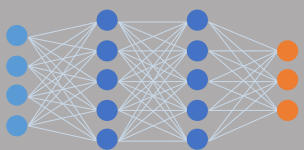


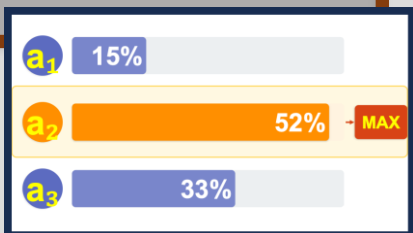
1

REINFORCEMENT LEARNING OPTIMIZATION

Actor-Critic Network
(Exploration & Exploitation)



Action
(A_t)



$$a^* = \operatorname{argmax} \pi(A_t | S_t) = a_2 (p = 0.52)$$

Actor

(Output Action)

Twin Critic

(Training Stability)

Critic

(Value Assessment)

Input: Airfoil Coordinate Data
Output: Action

2

MESH PROCESSING

Airfoil coordinate data

Upper: (X_i, Y_i^U)

Lower: (X_i, Y_i^L)

$i = 1, 2, \dots, n$

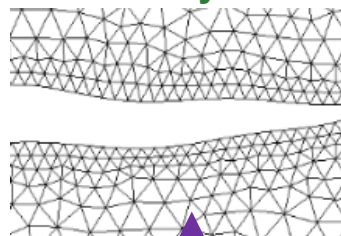
State (S_t)

Airfoil Parameters

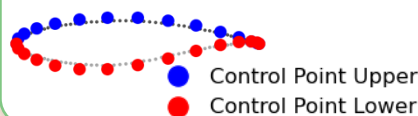
Action (A_t) \rightarrow State (S_{t+1})
Parameter Displacement



Mesh Quality Control

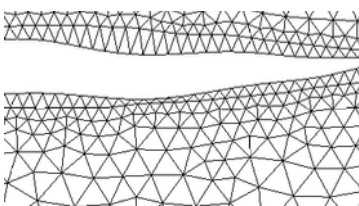


Geometric Processing
Smooth & Bézier Fitting



Control Point Upper
Control Point Lower

Generate Mesh



Control Points

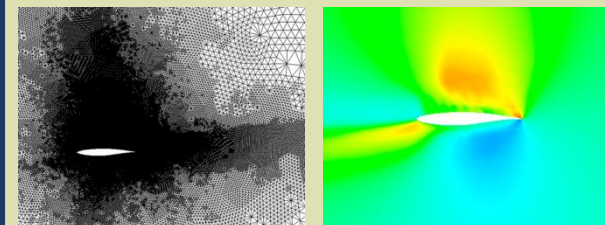
Input: Airfoil Coordinate Data & Action
Output: Mesh for Calculation

3

ENVIRONMENT (AFVM4CFD)

CFD Solver

(Steady State Euler Equations)



DWR-based Mesh Adaptation
for Accurate Target Functional

Lift, Drag, L/D ratio

Reward Selection & Next State
(R_t, S_{t+1})

Input: High Quality Mesh
Output: Reward