Original Edge Detector

$G_x = \begin{bmatrix} +1 & 0 & -1 \\ +2 & 0 & -2 \\ +1 & 0 & -1 \end{bmatrix}$

σ =3
(Kernel Size)

$\theta = 0.2$
Thresholding Value
(0-1)

$\gamma = 2$
Thinning Value
(0-inf)

$N = 3$
Median Filter Size

$ConvertToGene()$

$Gene$

$\begin{bmatrix} 1 \\ 0 \\ -1 \\ 2 \\ 0 \\ -2 \\ -1 \\ -2 \\ -1 \\ 3 \\ 0.2 \\ 2 \\ 3 \end{bmatrix}$

$geneToBinary()$

$getMutations()$

$ConvertFromGene()$

$Gene$

$\begin{bmatrix} 1 \\ 2 \\ -1 \\ 2 \\ 3 \\ -1 \\ -1 \\ -2 \\ -1 \\ 4 \\ 0.3 \\ 4 \end{bmatrix}$

$binaryToGene()$

Interpolation

New Edge Detector

$G_x = \begin{bmatrix} 1 & 1.6 & 0.88 & -1 \\ 1.63 & 0 & -1.27 & -1 \\ 0.88 & 1.03 & -0.33 & -1 \\ -1 & 1.63 & -1.63 & -1 \end{bmatrix}$

σ =4
(Kernel Size)

$\theta = 0.3$
Thresholding Value
(0-1)

$\gamma = 2$
Thinning Value
(0-inf)

$N = 4$
Median Filter Size

$breedEdgeDetctors()$

$Bianry\ Gene - [1\ \ 1\ \ 0\ \ \dots\ 1\ \ 0\ \ 1]$

$P(1) = 0.5, \quad P(0) = 0.5$

$Another\ Binary\ Gene - [1\ \ 0\ \ 0\ \ \dots\ 1\ \ 1\ \ 1]$

$[1\ \ 0\ \ 0\ \ \dots\ 1\ \ 1\ \ 1]$

$- Offspring\ Binary\ Gene$

Genetic Edge Detector Evolution

1st Generation

Edge Detector 1

Edge Detector 2

Edge Detector 3

Edge Detector N

GetFitness()

Top 50%

Top 10%

Edge Detector 7 Fitness=0.6

Edge Detector 2 Fitness=0.55

Edge Detector 1 Fitness=0.3

Edge Detector 23 Fitness=0.1

Bottom 50%

Remaining Edge Detectors Fitness < 0.1

Death

Survive Unchanged

Mutate() Replenishes Population

Previous Top 50%

Top 10%

Edge Detector 7 Fitness=0.6

Edge Detector 2 Fitness=0.55

Bottom 90%

Edge Detector 1 Fitness = ?

Edge Detector 23 Fitness = ?

Remaining Edge Detectors Fitness = ?

Survive Unchanged

breedEdge Detctors() Top 50% Modify Unknown/Bottom 90%

2nd Generation

Top 10%

Edge Detector 7 Fitness=0.6

Edge Detector 2 Fitness=0.55

Edge Detector 1 Fitness= ?

Edge Detector N Fitness = ?