

**TRANSFORMER-BASED MODELING AND ANALYSIS METHOD FOR  
STRUCTURED DATA  
ABSTRACT**

5        The present invention provides a Transformer-based modeling and analysis method  
for structured data, and relates to the technical field of data analysis. The method includes:  
executing piecewise linear transformation and adaptive quantum encoding on a numerical  
feature and a categorical feature by a dual-stream feature encoder, and fusing by a gating  
mechanism to obtain a fusion feature; inputting enhanced training samples into a feature  
10    extraction network which contains a hierarchical attention module and a self-calibration  
module, and extracting a global feature representation by a feature affinity graph and a  
causal attention mechanism; and constructing an information bottleneck feature filter to  
select a key feature subset, performing prediction and reconstruction by a dual-branch  
network, and analyzing a feature contribution by a structured gradient method. The present  
15    invention can effectively process heterogeneous features, improve the model performance,  
and provide an interpretable feature importance assessment mechanism.

Drawing accompanying abstract: Fig. 1