Submission Summary

Conference Name
Thirty-Fifth AAAI Conference on Artificial Intelligence

Track Name
AAAI2021

Paper ID
2515

Paper Title
Consumer Behaviour in Retail: Next Logical Purchase using Deep Neural Network

Abstract
Predicting future consumer behaviour is one of the most challenging problems for large scale retail firms. Accurate prediction of consumer purchase pattern enables better inventory planning and efficient personalised marketing strategies. Optimal inventory planning helps minimise instances of Out-of- stock/ Excess Inventory and, smart Personalised marketing strategy ensures smooth and delightful shopping experience. Consumer purchase prediction problem has generally been addressed by ML researchers in conventional manners, either through recommender systems or traditional ML approaches. Such modelling approaches do-not generalise well in predicting consumer purchase pattern. In this paper, we present our study of consumer purchase behaviour, wherein, we establish a data-driven framework to predict whether a consumer is going to purchase an item within a certain time frame using e-commerce retail data. To model this relationship, we create a sequential time-series data for all relevant consumer-item combinations. We then build generalised non-linear models by generating features at the intersection of consumer, item, and time. We demonstrate robust performance by experimenting with different neural network architectures, ML models, and their combinations. We present the results of 60 modelling experiments with varying Hyper-parameters along with Stacked Generalisation ensemble and F1-Maximisation framework. We then present the benefits that neural network architectures like Multi Layer Perceptron, Long Short Term Memory (LSTM), Temporal Convolutional Networks (TCN) and TCN-LSTM bring over ML models like Xgboost and RandomForest.

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Primary Subject Area
Machine Learning (ML) -> ML: (Deep) Neural Network Algorithms

Secondary Subject Areas
Machine Learning (ML) -> ML: Classification and Regression
Machine Learning (ML) -> ML: Ensemble Methods
Machine Learning (ML) -> ML: Hyperparameter Tuning / Algorithm Configuration
Machine Learning (ML) -> ML: Optimization
Machine Learning (ML) -> ML: Time-Series/Data Streams

Submission Questions Response

1. Abstract and Paper Submission Policies

Agreement accepted

2. Submission Limit

Agreement accepted

3. Guidelines for Changes to Titles/Authors after Submissions

Agreement accepted

4. Blind Review Instructions

Agreement accepted

5. Policy Concerning Submissions to Other Conferences or Journals

Agreement accepted

6. Fast-track submission

This is a regular AAAI submission.

7. AAAI Publication Ethics and Malpractice Statement

Agreement accepted

8. AAAI Code of Professional Ethics and Conduct

Agreement accepted

9. Choice of Submission Venue

Agreement accepted

10. Student Paper

No

11. Undergraduate Student Co-author

No

12. Reproducibility checklist (1)

Yes

13. Reproducibility checklist (2)

Yes

14. Reproducibility checklist (3)

Partial

15. Reproducibility checklist (4)

Yes

16. Reproducibility checklist (5)

No

17. Reproducibility checklist (5.1)

[Not Answered]

18. Reproducibility checklist (5.2)

[Not Answered]

19. Reproducibility checklist (5.3)

[Not Answered]

20. Reproducibility checklist (5.4)

[Not Answered]

21. Reproducibility checklist (5.5)

[Not Answered]

22. Reproducibility checklist (6)

Yes

23. Reproducibility checklist (6.1)

Not applicable

24. Reproducibility checklist (6.2)

Not applicable

25. Reproducibility checklist (6.3)

Yes

26. Reproducibility checklist (6.4)

Yes

27. Reproducibility checklist (6.5)

Not applicable

28. Reproducibility checklist (7)

Yes

29. Reproducibility checklist (7.1)

No

30. Reproducibility checklist (7.2)

No

31. Reproducibility checklist (7.3)

Not applicable

32. Reproducibility checklist (7.4)

Partial

33. Reproducibility checklist (7.5)

Yes

34. Reproducibility checklist (7.6)

Yes

35. Reproducibility checklist (7.7)

Yes

36. Reproducibility checklist (7.8)

Yes

37. Reproducibility checklist (7.9)

Yes