Electronic Supplementary Material (ESI) for Analyst.

1. Image preprocess for skew correction

For the projection of original images, several preprocess steps need to be performed to reduce the impact of noise and binarize the images. First, the green color channel was isolated from the red and blue channels and a top-hat filter was used to approximate and subtract the background, Fig. S1B shows the processed image after background removal. Then, a threshold was defined using an adaptive thresholding scheme, which converted the image to a binary image, expressing the positive chambers as white chambers (shown in Fig. S1C). There were still some unreasonable noise in the image, thus we used a median filter to reduce the impact of noise (shown in Fig. S1D).

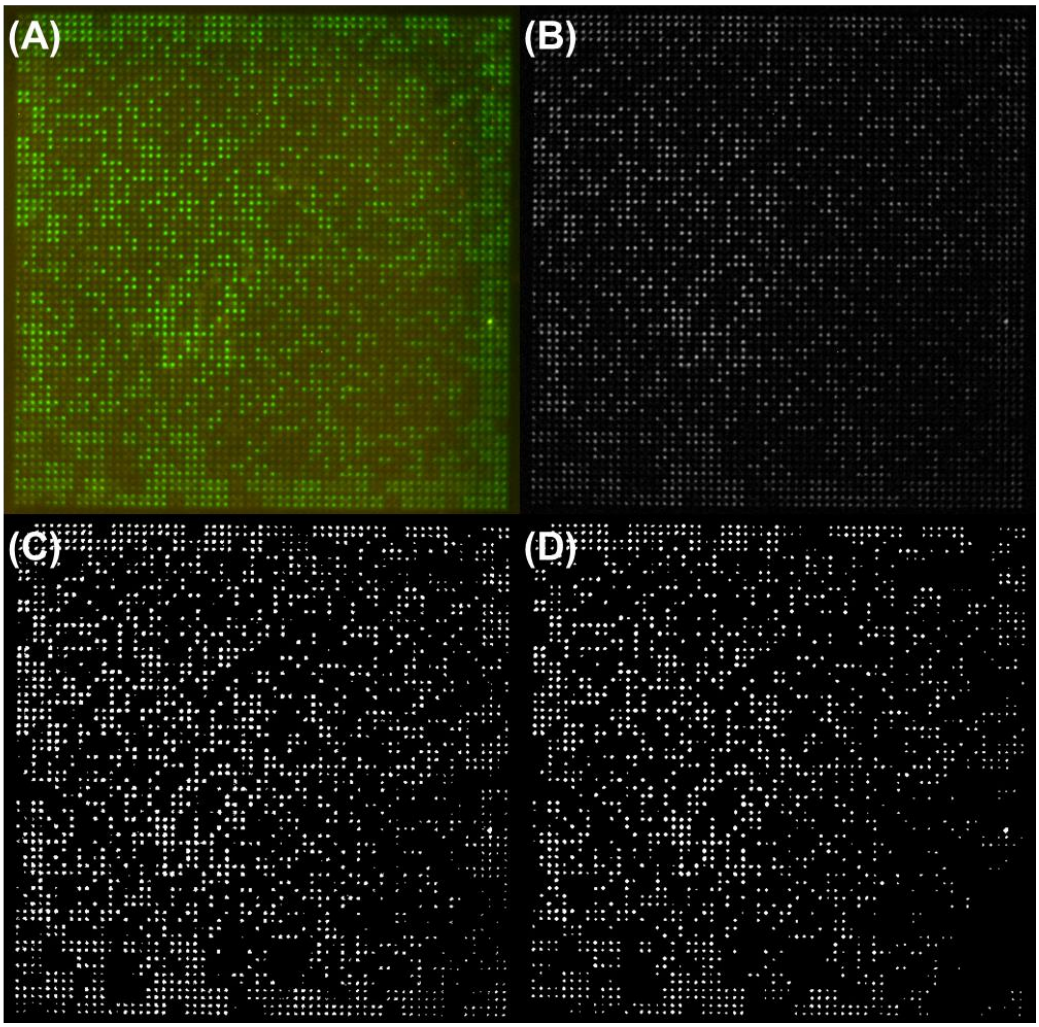

Fig. S1. (A) Original fluorescence image. (B) Processed image after background removal. (C) The binary image after thresholding. White chambers represent the positive chambers. There are still many some unreasonable noise in the image. (D) Image after reducing the impact of noise using a median filter.

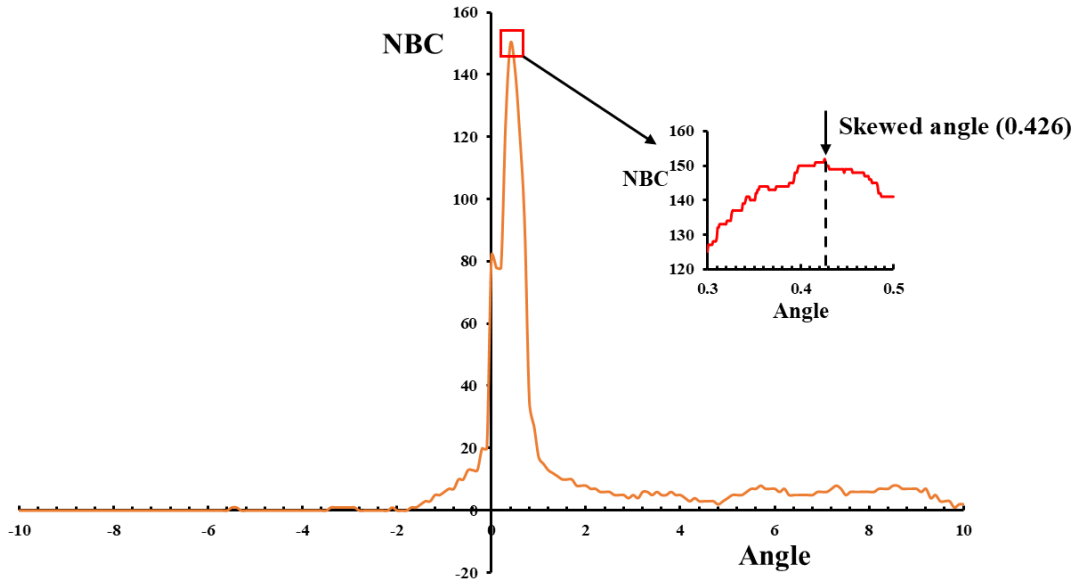

Fig. S2. Curves showing the changes of NBC value at various angles. The calculation of NBCs were performed first from -10° to +10° with 0.1° steps to get an approximate angle called θ_a (orange curve), then from θ_a - 0.1° to θ_a + 0.1° with 0.001° steps, getting the skewed angle θ (red curve).

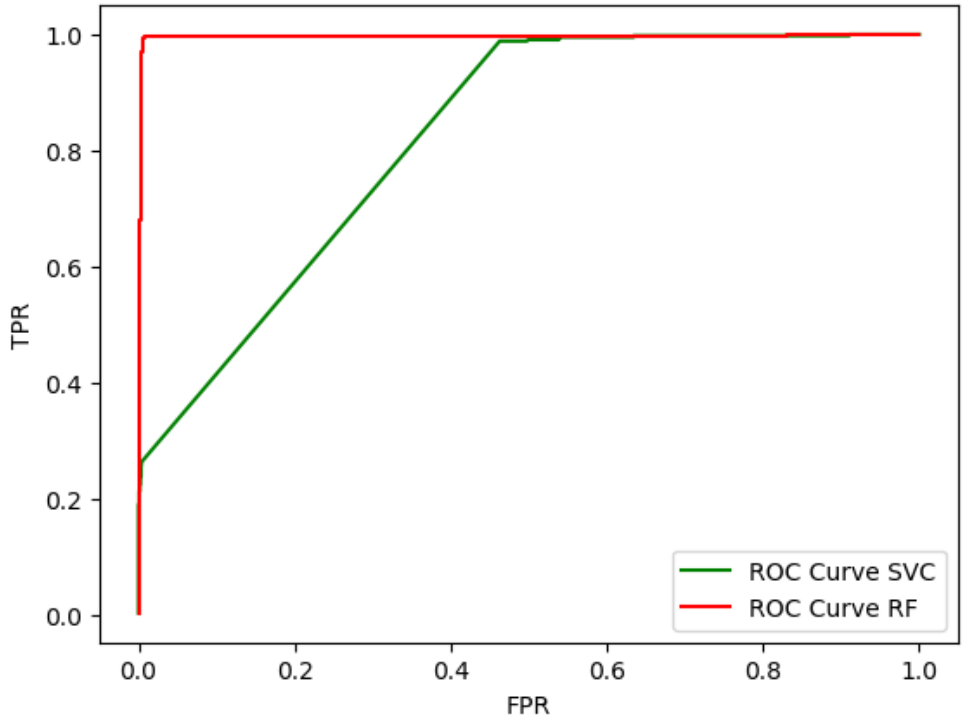

Fig. S3. ROC curves of random forest and SVC using the same training data set and test data set. The AUC (area under the curve) values of these two methods were calculated: RF_AUC=0.997, SVC_AUC=0.823, thus demonstrating that the random forest methodology performs better than Support vector machine (SVM).