Electronic Appendix 2

The code of Artificial Neural Network for glucose detection in Matlab. Sentences marked with % was the explanation of the code.

```
% Loading the data
input_train=R values of 80 training samples;
output_train=glucose concentration of 80 training samples;
input_test= R values of 20 forecast samples;
output_test= glucose concentration of 20 forecast samples;

% Data preprocessing
[inputn,inputps]=mapminmax(input_train);
[outputn,outputps]=mapminmax(output_train);

% Setup of artificial neural network
net=newff(inputn,outputn,[5]);

net.trainParam.epochs=100;
net.trainParam.lr=0.1;
net.trainParam.goal=0.00004;

% Training the network
net=train(net,inputn,outputn);

% Prediction using the network
inputn_test=mapminmax('apply',input_test,inputps);

% Output of the prediction results
an=sim(net,inputn_test);

% Inverse-normalization of the prediction results
BPoutput=mapminmax('reverse',an,outputps);

% Visualization of the prediction result
% Figure 1 is the comparison of prediction results and measured results of the 100 forecast samples

figure(1)
plot(BPoutput,':og')
hold on
plot(output_test,'-*');
legend('Measured','Predicted')
```

```
title('the prediction results of the ANNs','fontsize',12)
ylabel('R value','fontsize',12)
xlabel('Sample','fontsize',12)

% Figure 2 is the forecast error of the ANNs model
% error represents the forecast errer
error=BPoutput-output_test;
figure(2)
plot(error,'-*')
title(' the forecast error of the ANNs model ','fontsize',12)
ylabel('error','fontsize',12)
xlabel('sample','fontsize',12)
```