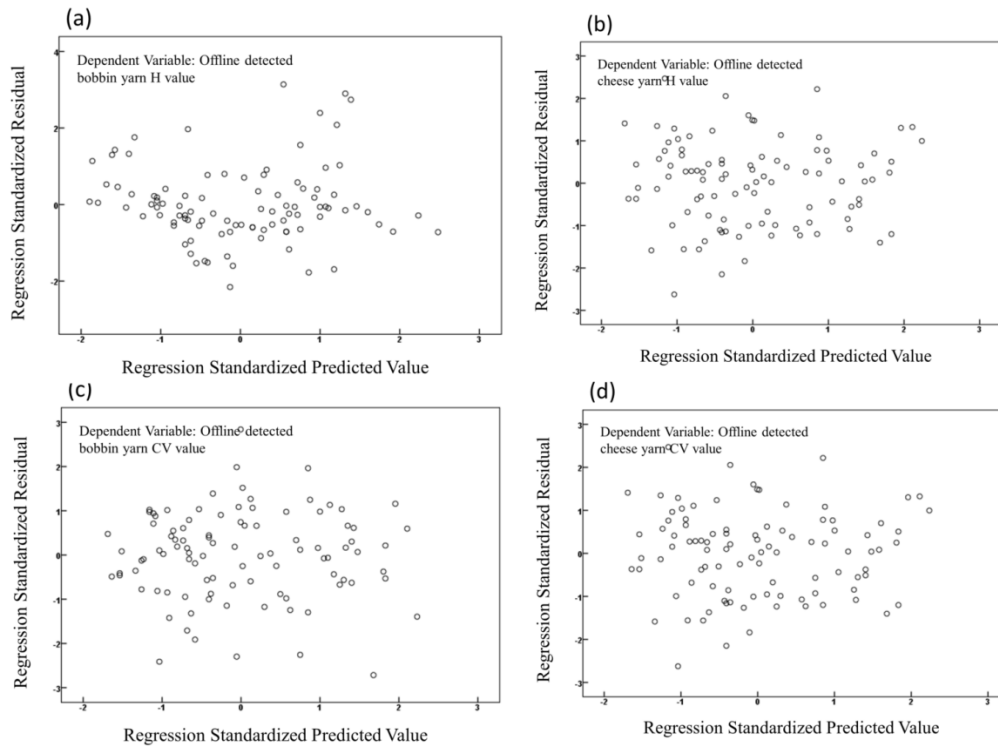**Supplemental Material**

Appendix I

Figure 1. (a-d): Scatter plot of regression standardized residual for four model functions. a: scatter plot of regression standardized residual associating the H value of bobbin yarns from online detection with that obtained by offline detection; b: scatter plot of regression standardized residual associating the H value of cheese yarns from online detection with that obtained by offline detection. ; c: scatter plot of regression standardized residual associating the CV value of bobbin yarns from online detection with that obtained by offline detection; d: scatter plot of regression standardized residual associating the CV value of cheese yarns from online detection with that obtained by offline detection.
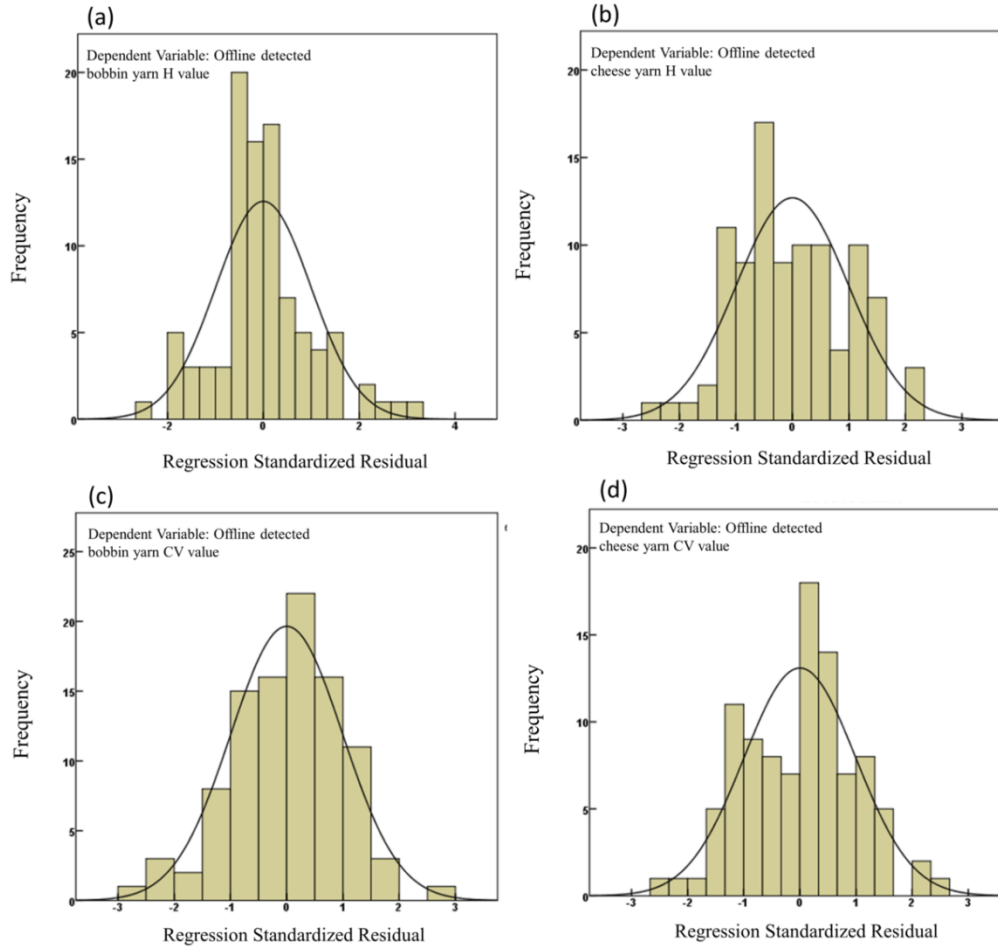
Figure 2. (a-d): Histogram plot of regression standardized residual for four model functions. a: histogram plot of regression standardized residual associating the H value of bobbin yarns from online detection with that obtained by offline detection; b: histogram plot of regression standardized residual associating the H value of cheese yarns from online detection with that obtained by offline detection.；c: histogram plot of regression standardized residual associating the CV value of bobbin yarns from online detection with that obtained by offline detection;、d: histogram plot of regression standardized residual associating the CV value of cheese yarns from online detection with that obtained by offline detection.
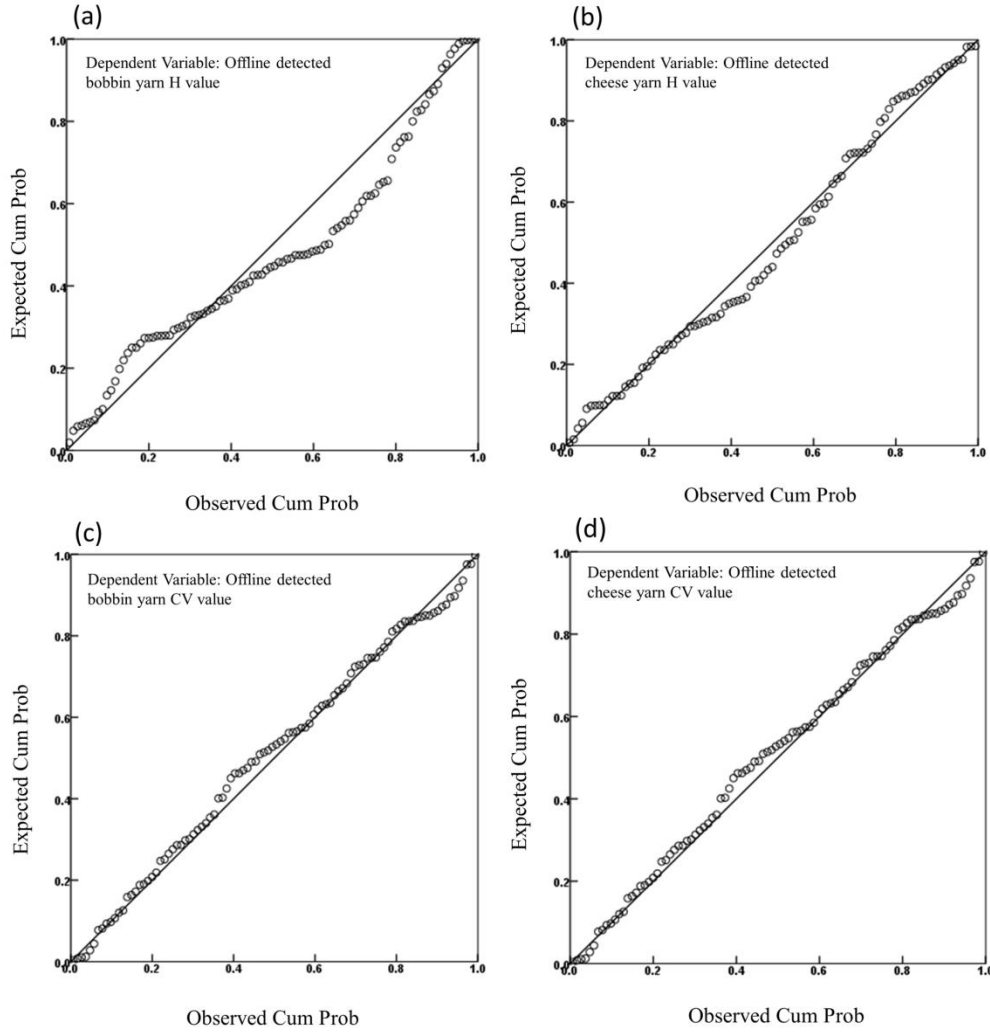
Figure 3. (a-d): P-P plot of regression standardized residual for four model functions. a: P-P plot of regression standardized residual associating the H value of bobbin yarns from online detection with that obtained by offline detection; b: P-P plot of regression standardized residual associating the H value of cheese yarns from online detection with that obtained by offline detection. ; c: P-P plot of regression standardized residual associating the CV value of bobbin yarns from online detection with that obtained by offline detection;、 d: P-P plot of regression standardized residual associating the CV value of cheese yarns from online detection with that obtained by offline detection.
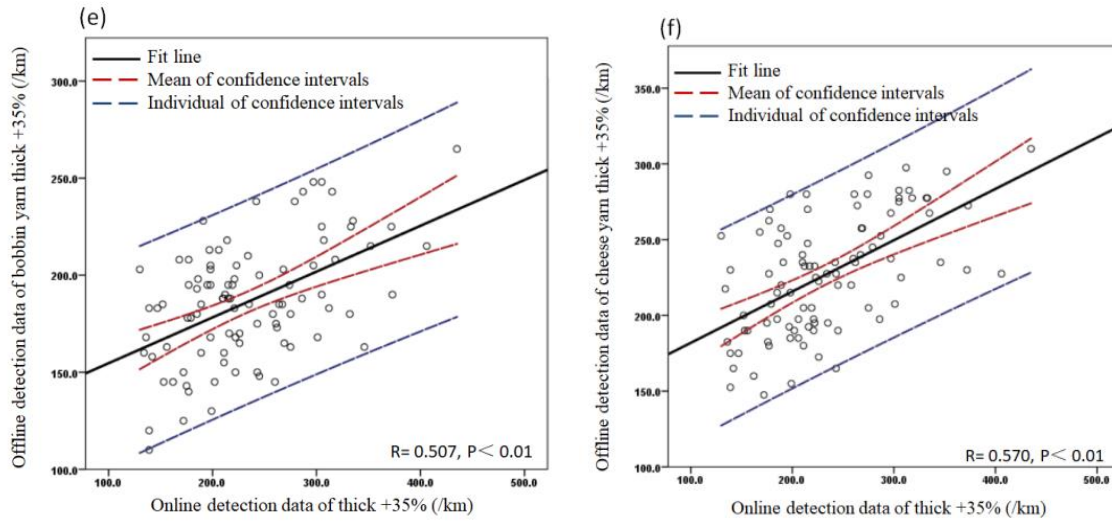
Appendix Ⅱ

Figure 5. (e-f): model functions (*black line*) with confidence intervals (*red curves*) and prediction intervals (*blue dash lines*). a: fitting curve associating thick +35% of bobbin yarns from online detection with that obtained by offline detection; b: fitting curve associating thick +35% of cheese yarns from online detection with that obtained by offline detection.