Operation on Node

Output N_4
Sum(N_1, N_3)

MaxPool N_3
$\sigma(\text{EMB}(\text{MaxPool})W_o) \odot (N_1 + N_2)W_x$

Conv3x3 N_2
$\sigma(\text{EMB}(\text{CONV3x3})W_o) \odot (N_0 + N_1)W_x$

Conv1x1 N_1
$\sigma(\text{EMB}(\text{CONV1x1})W_o) \odot N_0 W_x$

$N_0 = E$

GATES encoding process (4 steps):
- N_0: Input information E
- $N_1 = \sigma(\text{EMB}(\text{CONV1x1})W_o) \odot N_0 W_x$
- $N_2 = \sigma(\text{EMB}(\text{CONV3x3})W_o) \odot (N_0 + N_1)W_x$
- $N_3 = \sigma(\text{EMB}(\text{MaxPool})W_o) \odot (N_1 + N_2)W_x$
- $N_4 = \text{Sum}(N_1, N_3)$

Feature map computation:
- F_0: Input feature map
- $F_1 = \text{Conv1x1}(F_0)$
- $F_2 = \text{Conv3x3}(F_0 + F_1)$
- $F_3 = \text{MaxPool}(F_1 + F_2)$
- $F_4 = \text{Aggregate}(F_1, F_3)$

Operation on Edge

Output N_4
Sum(N_1, N_2, N_3)

N_3
$\sigma(\text{EMB}(\text{CONV1x1})W_o) \odot N_1 W_x +$
$\sigma(\text{EMB}(\text{CONV3x3})W_o) \odot N_2 W_x$

N_2
$\sigma(\text{EMB}(\text{MaxPool})W_o) \odot N_0 W_x +$
$\sigma(\text{EMB}(\text{AvgPool})W_o) \odot N_1 W_x$

N_1
$\sigma(\text{EMB}(\text{CONV1x1})W_o) \odot N_0 W_x$

$N_0 = E$

GATES encoding process (4 steps):
- N_0: Input information E
- $N_1 = \sigma(\text{EMB}(\text{CONV1x1})W_o) \odot N_0 W_x$
- $N_2 = \sigma(\text{EMB}(\text{MaxPool})W_o) \odot N_0 W_x$
  $+ \sigma(\text{EMB}(\text{AvgPool})W_o) \odot N_1 W_x$
- $N_3 = \sigma(\text{EMB}(\text{CONV1x1})W_o) \odot N_1 W_x$
  $+ \sigma(\text{EMB}(\text{CONV3x3})W_o) \odot N_2 W_x$
- $N_4 = \text{Aggregate}(N_1, N_2, N_3)$

Feature map computation:
- F_0: Input feature map
- $F_1 = \text{Conv1x1}(F_0)$
- $F_2 = \text{MaxPool}(F_0) +$
  $\text{AvgPool}(F_1)$
- $F_3 = \text{Conv1x1}(F_1) +$
  $\text{Conv3x3}(F_2)$
- $F_4 = \text{Aggregate}(F_1, F_2, F_3)$