This paper investigates the non-mirror effects of monolayer graphene under strain and successfully realizes dimension- and direction-tunable optical differentiation. Software simulations have demonstrated its application in edge detection. Perfect two-dimensional differentiation can be achieved by altering parameters such as the incident polarization angle, Fermi energy, electric field direction, and strain intensity. The system exhibits varying differentiation performances under different strain intensities; specifically, we have chosen to explore a strain intensity of S=0.2 because it demonstrates superior edge detection results compared to other intensities.This study explores the unique non-mirror effects exhibited by strained monolayer graphene and successfully achieves dimension- and direction-tunable optical differentiation. The application of this mechanism in edge detection is demonstrated through numerical simulations. By adjusting key parameters, including the incident polarization angle, Fermi energy, electric field direction, and strain intensity, perfect two-dimensional differentiation can be realized. Notably, the system displays varied differentiation performances under different strain intensities. Among these intensities, S=0.2 has been selected for detailed investigation due to its optimal edge detection capabilities, outperforming other tested values.