Encoder block

Surface positions → Select Anchors → MLP

Geometry → Supernode Pooling Transformer

Volume positions → Select Anchors → MLP

Q ↓ KV → Transformer — weight sharing — Transformer ← KV ↓ Q

Physics blocks ×K

Anchors → Q ↓ KV → Transformer — weight sharing — Transformer ← KV ↓ Q ← Anchors

cross-attention

Anchors → Q ↓ KV → Transformer — weight sharing — Transformer ← KV ↓ Q ← Anchors

Decoder blocks ×L

Anchors → Q ↓ KV → Transformer — Transformer ← KV ↓ Q ← Anchors

Linear projection — Linear projection

Surface prediction — Volume prediction

AB-UBT model

Surface → Surface tokens → Anchors → Surface branch → Surface prediction

Geometry → Geometry tokens → Geometry branch

Volume → Volume tokens → Anchors → Volume branch → Volume prediction

Multi-branch △ corss attention

Encoder block

输入信息 X^g X^s X^v

通过MLP模块 Z^g Z^s Z^v

$P^s : (Q(Z^s), K(Z^g), V(Z^g)) \xrightarrow{\text{attention}} Z_0^s$

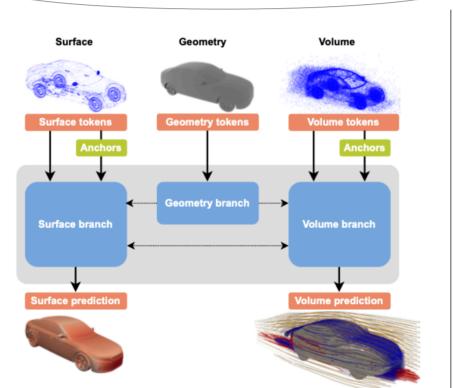$P^v : (Q(Z^v), K(Z^g), V(Z^g)) \xrightarrow{\text{attention}} Z_0^v$

Physics block

$B_k^s : (Q(Z_{k-1}^s), K(Z_{k-1}^s), V(Z_{k-1}^s)) \xrightarrow{\text{attention}} Z_k^{'s}$

$\rightarrow (Q(Z_k^{'s}), K(Z_k^{'v}), V(Z_k^{'v})) \xrightarrow{\text{Attention}} Z_{k+1}^s$

将面场信息作为查询Q的输入

$B_k^v : (Q(Z_{k-1}^v), K(Z_{k-1}^v), V(Z_{k-1}^v)) \xrightarrow{\text{attention}} Z_k^{'v}$

$\rightarrow (Q(Z_k^{'v}), K(Z_k^{'s}), V(Z_k^{'s})) \xrightarrow{\text{Attention}} Z_{k+1}^v$

switch_attention_1

单纯调整 Q和K-V的输入
将几何信息作为查询Q的输入，去得到面场所蕴含的数据信息

switch attention_2

提高计算效率
底层是MoE模型
为每个输入动态选择一个专家模型