

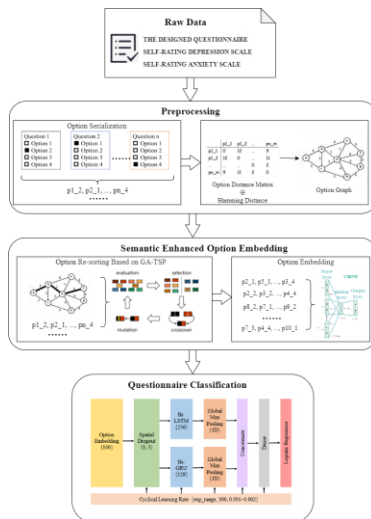
SEOE: an option graph based semantically embedding method for prenatal depression detection

**Xiaosong HAN, Mengchen CAO, Dong XU, Xiaoyue
FENG, Yanchun LIANG, Xiaoduo LANG, Renchu GUAN**

Frontiers of Computer Science, DOI: [10.1007/s11704-024-3612-4](https://doi.org/10.1007/s11704-024-3612-4)

Problems & Ideas

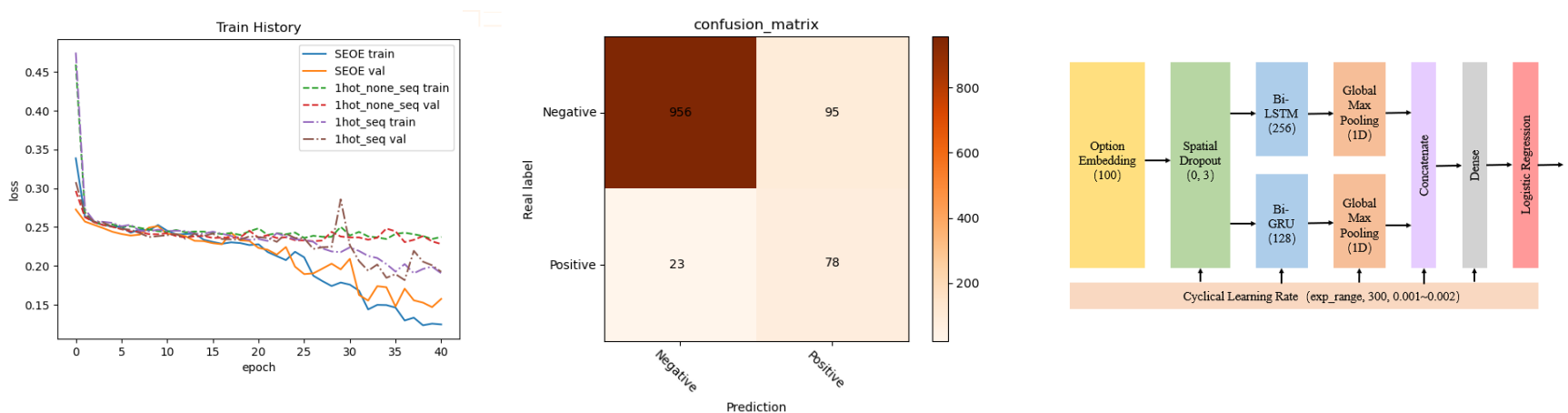
- Prenatal depression, which can affect pregnant women's physical and psychological health and cause postpartum depression, is increasing dramatically. Therefore, it is essential to detect prenatal depression early and conduct an attribution analysis.
 - Many studies have used questionnaires to screen for prenatal depression, but the existing methods lack attributability.
- Ideas: A semantically enhanced option embedding (SEOE) model to represent questionnaire options.



SEOE first quantifies options and resorts them, gathering options with little difference, since Word2Vec is highly dependent on context. The resort task is transformed into an optimization problem involving the traveling salesman problem. Moreover, all questionnaire samples are used to train the options' vector using Word2Vec. Finally, an LSTM and GRU fused model incorporating the cycle learning rate is constructed to detect whether a pregnant woman is suffering from depression.

Main Contributions

- Contributions:
 - A model that can early diagnose prenatal depression.
 - A method to resort questionnaire data for Word2Vec, available for all kinds of questionnaires.
 - Quantitatively determine the relationship and patterns between options and depression.
 - A novel model structure combining LSTM and GRU and CLR.
 - A comparison with latest graph neural network methods.



Left: the train history of SEOE compare to other methods; Middle: The confusion matrix of test dataset; Right: the model structure of LSTM_GRU_CLR