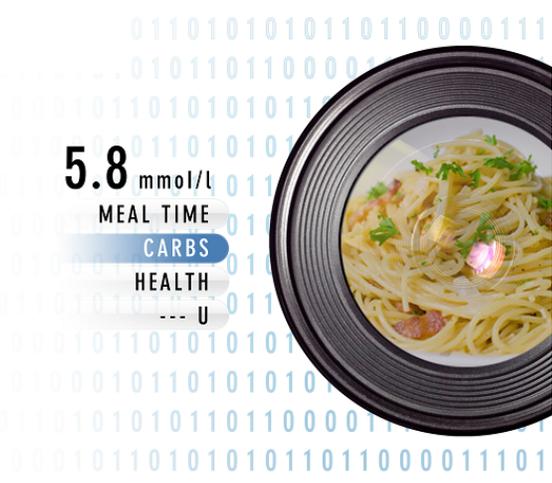


NEWSLETTER

GoCARB

TYPE 1 DIABETES SELF-MANAGEMENT AND CARBOHYDRATE COUNTING:
A COMPUTER VISION BASED APPROACH

5.8 mmol/L
MEAL TIME
CARBS
HEALTH
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ISSUE 1

AUGUST 2013

WELCOME TO GOCARB

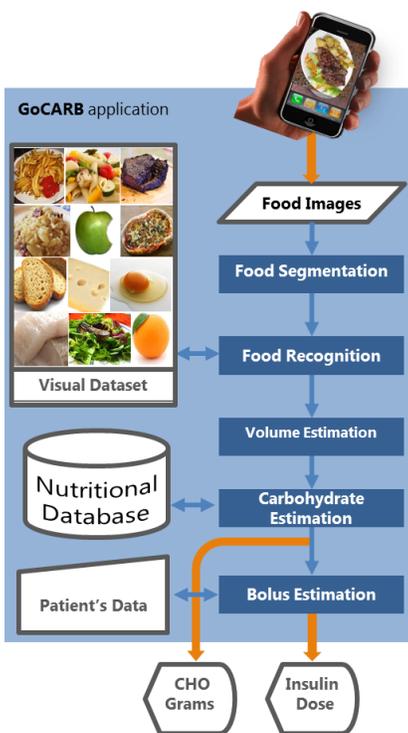
The aim of GoCARB is to design, develop and evaluate a system which will permit the automatic, near real-time recognition of the different types of foods on a plate and to estimate their content of carbohydrates. In addition, this information will be used to optimize the calculation of the bolus insulin dose. The ultimate objective is to have an application running on a mobile phone which can be used in everyday life to support the diabetic patient during carbohydrate counting and insulin dose estimation.

estimate carbohydrates precisely.

GoCARB addresses the need of people with diabetes for a more effective, automated and precise way to estimate the grams of carbohydrates in food, as well as improving their management of their disease, and enhancing their quality of life.

We are excited to be working on this project and hope that through various media and frequent outreach programs such as those detailed in this newsletter, people will come to recognize the groundbreaking and high impact research that is being conducted by the GoCARB team.

GoCARB is a project funded by the European Commission's 7th Framework Programme. The aim of the project is to support diabetes patients in counting carbohydrates and estimating the size of the required insulin dose. Although studies have shown that planning meals and counting carbohydrates is of great importance for diabetic patients, even well trained patients find it difficult to es-



The input of the system consists of two meal images. One of them is used for segmenting the food items on the plate which are then recognized by the next step. 3D reconstruction and volume estimation follows by using both images. Then, carbohydrate content is estimated by considering a nutritional database and the insulin bolus is calculated using additionally some patient data.

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NEWSLETTER

NEWS FROM GOCARB

September 1st, 2011 is the official starting date of GoCARB. GoCARB is a transatlantic research project funded by the EC. The consortium members are in close collaboration towards enhanced and individualized diabetes

treatment. The project results are disseminated in dedicated conferences and journals, while a series of training and outreach activities communicates the GoCARB achievements in diabetic patients and the general public.

1 GoCARB at International Conferences

6th International Conference on ATTD 2013

GoCARB was presented at the **ATTD2013** conference on Feb 27 - Mar 2 in Paris, France. GoCARB participated with two posters:

- Segmentation and recognition of food images for carbohydrate counting
- Food volume estimation from multiple images with free camera positioning



35th Annual International Conference of the IEEE Engineering in Medicine and Biology Society

GoCARB was presented at the **IEEE EMBS 2013** conference on July 3-7, 2013 2 in Osaka, Japan with one poster:

- A computer vision based approach towards the automatic carbohydrate intake monitoring

2 Visit of National Contact Points



On April, 22nd 2013 the ARTORG Center hosted representatives from a number of National Contact Points (NCPs). The NCPs from Switzerland, Czech Republic, Poland and from South Africa were given details on how the consortium was initially put together and the project implementation.

During the visit, the NCPs were able to meet researchers working on GoCARB. The NCPs were also given exclusive access to the GoCARB Lab, where they could see some of the techniques developed used to identify food and estimate the corresponding volume

3 GoCARB Public Lecture

On May 27th, 2013 a public lecture has been organized by the GoCARB partners at the Bern University Hospital. Swiss diabetic patients associations were invited, while the event has been advertised to local media and newspapers. Three speakers, Profs. Peter Diem, Christoph Stetler and Stavroula Mougiakakou have presented the lat-

est technological achievements in the area of diabetes. The attendees could visit Roche's booth and be introduced to medical devices for insulin delivery and glucose measurement. More than 100 people attended the event.

4 Lectures and Seminars

When	Where	Title and Presenter
17.07.2013	Mannheim, Germany Roche Diagnostics GmbH	Seminar "GoCARB and the food recognition problem: progress and remaining challenges" Dr. Marios Anthimopoulos, Post-doctoral Researcher, ARTORG Center, University of Bern, Switzerland
03.07.2013	Mannheim, Germany Roche Diagnostics GmbH	Seminar "Design and development of a reinforcement learning based algorithms for insulin dose optimization in individuals with type 1 diabetes" Dr. Elena Daskalaki, ARTORG Center, University of Bern, Switzerland
13.12.2012	Bern, Switzerland MSc in Biomedical Engineering Course: Technology and Diabetes Management	Lecture "Insulin delivery devices" Dr. Alan Greenburg, Clinical Analyst, Roche Diagnostics, Indianapolis, Indiana, USA
06.12.2012	Bern, Switzerland MSc in Biomedical Engineering Course: Technology and Diabetes Management	Lecture "Glucose measurement" Dr. Joachim Hoenes, Chief Scientist, Roche Diagnostics GmbH, Mannheim, Germany
07.08.2011	Bern, Switzerland University of Bern Bern University Hospital Bern University of Applied Science	Seminar "Translating research prototype to commercial medical device product" Dr. Robert Hellwig, Head of Product Management, Roche Diabetes Care AG, Burgdorf, Switzerland

NEWSLETTER

NEWS FROM THE DIABETES AND NUTRITIONAL MANAGEMENT

According to the International Diabetes Federation (IDF) at least 371 million people suffer from diabetes worldwide. While it is estimated that in 2030 this number will increase to over 552 million. Specifically in Europe, 8.4% of the adult population has diabetes, while for children, Europe presents the highest number of instances of Type 1 Diabetes (T1D). It is worth mentioning, that the number of T1D incidence in young individuals suggests an

“accelerating” epidemic, with the rate of increase exceeding previous estimations. Among the diabetic population, 90% of the cases refer to Type 2 Diabetes.

Diabetes treatment involves regular self-monitoring of glucose levels, insulin treatment, balanced diet and regular physical activity.



Recent studies have shown that in children and adolescents on intensive insulin therapy an inaccuracy of ± 10 g in carbohydrate counting does not deteriorate the post-prandial control, while a ± 20 g variation significantly impacts the postprandial glycaemia.

Smart CE et al, Diabet Med. 2009 Mar;26(3):279-85.

Smart CE et al, Diabet Med. 2012 Jul;29(7):348-353.

Prandial insulin dose calculation is based on the carbohydrate of the upcoming meal. Imprecise counting of carbohydrates can lead to either under- or overdosing of prandial insulin, resulting in out-of-range post-prandial glucose fluctuations. Postprandial hyperglycemia is an important risk factor for diabetes complications and macrovascular disease, so managing postprandial glucose levels is of utmost importance for individuals with diabetes.

Adults with T1D require more insulin coverage for higher-fat meals than for lower-fat meals with identical carbohydrate content.

Wolpert HA et al. Diabetes Care. 2013 Apr;36(4):810-6

The presence of balanced amounts of protein and fat determined a different glycemic response from that obtained with only carbohydrate up to 3 h after eating.

García-López et al. Diabetes Technol Ther. 2013 Feb;15(2):166-71.

FORTHCOMING EVENTS

On August 27th the GoCARB partners will meet in Bern for their Annual Meeting, which will be followed by the Mid-Term Review (MTR) meeting. The meeting will take place on August 28th. During the MTR meeting the Pro-

ject Officer and an External Evaluator will assess the GoCARB progress in terms of science and technology, financial and administration issues related to Marie-Curie IAPP projects.

International Conferences

1

13th IEEE International Conference on Bio-Informatics and BioEngineering (IEEE BIBE 2013) (November 11-13, 2013, Chania, Greece). Early registration for the conference ends on September 16th, 2013.

3

The 13th Annual Diabetes Technology Meeting of the Diabetes Technology Society will take place from October 31 to November 2, 2013 in San Francisco, California, USA. The early registration ends on September 30, 2013.

2

Call for abstracts for the 7th International Conference on Advanced Technologies and Treatments for Diabetes (ATTD2014), February 5-8, 2014 (Vienna, Austria). The abstract submission deadline is on October 8th, 2013

4

The 36th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC'14) will be held from August 27-31, 2014 at Chicago, Illinois, USA.

RELATED PROJECTS

- Technology assisted dietary assessment - www.tadaproject.org/
- Personal glucose predictive diabetes advisor (diAdvisor) - www.diadvisor.eu/
- Artificial pancreas at home (AP@home)- www.apathome.eu/
- Remote accessibility to diabetes management and therapy in operational healthcare networks (REACTION) - www.reaction-project.eu

RELATED LINKS

- European Commission, Marie Curie Actions - <http://ec.europa.eu/research/mariecurieactions/>
- European Association for the Study of Diabetes - www.easd.org
- American Diabetes Association - www.diabetes.org
- International Diabetes Federation - www.idf.org
- Diabetes Research Foundation - www.jdrf.com

GoCARB Consortium List

20 SCIENTISTS, 9 NATIONALITIES, 3 PARTNERS, ONE PROJECT!

1

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u^b

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