





















the spatio-temporal and attribute characteristics [26]. Zhang et al. partition the road network into grids, and consider various short and long-term features [33].

On the broader scale, there also exists work that estimates travel time given the input of an origin-destination (OD) pair [11, 15]. However, while these methods are advantageous in faster computations, they have a limited consideration in terms of the vehicle path choice variabilities between the origin and destination, which the travel time of a vehicle is highly dependent on. Furthermore, deep learning has been used in various spatio-temporal problems, such as crowd-flow prediction [34], transportation mode prediction [21] and trajectory predictions for road agents [3, 8, 17, 24, 35]. In general, utilizing deep learning for path travel time estimation is a new field, and there has not been any work which seeks to perform this task across hybrid trajectories.

## 6 CONCLUSION

In this paper, we propose an Attribute-related Hybrid Trajectories Network capable of estimating path travel times by effectively utilizing hybrid trajectory data. This method implicitly models the correlations across hybrid trajectories, something largely ignored in existing work. It also extracts the correlations of attributes that affect path travel time and leverage on-road information to extract sub-path features. Through experiments, we demonstrate the superior performance of our method over the state of the art methods. For future work, we will explore how path travel time estimation can be used in identifying real-time traffic conditions.

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