Supplementary Information (SI) for Journal of Materials Chemistry C.

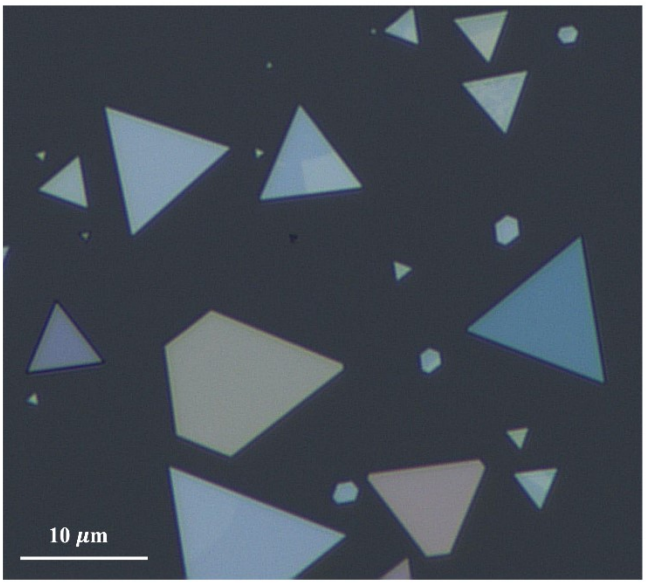

Fig. S1 The OM image of the Cu_2Te nanosheets.

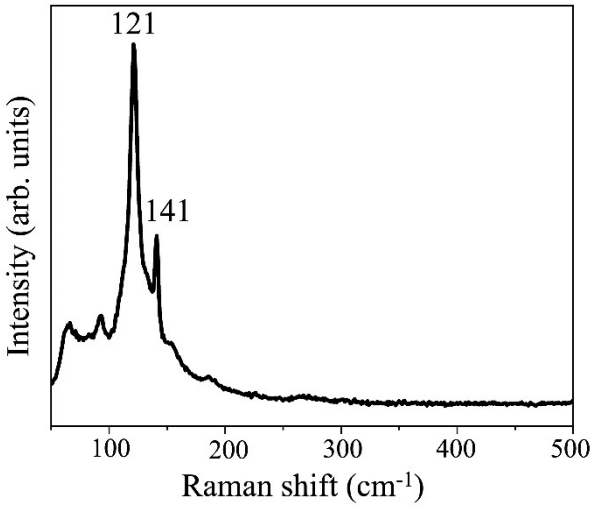

Fig. S2 The Raman spectra of Cu_2Te nanosheet.

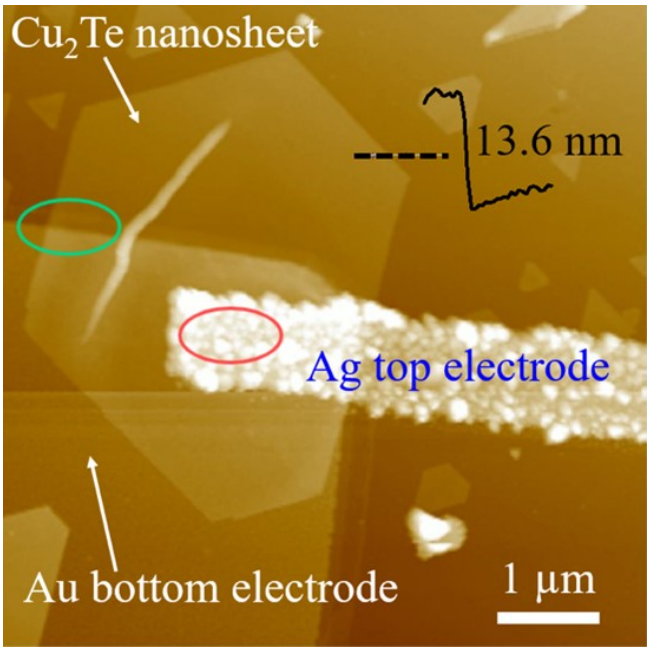

Fig. S3 Typical AFM image of the Cu_2Te vertical device with Au bottom electrode and Ag top electrode. Red oval: Ag actively participates in switching reactions of memristor, resulting in the observed particle size. Green oval: A dual-layer resist process involving MMA and PMMA was used in the preparation of the Au electrode, resulting in a distinct multilayer structure.

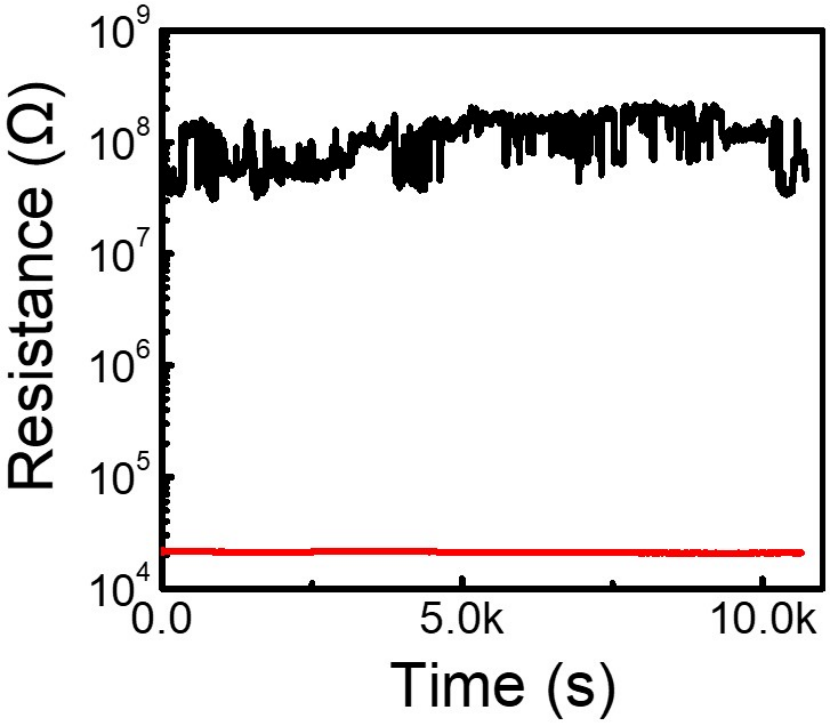

Fig. S4 Typical retention performance of Cu_2Te vertical device.

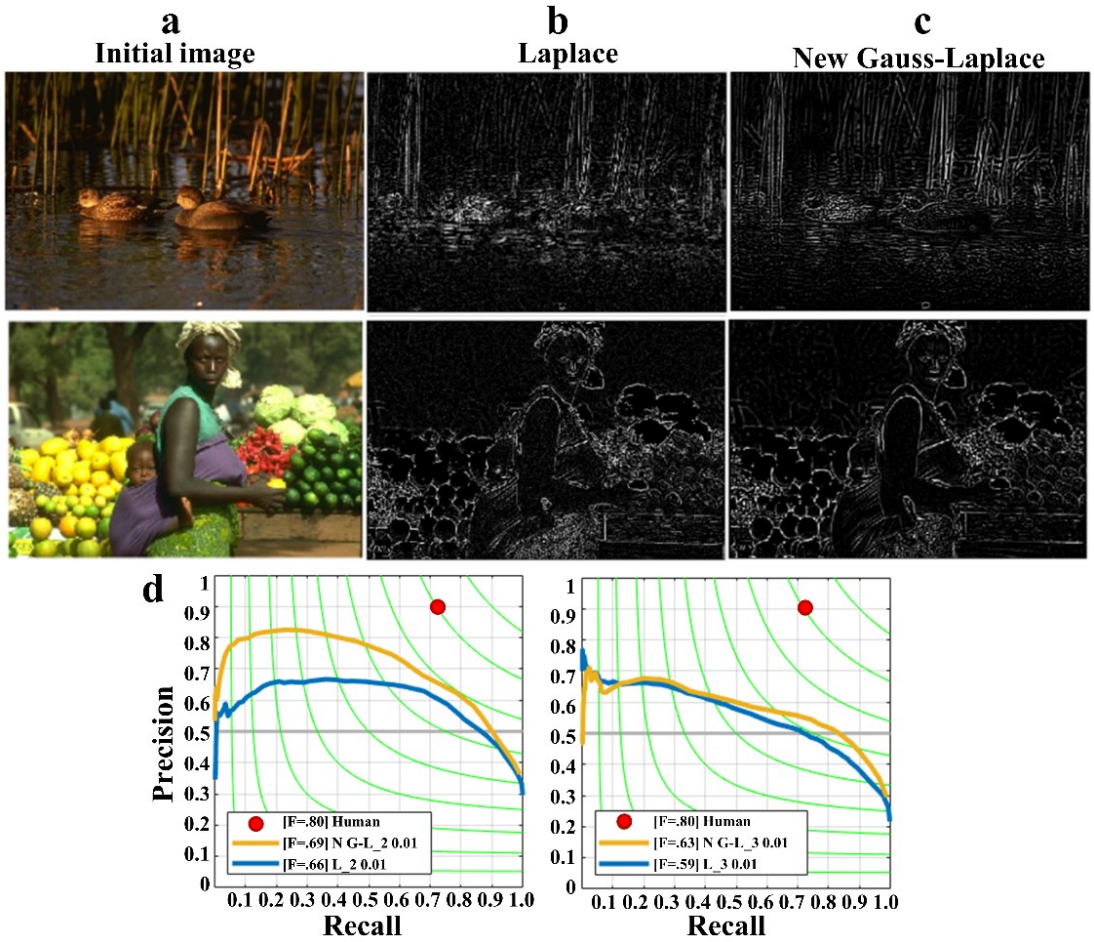

Fig. S5 a The initial input images figures 2 and 3. b-c The edge detection results of input images figures 2 and 3 with noisy (σ=0.01) are obtained by using the Laplace operator and the new Gauss-Laplace operator respectively. d The P-R curves are used to evaluate the edge detection results of two operators. N G-L denotes the new Gauss-Laplace operator and L denotes the Laplace operator. The number 2 and 3 represent the two images figures 2 and 3 in Figure S1a. The number 0.01 represents the standard deviation of noise σ (0.01).

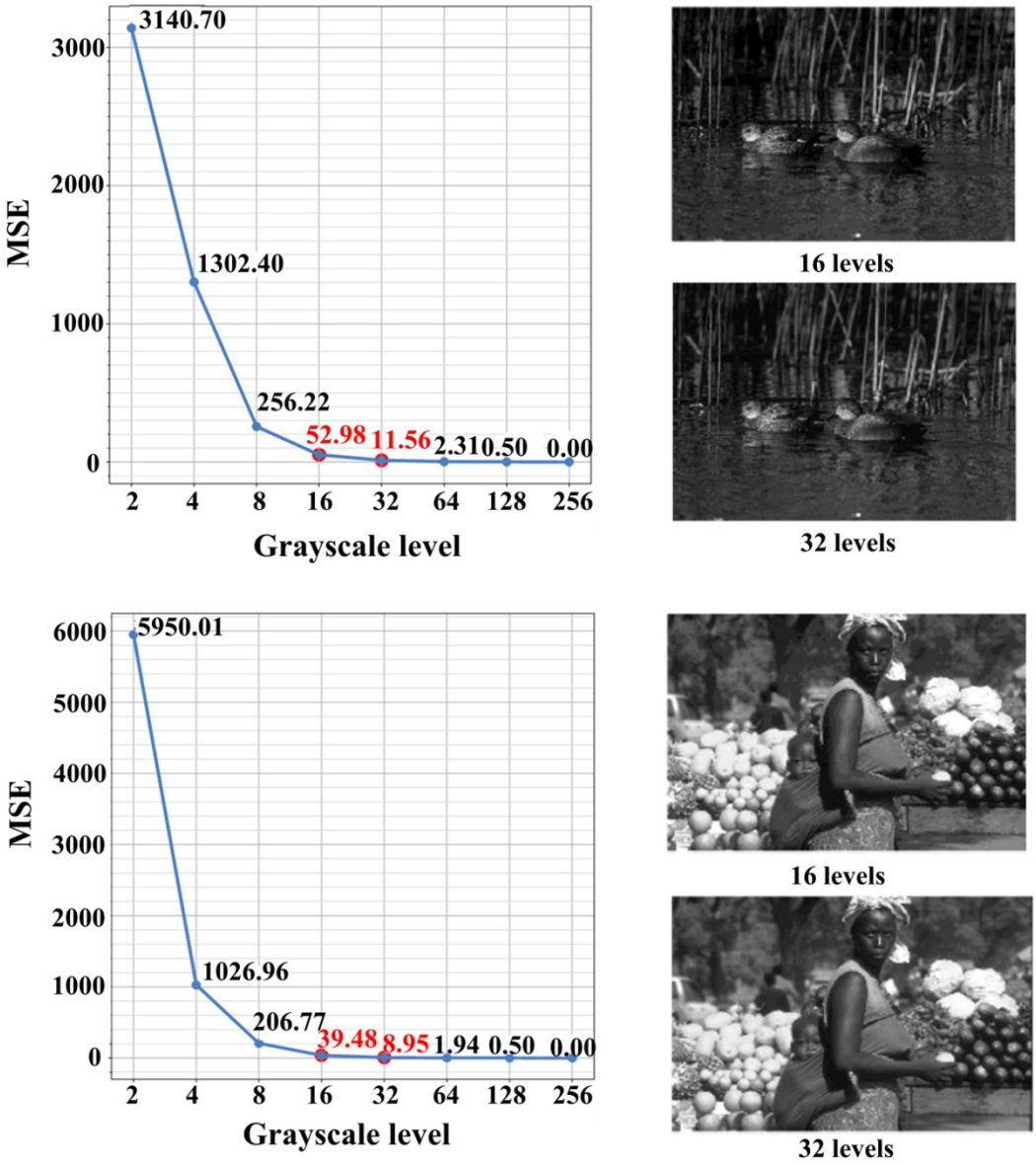

Fig. S6 The changes of MSE values when reducing grayscale levels of grayscale images figures 2 and 3 from 256 grayscale levels to 2 grayscale levels. In addition, the images' 16-grayscale-level and 32-grayscale-level counterpart are presented.