pepper

patient empowerment
through predictive
personalised
decision support

newsletter

The Newsletter of the Patient Empowerment through Predictive Personalised
Decision Support (PEPPER) Project

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RomSoft

Content

Editorial

Dr. Clare Martin

Project Coordinator

It is a great pleasure to welcome you to the second issue of the Patient Empowerment through Predictive Personalised Decision Support (PEPPER) Project newsletter. The project continues to make exciting progress, with Type 1 diabetes patients recruited to the initial feasibility study which is about to start. This issue includes reports of the two most recent project meetings, in Paris and Iasi respectively. The Paris meeting was co-located with the Advanced Technologies and Treatments for Diabetes conference (ATTD 2017), at which we presented an introduction to our work. The project partners have also been busy fostering a network of interested stakeholders. This included organising the Second Workshop on Artificial Intelligence in Diabetes (AID), which took place during the international conference on Artificial Intelligence in Medicine in June, and is described here. I do hope that you enjoy this issue of our newsletter. If you would like to offer us any feedback please contact contact_pepper@googlegroups.com.

I. PEPPER meetings in Paris (14th 15th February)

The Horizon 2020 PEPPER project reached the end of its first year culminating in a key achievement. A major project milestone was reached with the completion of the first prototype. The system development was based on a thorough analysis of the needs of key stakeholders including patients, clinicians and carers. Each of the safety-critical components has now been tested using the UVA/Padova T1D simulator.

The system was demonstrated to the Innovation Advisory Board (IAB) during the project meeting at the Cellnovo premises in Paris in February 2017. The IAB is comprised of individuals with Type 1 Diabetes, as well as representatives of Diabetes UK, the Juvenile Diabetes Research Foundation (JDRF), Sociedad Española de Endocrinología y Nutrición and the Nightscout Foundation and #WeAreNotWaiting patient community.
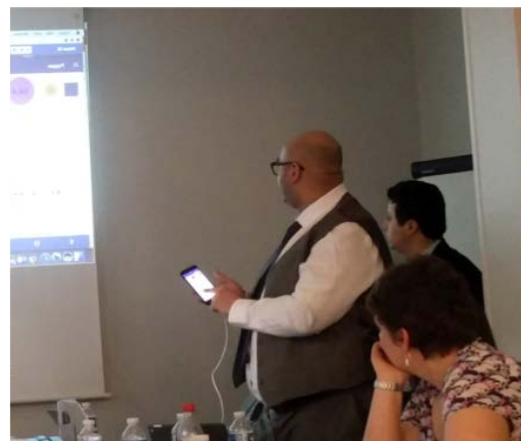
The board provided valuable feedback, which will influence the design of the training procedure and subsequent prototypes. IAB member Tim Omer said : "As we capture higher quality and quantity of data about our condition, it is refreshing to finally see progress in assisting the patient with analysing this data to provide actionable feedback to reduce the burden of Type 1 Diabetes". Carol Wheeler said: "Genuinely emotional meeting all of the people involved in this project. As a type 1 diabetic, I found the demonstration of the system very exciting. The idea of using scenario comparisons as the basis for suggested actions to the patient is hugely encouraging since it aims to automate the decision making process I am responsible for on a daily basis. Something that lessens that load is huge!"

The project meeting was co-located with the Advanced Technologies and Treatments for Diabetes conference (ATTD 2017) in Paris. The consortium used this opportunity for dissemination via a poster as well as distribution of the newsletter and flyers.

3

II. PEPPER meeting in Iasi (14th-15th July)

Following the regular meeting schedule, the Project Management Team (PMT) met this past 14th-15th July in Iasi, Romania. Romsoft SLR organized this meeting and it was hosted by Lucian Nita and Daniel Vecliuc. This meeting had as key action points preparing a meeting with the Project Steering Group (PSG) and a follow up on the project status upon the mid-term report on which the EU commission will inspect the current work.

The PSG provides project governance and holds two main functions: it provides strategic direction to the project and supports the project coordinator on her decisions. In this meeting, the membership was confirmed, since new members had been recruited from each partner to replace the original committee. The final members are now: Clare Martin, Nigel Crook (OBU); Nick Oliver (ICL); Roberto Petite (UDG); Maria Gifre (IDIBGI); Dorin Cristea (RMS); Sophie Baratte (CEL). The PSG had a very fruitful meeting, stablishing the basis of future partner relationships to improve better and faster interactions towards the final integration of all PEPPER parts into the final product that will be used in the clinical trials.

The project follow up provided by all the work package leaders ensured that most of the individual works have already meet the technical specifications and that the integration of all the components into a valid product to start the clinical trials is underway. Since a tight collaboration between partners is needed for this step, the current strategies had to be pumped up and a specially designed task and bug tracking application has been integrated into the PEPPER intranet.

The Project Management Group in front of the Place of Culture.

III.   PEPPER News

2nd Workshop on Artificial Intelligence for Diabetes

The Second Workshop on Artificial Intelligence for Diabetes was held on 24 June 2017. It took place in conjunction with the 16th Conference on Artificial Intelligence in Medicine, AIME 2017, in Vienna, Austria. The workshop was organised by Pau Herrero-Viñas (Imperial College London), Beatriz López (Universitat de Girona) and Clare Martin (Oxford Brookes University), as an initiative of the PEPPER consortium. The workshop was attended by thirteen international researchers from five different countries.

The invited speaker was Prof. M. Elena Hernando, Grupo de Bioingeniería Telemedicina, Universidad Politécnica de Madrid (Spain). Elena spoke about the challenge to create proactive Artificial Intelligence (AI) systems that are integrated in the healthcare information systems, accessible from patients' devices and able to collect relevant multi-parametric data from patients in a seamless way. The talk discussed lessons learned from previous experiences and presented new opportunities for AI in diabetes. There were eight further talks on a broad variety of topics ranging from the monitoring of drug purchase to support clinical decisions in the type 2 diabetes population to clinical decision support for the diagnosis of retinopathy. Full details and proceedings are available on the workshop website.

One of the decisions taken at the inaugural workshop in 2016 was that the group should create and maintain an indexed website of resources to support research into Artificial Intelligence in Diabetes. This work has been started and the resulting website was demonstrated at this workshop and will be open to the community soon. Discussions took place about how to structure, manage and maintain the website and associated mailing list. It was agreed that the next workshop will be organised in conjunction with IJCAI/ECAI 2018 in Stockholm, in order to capitalise on the enthusiasm and momentum created by the first two events

Other related news

Scientists from Seoul National University have developed a sensor that can monitor blood sugar levels by analysing sweaty skin. The sensor needs just one millionth of a litre of sweat to do the testing. Can sweat patches revolutionise diabetes? Read the full BBC news article on the following link: http://www.bbc.co.uk/news/health-39208696

Smartphones can already control homes and cars, and diagnose diseases. Chinese and Swiss researchers now show that a smartphone can command engineered cells implanted in diabetic mice to produce insulin. Read the full IEEE Spectrum article on the following link: https://goo.gl/XajcnO

An innovative digital health system (GDm-Health) developed by researchers and engineers working with frontline clinicians in Oxford is helping women who develop diabetes during pregnancy to better manage their condition and make fewer hospital visits. The system uses a smartphone app to track blood glucose levels, and enable swift communication between pregnant women with gestational diabetes and specialist midwives. Data is transferred simply and securely in real time, enabling instant review and feedback. Read the full case study at https://goo.gl/AbCTql

Can tattoos embrace technology in order to make the skin interactive? DermalAbyss is a proof-of-concept that presents a novel approach to bio-interfaces in which the body surface is rendered an interactive display. Traditional tattoo inks are replaced with biosensors whose colors change in response to variations in the interstitial fluid. It blends advances in biotechnology with traditional methods in tattoo artistry. Full article at https://www.media.mit.edu/projects/d-Abyss/overview/

Researchers give weight loss apps much needed scientific merit. Half of European adults are either overweight or obese. Many turn to self-help apps as a means to burn excess fat, but despite hundreds of digital tools available very few help maintain a slimmer waistline and few are based on tried and tested science. Full information at https://horizon-magazine.eu/article/researchers-give-weight-loss-apps-much-needed-scientific-merit_en.html

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Can sweat patches revolutionise diabetes? Scientists have developed a sensor that can monitor blood sugar levels by analysing sweaty skin. http://www.bbc.com/news/health-39208696

IV. Profile – Pau Herrero Viñas

Pau Herrero-Viñas holds a double Ph.D. degree on Automation by University of Angers (France) and on Information Technologies by University of Girona (Spain).

After receiving his PhD, Pau did a postdoctoral stay at University of California Santa Barbara (USA) working on diabetes technology projects. He then spent two years at the Autonomous University of Barcelona/Hospital de Sant Pau (Spain) leading different eHealth projects related to diabetes management.

He is currently a Research Fellow within the department Electrical & Electronic Engineering at Imperial College London. His main research interest lies in the field of diabetes technology and antimicrobial resistance. In particular, he is involved in the development of an artificial pancreas system and an intelligent decision support system for diabetes management.
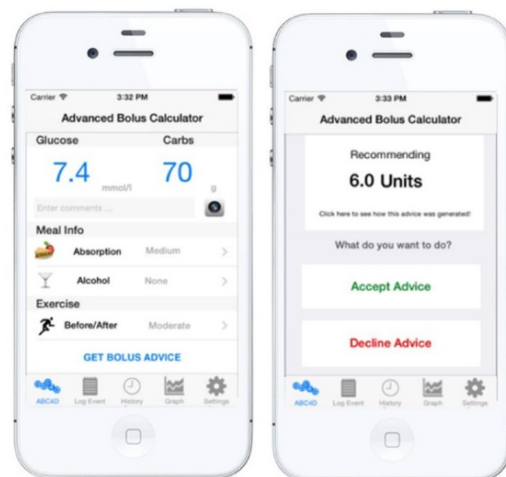
V. Dissemination
March 2017 <> July 2017

Automatic Adjustment of Basal Insulin Infusion Rates in Type 1 Diabetes using Run-to-Run Control and Case-Based Reasoning
Pau Herrero, Peter Pesl, Monika Reddy, Nick Oliver and Pantelis Georgiou.
2nd Workshop on Artificial Intelligence for Diabetes (AIME)
Vienna, Austria, 2017
Proceedings

Towards a Formal Model of Type 1 Diabetes for Artificial Intelligence
Daniel Brown, Clare Martin, David Duce, Arantza Aldea, R. Harrison
2nd Workshop on Artificial Intelligence for Diabetes (AIME)
Vienna, Austria, 2017
Proceedings

Involving physical activity in insulin recommender systems with the use of wearables
Beatriz López, Alejandro Pozo, Ferran Torrent-Fontbona.
Informatics for Health
Manchester, UK, 2017

A CBR-based bolus recommender system for type 1 diabetes
Ferran Torrent-Fontbona, Beatriz López, and Alejandro Pozo-Alonso.
2nd Workshop on Artificial Intelligence for Diabetes (AIME)
Vienna, Austria, 2017
Handle

Prediction of postprandial hypoglycaemias from insulin intakes and carbohydrates: analysis and comparison between real and simulated datasets
Fabien Dubosson, Natalia Mordanyuk, Beatriz López, and Michael Schumacher.
2nd Workshop on Artificial Intelligence for Diabetes (AIME)
Vienna, Austria, 2017
Proceedings

VI.   Future events

25th-27th Oct 2017 <> Deltebre, Terres de l'Ebre, Catalunya, Spain
20th International Conference of the Catalan Association for Artificial Intelligence
https://ccia2017.upc.edu

AI4D website will be available soon to the public at http://ai4diabetes.org and
http://ai4d.org. Check out the @Ai4Diabetes Twitter to be updated

The PEPPER teammates Marion Waite and Clare Martin will be at the University of
Oxford Curiosity Carnival on 29th September.
More info: http://www.ox.ac.uk/curiosity-carnival

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