**Foetal weight forecast**

## Objective:

Foetal weight estimation is a clinically relevant task for proper medical care in perinatal situations. Usually this estimation is based on measurements from echographic examinations. Several estimation formulas have been developed by other authors with limited degree of success. Our approach is based on neural nets (NN) in order to achieve a clinically usable estimation of foetal weight.

## Methods and Results:

In the frame of a multicenter study involving several Portuguese Hospitals a data set of 414 cases were collected. Each case consists of five input features and the correct foetal weight measured at birth. The input features are echographic measurements: biparietal diameter, cephalic circumference, abdominal circumference, femur length, and the umbilical artery resistance index. All these features were measured using an established protocol.

The following NN approaches were experimented: multilayer perceptrons (MLP); radial basis functions (RBF); support vector machines (SVM).

The following table shows the relative errors and percent of errors that are less than 5% given by our NN for the estimated foetal weight and estimated foetal length. See details in (Sereno F, Marques de Sá J.P, Matos A, Bernardes J, 2000b, **A Comparative Study of MLP and RBF Neural Nets in the Estimation of the Foetal Weight and Length**, in Campilho A., Mendonça A., 2000, Proc. of RECPAD 2000, University of Porto).

| | MLP | RBF |
|---|---|---|
| **Foetal Weight:** | | |
| Relative Error | 7.52% | 7.15% |
| Percent of Errors < 5% | 41.1% | 42.7% |
| **Foetal Length:** | | |
| Relative Error | 2.8% | 2.6% |
| Percent of Errors < 5% | 85% | 87% |

The following picture shows a MS Windows 98 application with the developed NN. Estimates of Foetal Weight (EFW) can be obtained by introducing values of echographic measures. The last two values of the EFW are predictions given by multilayer (MLP) and radial basis functions (RBF) neural networks.


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