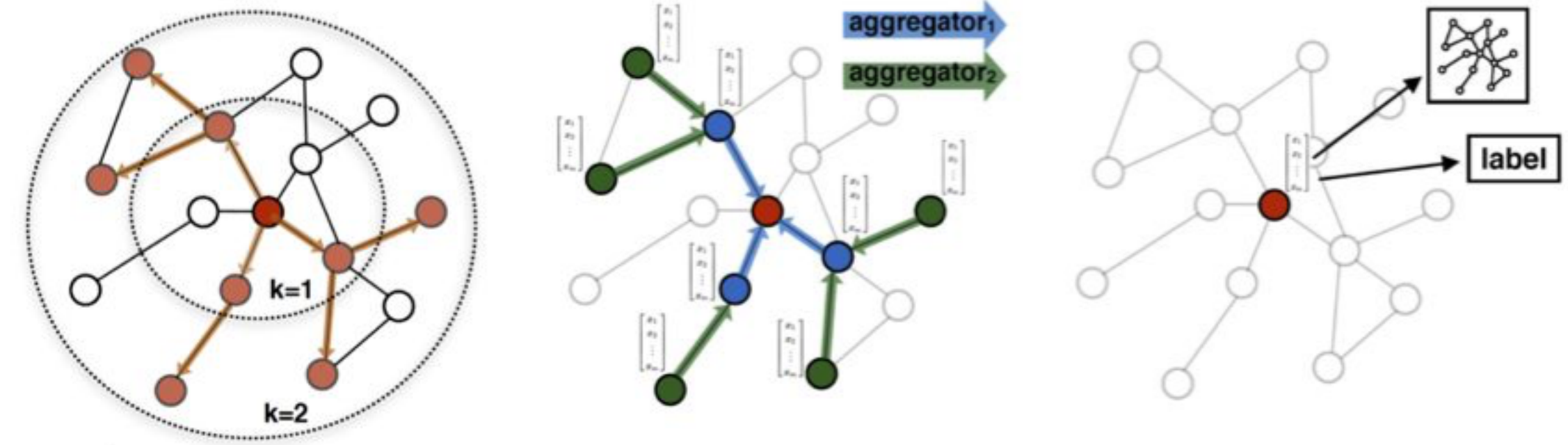


# Methodology

## FANG - Representation Learning



GraphSage

- Like Deep Walk and node2vec compute a node embedding by sampling its neighborhood, and then optimizing for the proximity loss similarly to word2vec.
- Now the neighborhood is defined by the graph structure.
- Recently, GraphSage was proposed to overcome this limitation by allowing auxiliary node features to be used jointly with proximity sampling as part of the representation learning.

# Methodology

## FANG – Representation Learning

- Let  $GraphSage(\cdot)$  be GraphSage's node encoding function
  - Now obtain the structural representation  $z_u$  for any **user  $u$**  and **source node  $r$**  as  $z_r = GraphSage(r)$
  - For news node, further enrich their structural representation with user engagement temporal representation with user engagement temporality.
  - This can be formulated as learning an aggregation function  $F(a, U)$  to get a temporal representation  $v_a^{temp}$  that captures  $a$ 's engagement pattern.
  - Combine the temporal and the structural representations of a news  $a$  into a single representation:  $z_a = v_a^{temp} + GraphSage(a)$