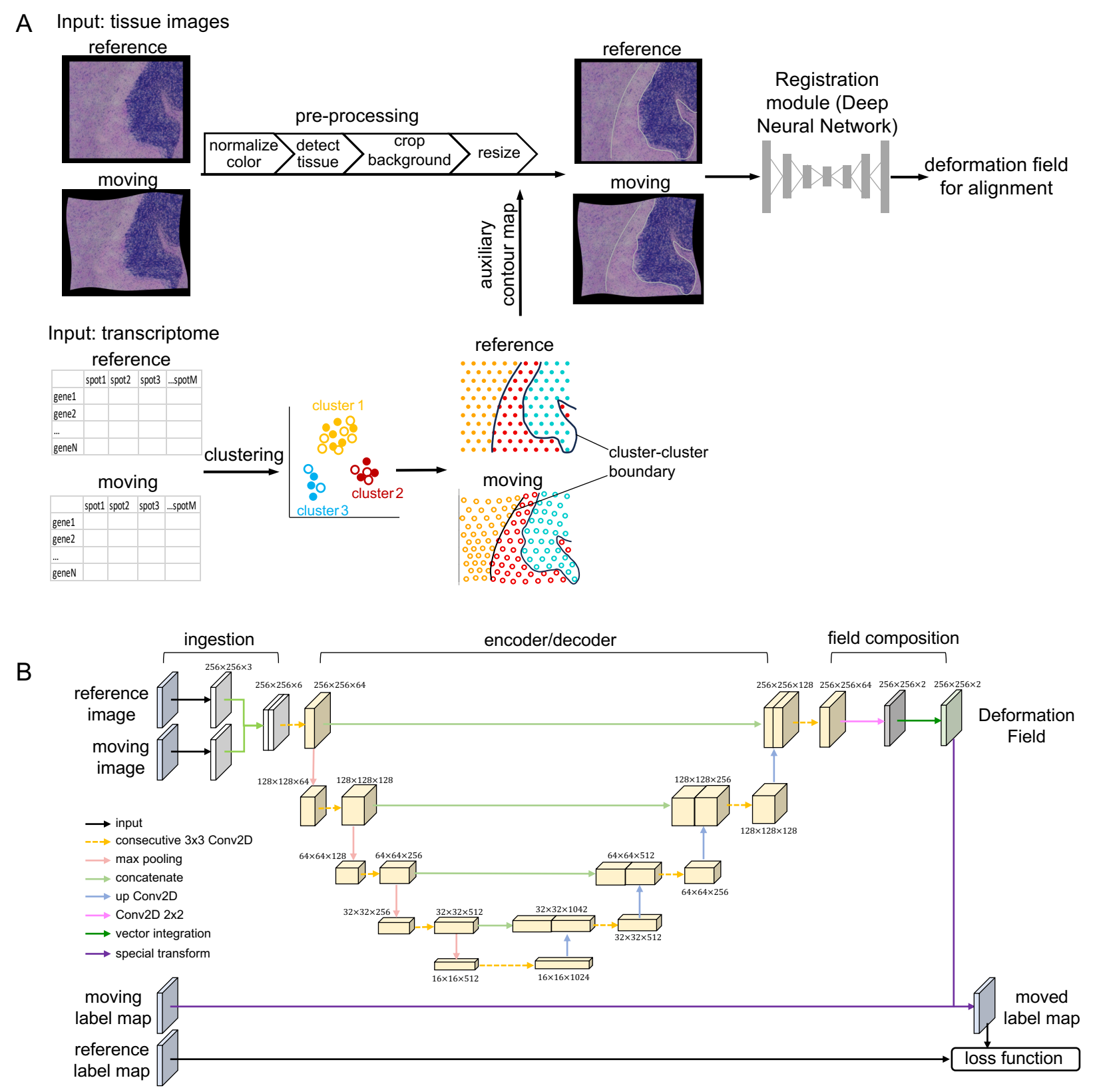
A
Input: tissue images
reference
moving
pre-processing
normalize color
detect tissue
crop background
resize
reference
moving
auxiliary contour map
Registration module (Deep Neural Network)
deformation field for alignment
Input: transcriptome
reference
spot1 spot2 spot3 ...spotM
gene1
gene2
...
geneN
moving
spot1 spot2 spot3 ...spotM
gene1
gene2
...
geneN
clustering
cluster 1
cluster 2
cluster 3
reference
cluster-cluster boundary
moving
B
ingestion
encoder/decoder
field composition
reference image
moving image
256×256×3
256×256×6
256×256×64
256×256×128
256×256×64
256×256×2
256×256×2
Deformation Field
128×128×64
128×128×128
128×128×256
128×128×128
64×64×128
64×64×256
64×64×512
64×64×256
32×32×256
32×32×512
32×32×1042
32×32×512
16×16×512
16×16×1024
input
consecutive 3x3 Conv2D
max pooling
concatenate
up Conv2D
Conv2D 2x2
vector integration
special transform
moving label map
reference label map
moved label map
loss function