Image Super-Resolution Using Deep Convolutional Networks

(4) implementation

Visual Computing Lab

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Result

- Training Data 30 set → 91 set
- Gradient Descent → Rmsprop, Adam
- Cost 0.128 → 0.032

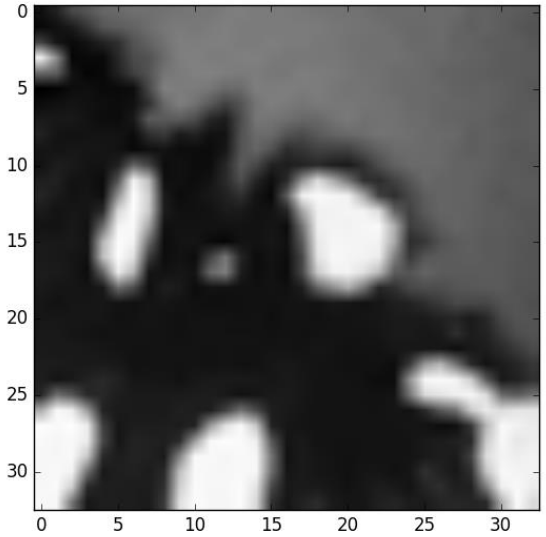
Divide to Batch size

- Training Data 91 set → 21884 sub-Images
- Resource exhausted : OOM Error
- Batch size = 128
- [21884,33,33,1] 한번에 계산하던 것을

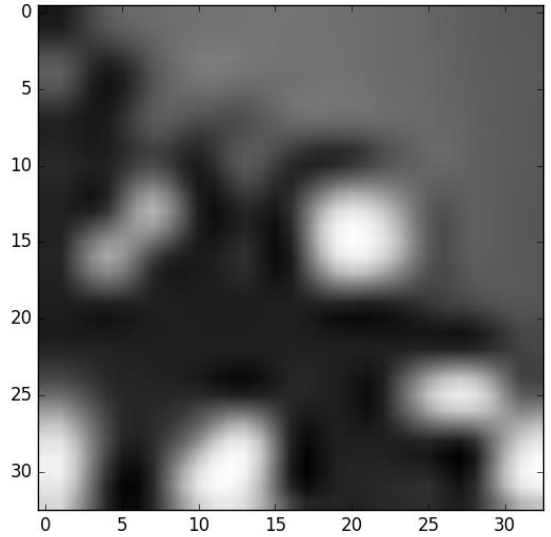
→ [128,33,33,1] 분할하여 계산

Experiments

Divide 33by33

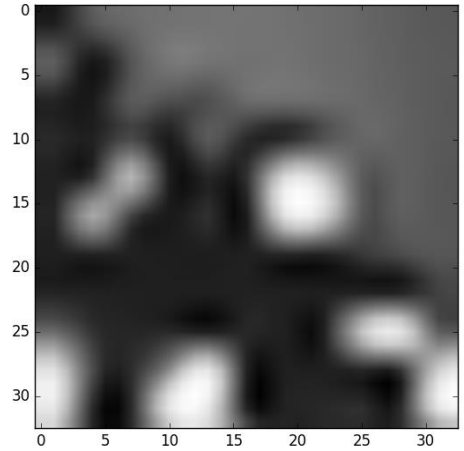


Original

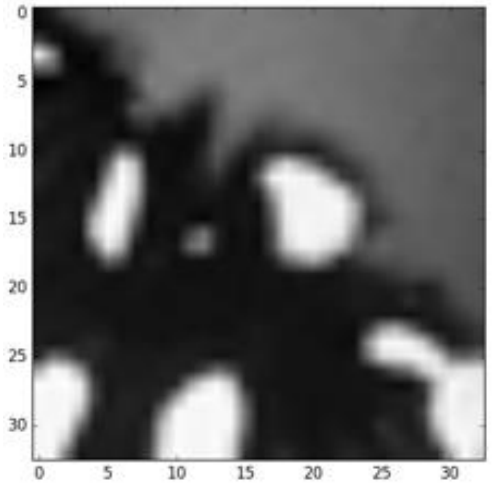


Input

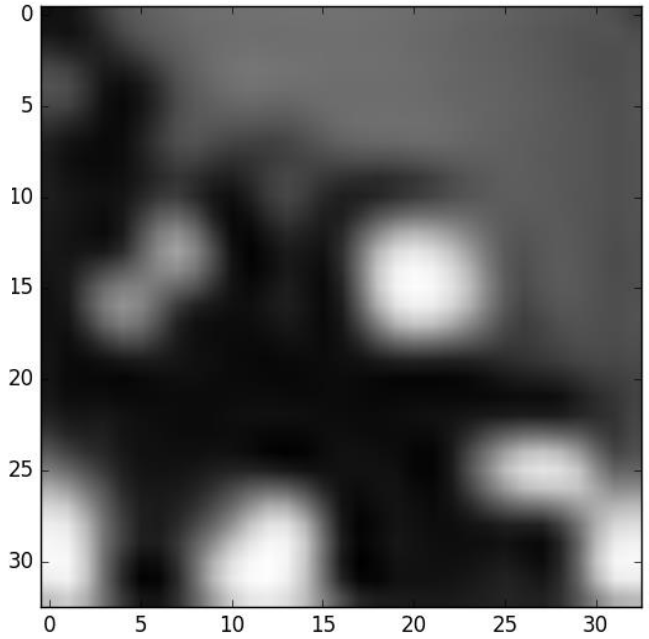
Result - Batch 적용 후



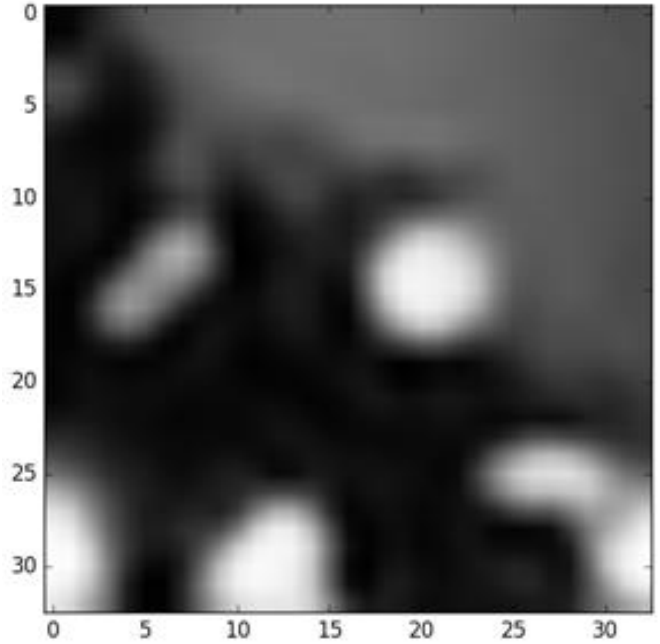
Input



Original

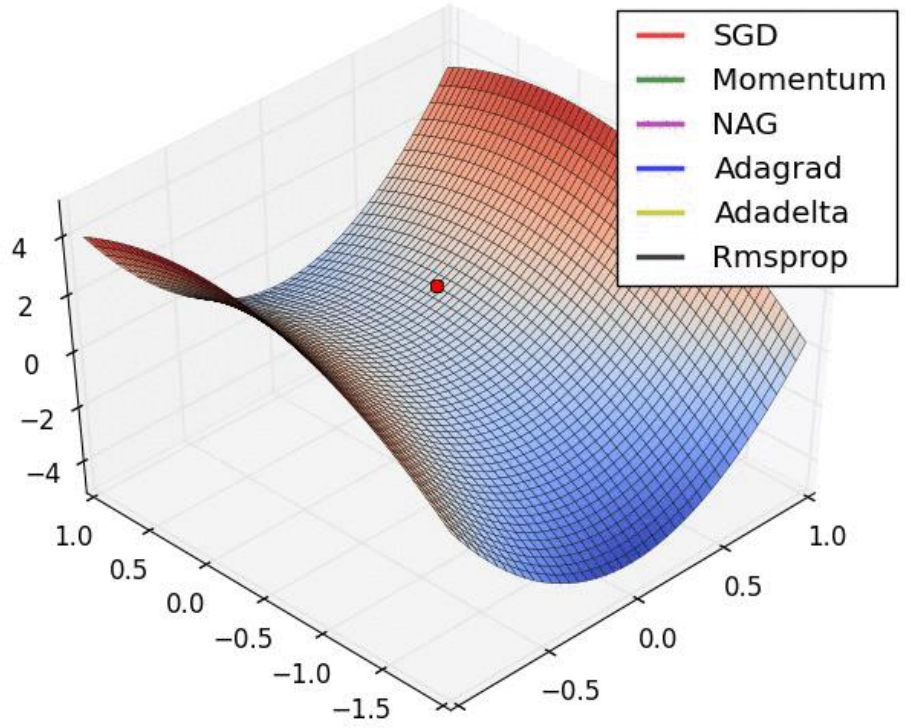


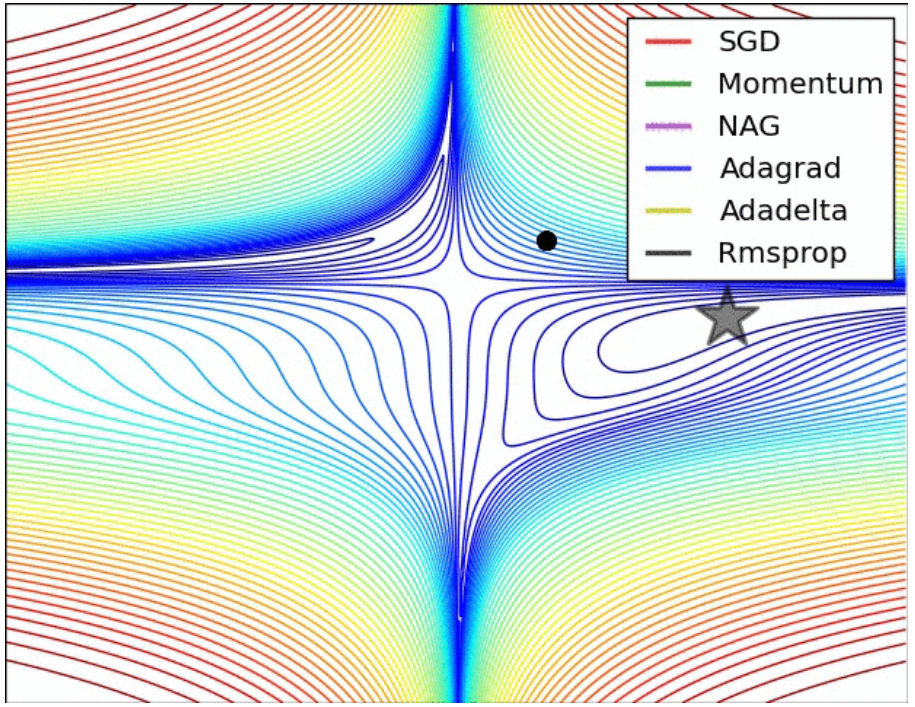
적용 전 : 0.12847



적용 후 : 0.0391

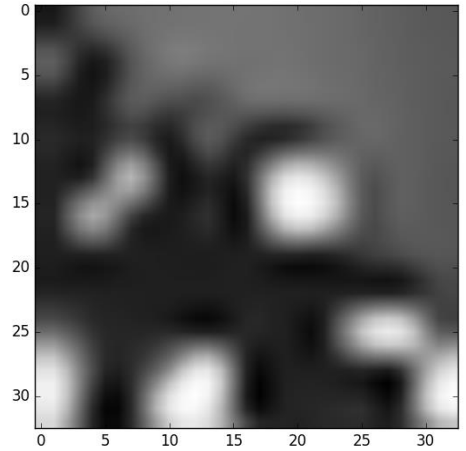
Optimizer Algorithm



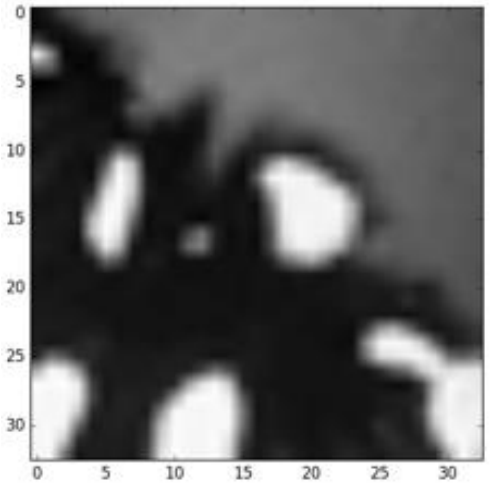


http://cs231n.github.io/neural-networks-3/

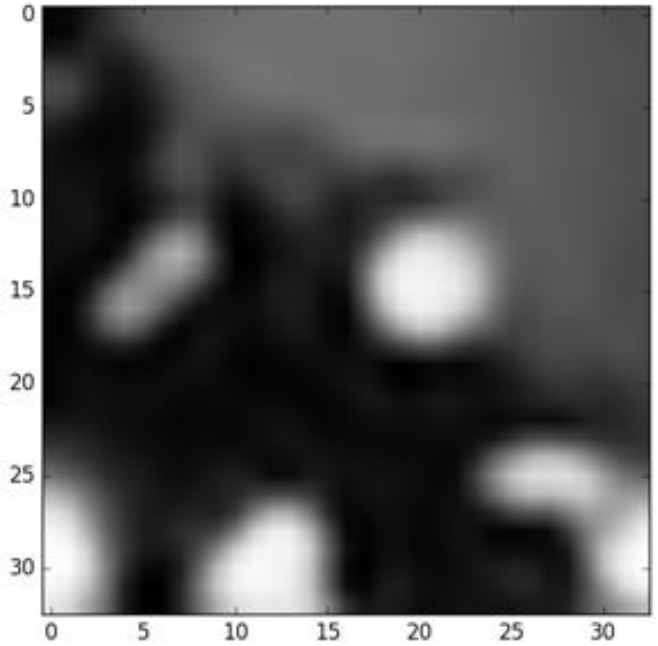
Result - Rmsprop



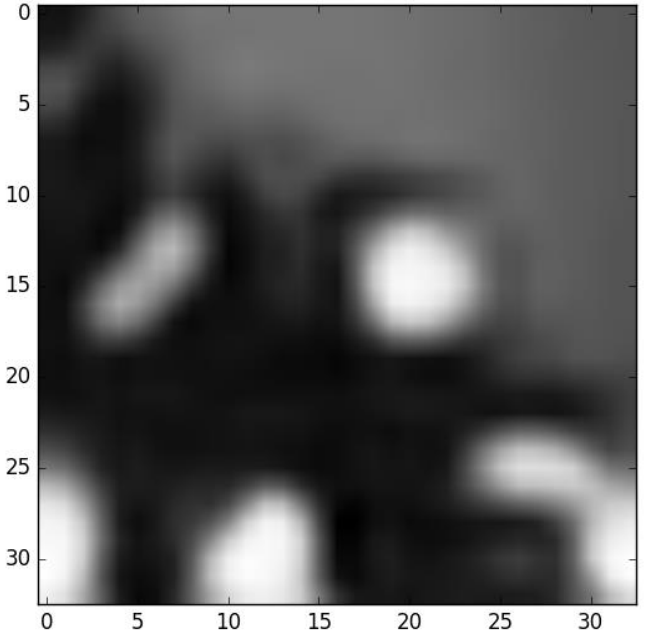
Input



Original

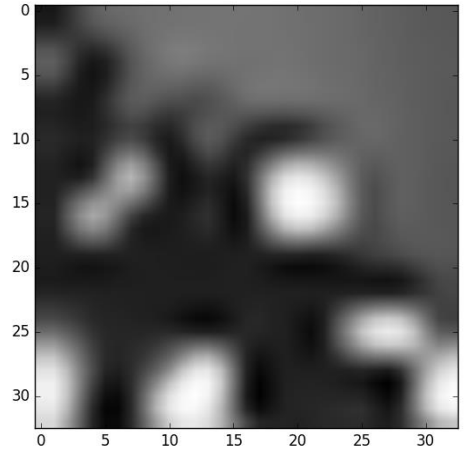


Gradient : 0.0391

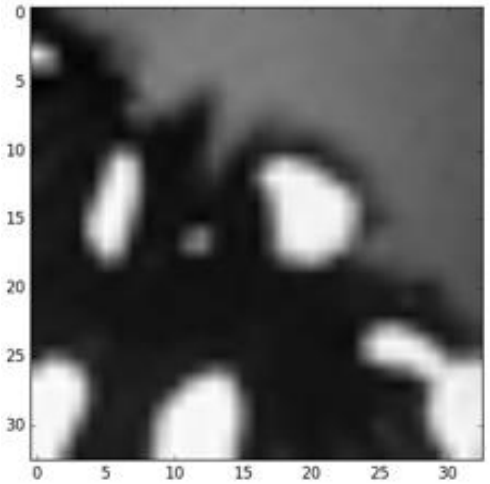


Rmsprop : 0.0339

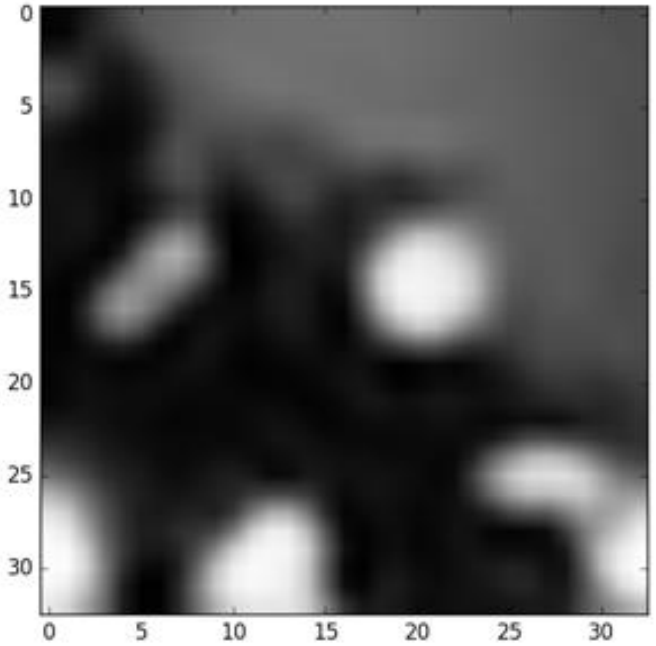
Result - Adam



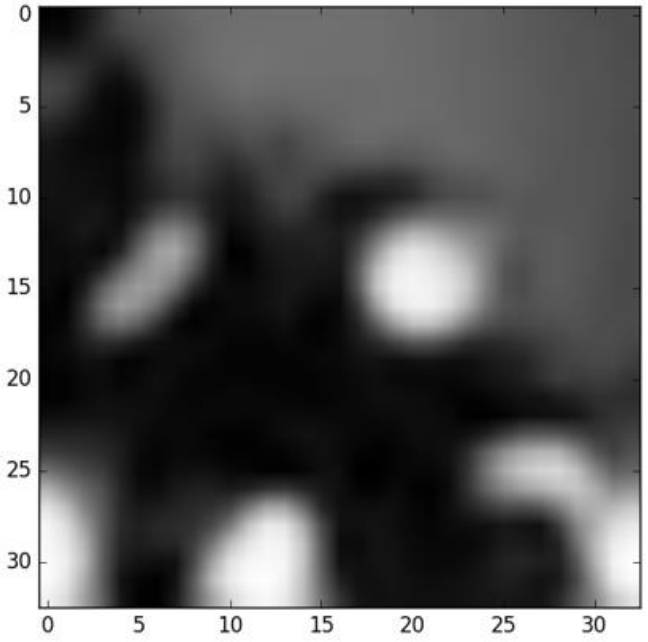
Input



Original

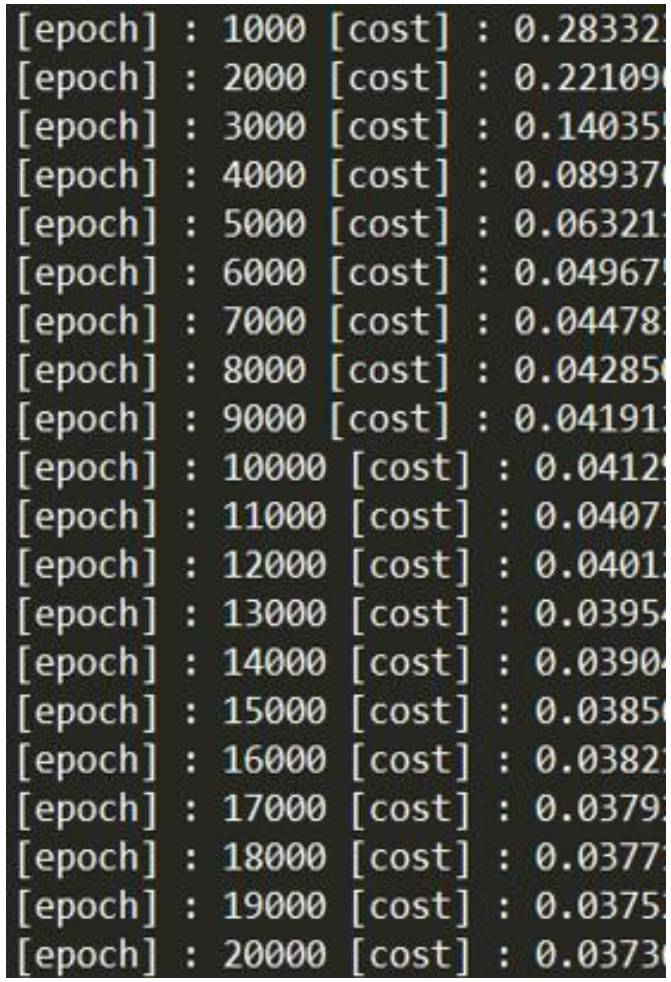


Gradient : 0.0391

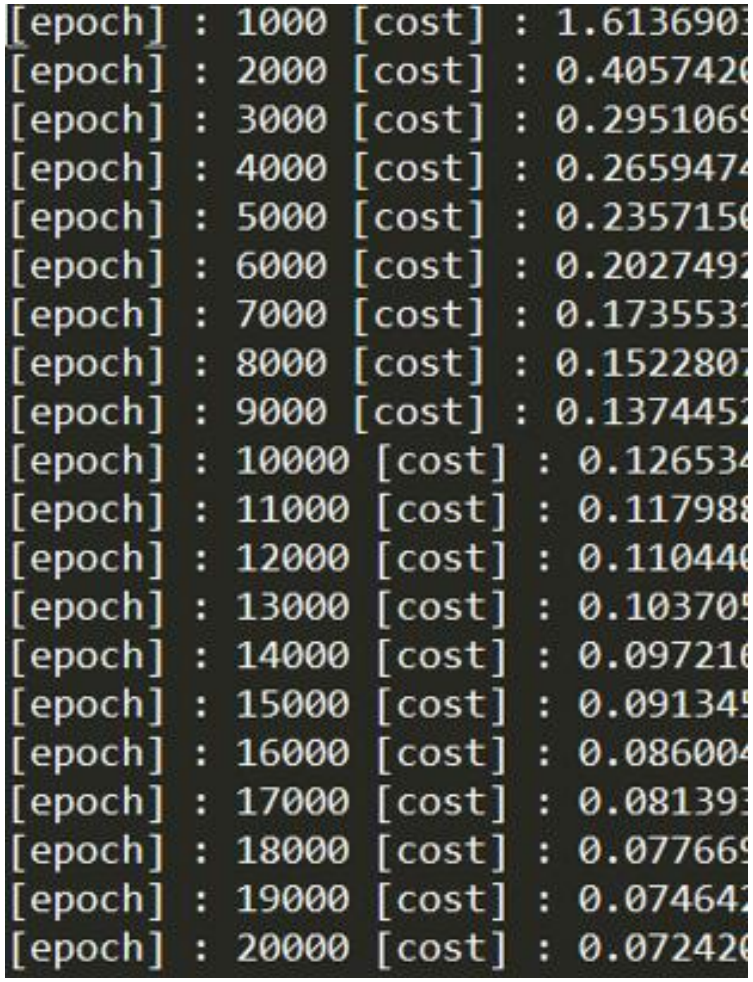


Adam : 0.03232

Learning rate – Adam 0.01



Adam



Gradient

Learning rate – Adam 0.0001

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[epoch] : 500000 [cost] : 0.03271163439871195
[epoch] : 501000 [cost] : 0.0326673251617809
[epoch] : 502000 [cost] : 0.032672864556148
[epoch] : 503000 [cost] : 0.0326839861281983
[epoch] : 504000 [cost] : 0.0326904430533485
[epoch] : 505000 [cost] : 0.0326942169244455
[epoch] : 506000 [cost] : 0.032672665066852
[epoch] : 507000 [cost] : 0.0326831372975207
[epoch] : 508000 [cost] : 0.032666111903210
[epoch] : 509000 [cost] : 0.032719976494691
[epoch] : 510000 [cost] : 0.032687413736301
[epoch] : 511000 [cost] : 0.0326800655888612
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[epoch] : 513000 [cost] : 0.032670088660191
[epoch] : 514000 [cost] : 0.03267063757623
[epoch] : 515000 [cost] : 0.0326686206273734
[epoch] : 516000 [cost] : 0.03267780790817
[epoch] : 517000 [cost] : 0.0326518061474951
[epoch] : 518000 [cost] : 0.032689509295639
[epoch] : 519000 [cost] : 0.0326559371246463
[epoch] : 520000 [cost] : 0.03266880402259
```

Learning rate – Adam 0.00001

```
[epoch] : 3000000 [cost] : 0.03237175143816891 5
[epoch] : 3001000 [cost] : 0.0323525472859139 8
[epoch] : 3002000 [cost] : 0.0323897049460998 36
[epoch] : 3003000 [cost] : 0.0323705801411586 64
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[epoch] : 3005000 [cost] : 0.0323450152775930 16
[epoch] : 3006000 [cost] : 0.0323749974630225 26
[epoch] : 3007000 [cost] : 0.0323317714473780 5
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[epoch] : 3009000 [cost] : 0.0323571379515616 36
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[epoch] : 3011000 [cost] : 0.0323643123142092 55
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[epoch] : 3018000 [cost] : 0.0323289217742379 06
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[epoch] : 3020000 [cost] : 0.0323246219756958 2
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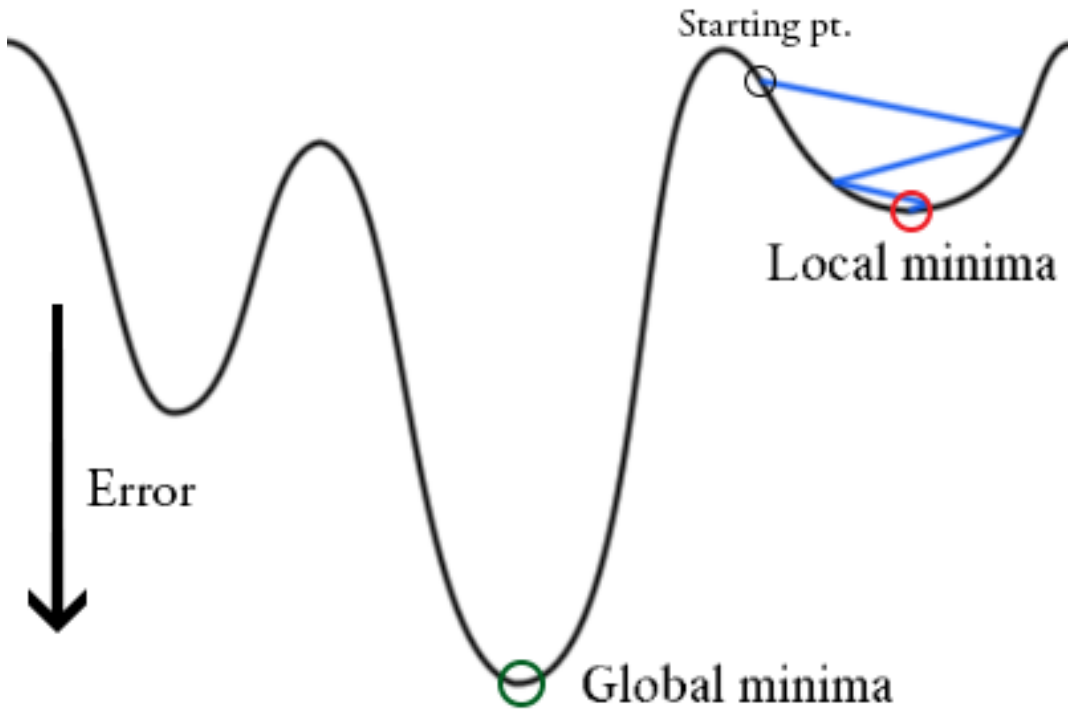
Future works



- Local Minimum 탈출하기