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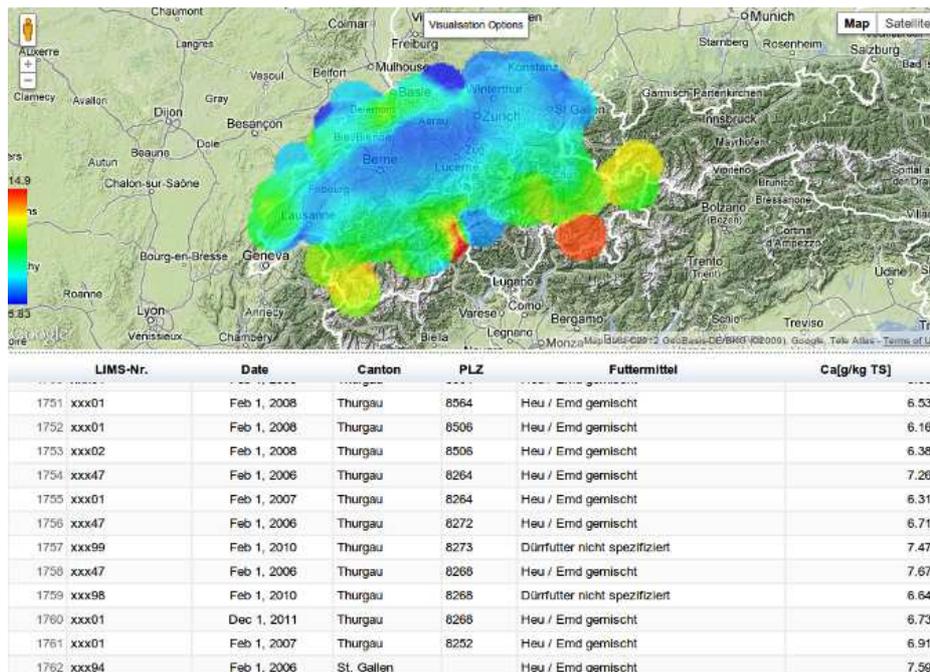Fax +41 44 635 68 09
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Master Project in Informatik
Datenbanktechnologie
Topic: Implementation of the Animated Color Plots in the On-line Swiss Feed Database

For the regional analyses of the nutritive containment the on-line web application of the Swiss Feed Database offers color plots. Consider the below Figure. The user aims to compare the containment of nutrient 'calcium' in hey across different regions of Switzerland. In total, between 2005 and 2012 there are 2000 measurements of this nutrient from 555 different locations. The colored image on the top of the map employs hot and cold colors to represent high and low concentration of calcium. It can be easily observed that mountain hey has much higher concentration of calcium comparing to the hey in the central part of Switzerland. However, it is not possible to observe how the containment of calcium was changing from 2005 till 2012.

Computation of the color plots is done with a help of Kernel Density Estimation and Kernel Regression. These methods take into account all measurements of the query result and provide the expected nutritive value even in the areas that are between origins of the feed samples. On a technical level, the efficient implementation of the color plots requires to compute the density on grid points of a sparse regular grid and, then, interpolate the density between the grid points.

LIMS-Nr.	Date	Canton	PLZ	Futtermittel	Ca[g/kg TS]
1751 xxx01	Feb 1, 2008	Thurgau	8564	Heu / Emd gemischt	6.530
1752 xxx01	Feb 1, 2008	Thurgau	8506	Heu / Emd gemischt	6.167
1753 xxx02	Feb 1, 2008	Thurgau	8506	Heu / Emd gemischt	6.387
1754 xxx47	Feb 1, 2006	Thurgau	8264	Heu / Emd gemischt	7.264
1755 xxx01	Feb 1, 2007	Thurgau	8264	Heu / Emd gemischt	6.310
1756 xxx47	Feb 1, 2006	Thurgau	8272	Heu / Emd gemischt	6.718
1757 xxx99	Feb 1, 2010	Thurgau	8273	Dürrfutter nicht spezifiziert	7.478
1758 xxx47	Feb 1, 2006	Thurgau	8268	Heu / Emd gemischt	7.674
1759 xxx98	Feb 1, 2010	Thurgau	8268	Dürrfutter nicht spezifiziert	6.649
1760 xxx01	Dec 1, 2011	Thurgau	8268	Heu / Emd gemischt	6.732
1761 xxx01	Feb 1, 2007	Thurgau	8252	Heu / Emd gemischt	6.910
1762 xxx94	Feb 1, 2006	St. Gallen		Heu / Emd gemischt	7.599

The goal of this project is to implement animated color plots in the on-line web application of the Swiss Feed Database. The approach will consists of the following steps. First, the time line is split into small intervals and, then, for each interval a static color plot is computed with a help of Kernel Regression on a sparse regular grid. Next, with a help of linear interpolation the static color plots are combined into a smooth animation and displayed on the map. In their work the students will work with the Postgres relational database, PHP, JavaScript and 'canvas' element of HTML5 standard.

The requirements on the implementation are:

- a user is able to switch between two types of color plots: static and animated;
- it is possible to control the animation: pause it and scroll towards the desired time point.
- the implementation is optimized to ensure fast response, i.e., it must take seconds for the user until the animation is computed.
- the students will provide a technical report that describes their implementation.

The list of the literature is:

1. Silverman, B.W. (1986). Density Estimation for Statistics and Data Analysis. Chapman and Hall, London.
2. Visualization of the Varying Spatial Density Information in the Swiss Feed Database. Andrin Betschart. Bachelor Thesis.
3. http://www.html5canvastutorials.com.

Supervisor:

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Starting date:

Ending date:

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