
OpenTele+ for Extending Telemedicine with Pervasive Healthcare Features

Stefan Wagner

Aarhus University
Finlandsgade 22
8000 Aarhus, Denmark
sw@eng.au.dk

Esben Hunnerup

Aliviate Development ApS
Sindalsvej 29
8240 Risskov, Denmark
esben.hunnerup@aliviate.dk

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Abstract

Telemedicine systems have achieved widespread adoption across the developed world. Telemedicine platforms could arguably benefit from increased access to pervasive computing features, such as context awareness and calm technology. This includes medication and activity trackers. The aim of this demo is to demonstrate the OpenTele platform and showcase how it may be easily extended with such pervasive computing features. Based on the CAMI and OpenTele+ projects, we demonstrate how this may be achieved.

Introduction

Telemedicine systems have achieved widespread adoption across both the public and private healthcare sectors of the developed countries. One of the available systems is the “OpenTele” system developed in Denmark as a national reference and open source implementation. The research projects CAMI and OpenTele+ have adopted OpenTele as the main interface for communicating with healthcare professionals. However, the standard telemedicine features found in OpenTele are not sufficient to support the new generation of context-aware self-care systems. Thus, telemedicine platforms such as OpenTele could arguably benefit from increased access to pervasive computing features, such as context awareness, including support for medication trackers and activity trackers. The aim of this abstract is to demonstrate the OpenTele platform, and showcase how it may be easily extended with pervasive computing features.

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Figure 1. The two first screenshots shows the HTML-based clinician interface of OpenTele. The bottom screenshot shows the patient HTML client.

OpenTele

The OpenTele platform is an open source telemedicine ecosystem developed in Denmark as the National Danish reference standard [1,2]. According to the 4S organization, which is responsible for its maintenance, OpenTele is “a complete telemedical platform for handling patient recorded outcome data and measurements from personal health devices. The platform comprises a server part and a tablet app installed on a tablet located in the home of the citizen. Using this tablet, the citizen can answer questionnaires, perform measurements and exercises, and communicate with the general practitioner or hospital staff. The server exposes a web portal where a clinician can handle – and communicate with – patients, and review the data they collected.” [1]

OpenTele is open source, component-based, and highly adaptable and extendable seen in a systems engineering perspective [2]. It is built using the Java programming language for the server side and HTML5 and JavaScript for the web clients. Also, Java for Android is used for the tablet patient client allowing for wireless integration with medico devices. The database is based on the popular MySQL database server, while a REST interface is provided for parts of the OpenTele model, using JSON (Java Script Object Notation) encoding. The REST interface allows third party access to the system [2].

CAMI and OpenTele+

CAMI is a “Companion with Autonomously Mobile Interface” in an “Artificially intelligent ecosystem for self-management and sustainable quality of life in Ambient Assisted Living”. CAMI’s aims at creating a framework relying on Artificial Intelligence (AI) and allowing a seamless integration of any number of

sensors and home appliances with commercial robotic platforms [3]. CAMI’s aim is to pave the road of “robots” into the field of ambient assisted living and in settings characterized by a substantial human-machine interaction. CAMI offers a fully integrated AAL solution at the overlap of telecare and telehealth, smart homes and robotics by offering services for social care, home care, and mobility. CAMI relies on OpenTele for communicating with healthcare professionals, and the OpenTele+ features have been developed as part of CAMI, in order to extend OpenTele with the relevant features.

Planned demonstration

As part of the CAMI project, the OpenTele platform is extended with context-aware features, including medication and activity trackers, by extending the REST API. We shall demonstrate these features and provide guidelines for third party companies for using CAMI, OpenTele+, and/or OpenTele.

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