



M-Eco

The Medical Ecosystem – Personalized Event-based Surveillance

M-Eco provides an event-based system for the early detection of emerging health threats. It exploits content from informal sources such as social media and multimedia data, applies sophisticated event detection techniques to identify potential threats and provides signals to the user in a personalized way.

Objectives of the project

Context

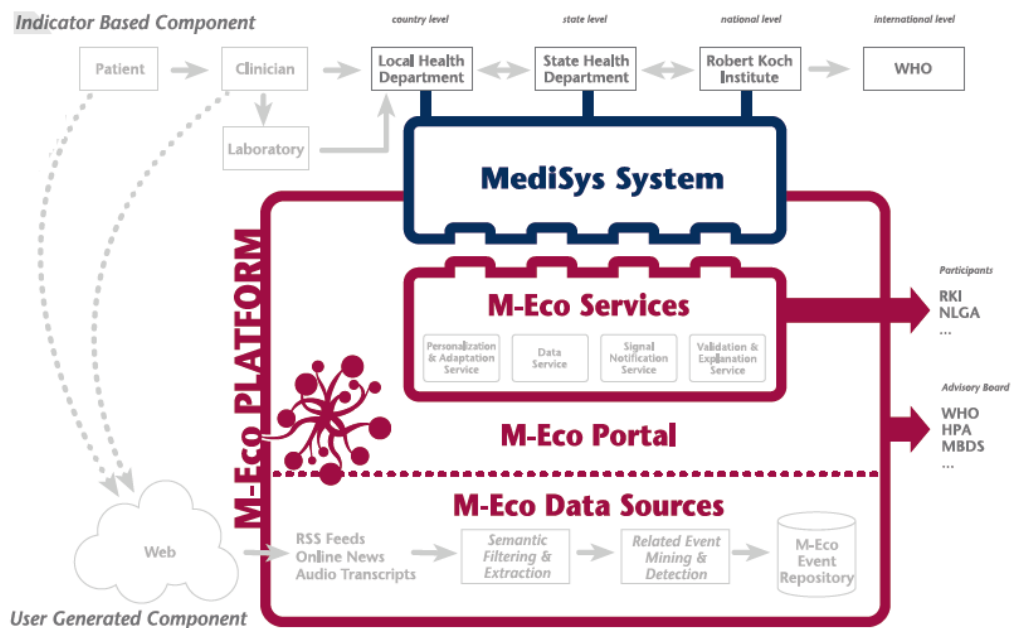
In 2009, in the Federal Republic of Germany, approximately 400,000 cases of infectious diseases have been reported; 420 public health departments were engaged in collecting the corresponding data and processing the reports.

Systems such as SurfStat,

M-Eco uses first hand information to support the early detection of disease activity.

provided by the Robert-Koch-Institute, the national health organization in Germany, exist to offer an easily accessible "epidemiological snapshot" on up-to-date summary statistics for numerous infectious diseases.

These indicator-based systems represent only part of the solution.



Experiences show that they fail when confronted with agents that are new emerging like the agents causing the lung disease SARS in 2002. Further, due to slow reporting mechanisms, the time until health threats become visible to public health officials can be long. Event-based surveillance systems use additional sources of information and are intended to improve the early detection of potential health threats.

- Applying statistical algorithms from biosurveillance for generating signals,
- Validating generated signals semi-automatically, and
- Making generated signals available in a personalized way.

The project work is highly user-driven, involving potential users (e.g., epidemiologists working in health organizations) right from the beginning in requirement gathering, scenario specification and system evaluation.

M-ECO SIGNAL NOTIFICATION SCENARIO

Dieter, working at Robert Koch Institute in Germany, has to monitor signals which pose a health threat to the public. He is creating a M-Eco signal search, specifying diseases, symptoms of his monitoring interest together with a location or time span in which he is interested. As a daily routine the M-Eco system checks its indexed blogs, audio transcripts and other data tracking and detecting topics, locations, and diseases that have been extracted. It will notify Dieter every week on new signals matching the query and also those that might be of his interest based on his previous searches or that are related to his current interest.

Project Description

M-Eco considers social media data sources which will help to get information on potential health threats first hand: Those who experience diseases, i.e. patients and physicians, blog or write their experiences in forums, blogs or Twitter messages. The project's assumption is that through these channels information on potential health threats is available earlier than through traditional reporting.

The M-Eco system comprises four major components:

- Content collection,
- Preprocessing,
- Signal generation and a
- Recommendation and user modeling.

The content collection component gathers natural language documents from blogs, forums and twitter. Further, radio and TV streams are recorded and transcribed into text. The signal generation component first extracts information on public health events from the collected texts which is then analyzed and aggregated. Second, using background knowledge and by applying statistical algorithms signals are generated from the information on detected public health events. The recommendation and user modeling ensures a personalized filtering and visualization of generated signals. Beyond the structured presentation of signal information, tag clouds, graphs, maps and other techniques will be exploited to present signal information to the user.

Project Status

The M-Eco consortium could show already in the first year that in social media data hints to public health events can be identified. An event-driven architecture has been introduced and components necessary for this architecture has been developed and implemented.

In meetings with representatives of health organizations requirements for improved disease surveillance systems have been collected.

Expected Results & Impacts

M-Eco focuses on achieving impact in three areas:

- Improved epidemic intelligence,
- Improved access and analysis facilities for signals to public health events,
- Improved filtering of associated signal information.

The M-Eco project will provide the components developed by the consortium as services to be easily included into existing systems. These services are intended improve current epidemic intelligence systems with respect to data sources, technology and result filtering and selection according to user needs. The services will be integrated into SurvNet@RKI, an indicator-based system. Output from the MediSys System, an existing event-based surveillance system, will also be integrated into M-Eco.

To find out whether Web 2.0 data is able to provide a valuable source of information for Epidemic Intelligence, the M-Eco services will be evaluated by various user groups. The evaluations will assess the usefulness, usability and quality of the developed M-Eco portal and technologies.



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- Robert-Koch Institut (Germany)
- Niedersächsisches Landesgesundheitsamt (Germany)
- Joint Research Centre (Italy)

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KEYWORDS

Event-based Surveillance, Event Detection, Disease Surveillance