

Conditions

c (ctrl) p (pert)

z (covariates)

Initial Gene Vector

Gene A Gene B Gene C Gene D Gene E Gene F
MASK MASK MASK MASK MASK MASK

(Fully Masked)

Regulatory Policy

Which genes to predict next?



Not All
Predicted

Selected Genes

MDDM

Predict expression tokens

Step 1

Gene A Gene B Gene C Gene D Gene E Gene F
 x_A MASK x_C MASK MASK MASK

Step 2

x_A x_B x_C x_D MASK MASK

Step 3

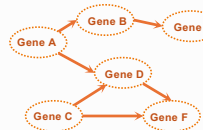
x_A x_B x_C x_D x_E x_F

Generation
Trajectory

All Predicted

Final Generation Result

Biological Prior



RL Optimized

A B C D E F All Masked

Sample $\times$ K

Step 1

A
B

Step 2

C
D

Step 3

E
F

Results

Step 1

A
C

Step 2

B
D

Step 3

E
F

Results

Get Reward