educational and/or motivational feedback to patients at home
- Alerts to medical professionals of patient’s at risk so that they can intervene to prevent worsening of patient’s condition and hospitalizations
- All with the aim of improving clinical outcomes of chronic patients, including mortality, hospitalization, and quality of life.

Our recent proposal:
- Possible architecture of next generation personalized RPM systems heavily based on knowledge discovery from RPM data leading to identification of potentially useful features and patterns for patient modeling and adaptation rules

Background and preceding work

Focus of this work is Heart Failure Hospitalization Prediction:
On a daily basis, based on the available data about a patient at moment $t$, cast a prediction whether the hospitalization for this patient is likely within next 14 days period ($t_{i+1}$, $t_{i+14}$)

Our contribution:
We proposed an approach to learn a classifier that utilizes information spread across different data sources and is able outperform the expert-authored rules used to trigger alerts

Our approach

Hospitalization prediction for the following two weeks window

Forming of a positive (HFH took place) training instance

Experimental evaluation on TEN-HMS dataset

For further information please visit www.win.tue.nl/~mpechen/projects/rpm/ or e-mail us at m.pechenizkiy@tue.nl