AI506 Term Project

RecFormer

One Model To Rule Them All

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Derrick Adams
Department of Chemical and Biomolecular Engineering, KAIST
Daejeon, South Korea
derrad@kaist.ac.kr

Dongjae Lee
Graduate School of AI, KAIST
Daejeon, South Korea
dongjae.lee@kaist.ac.kr

Nikita Sokovnin
School of Computing, KAIST
Daejeon, South Korea
sokovnik@fel.cvut.cz

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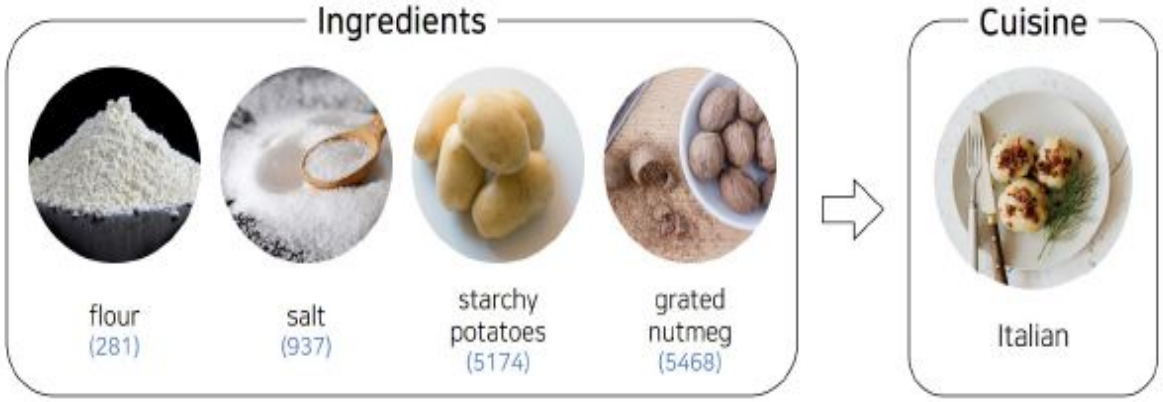
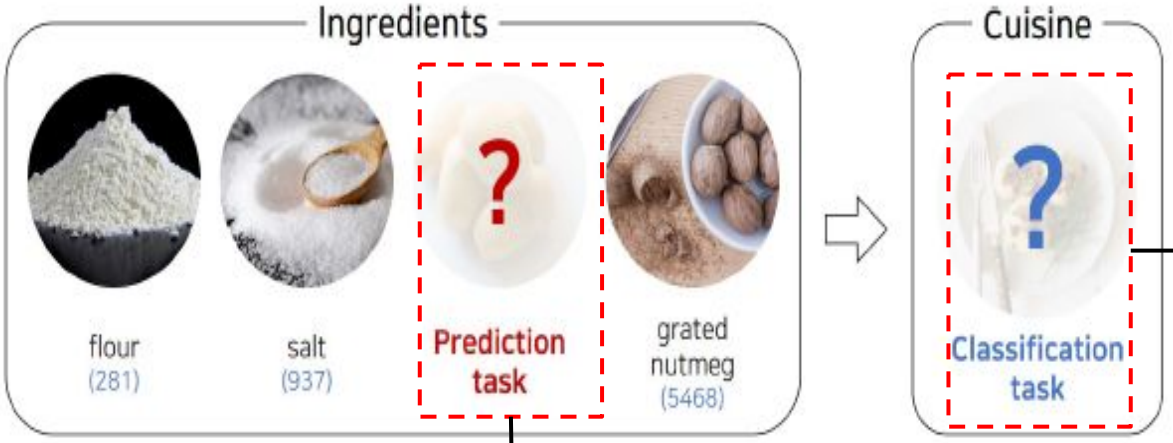
Problem Description



	# recipes
Training data	32,457
Validation data	7,848
Test data	3,294



1. Classification task

(Predicting type of cuisine given recipe)

2. Completion task

(Predicting missing ingredient in a recipe)

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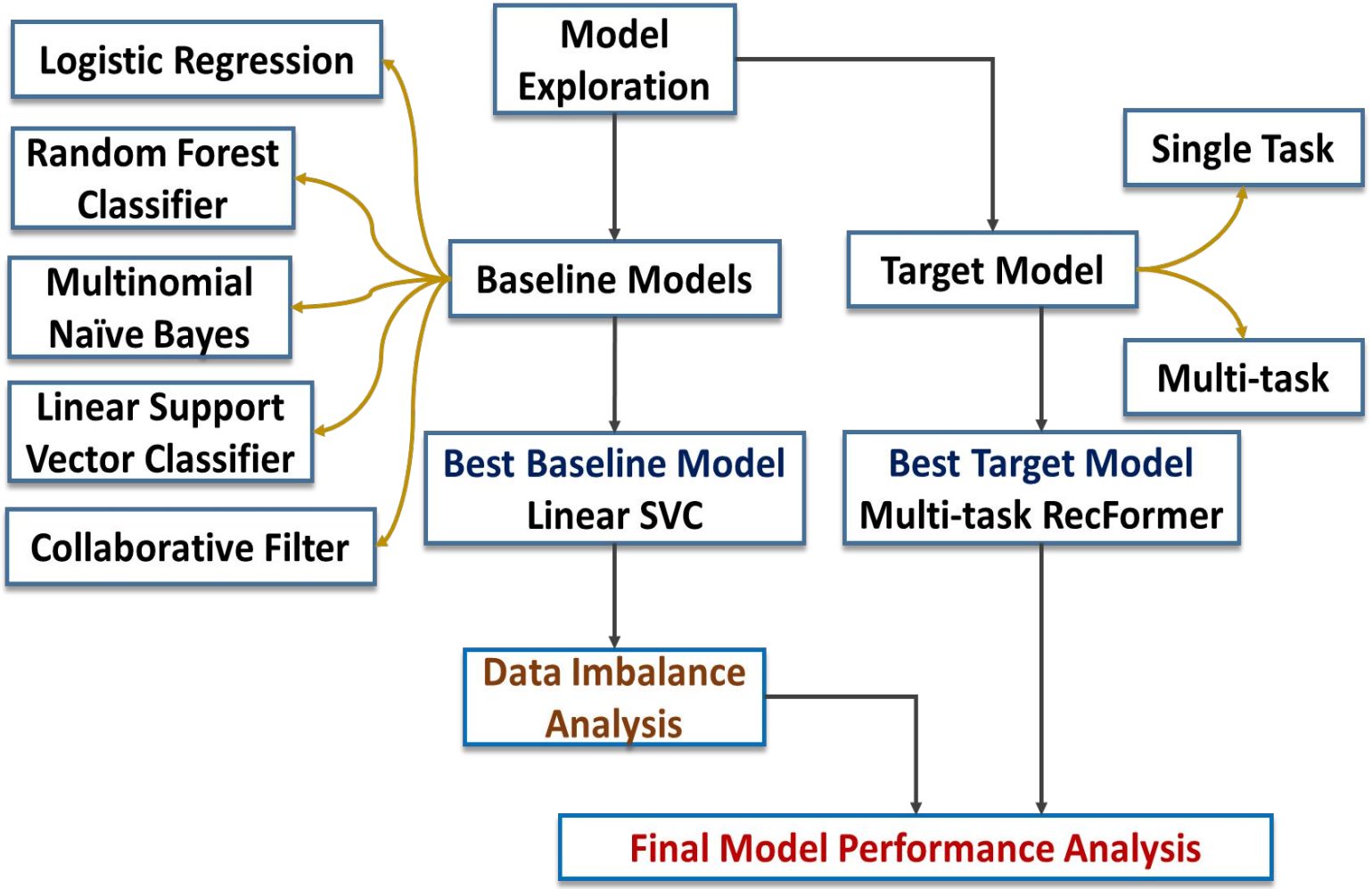
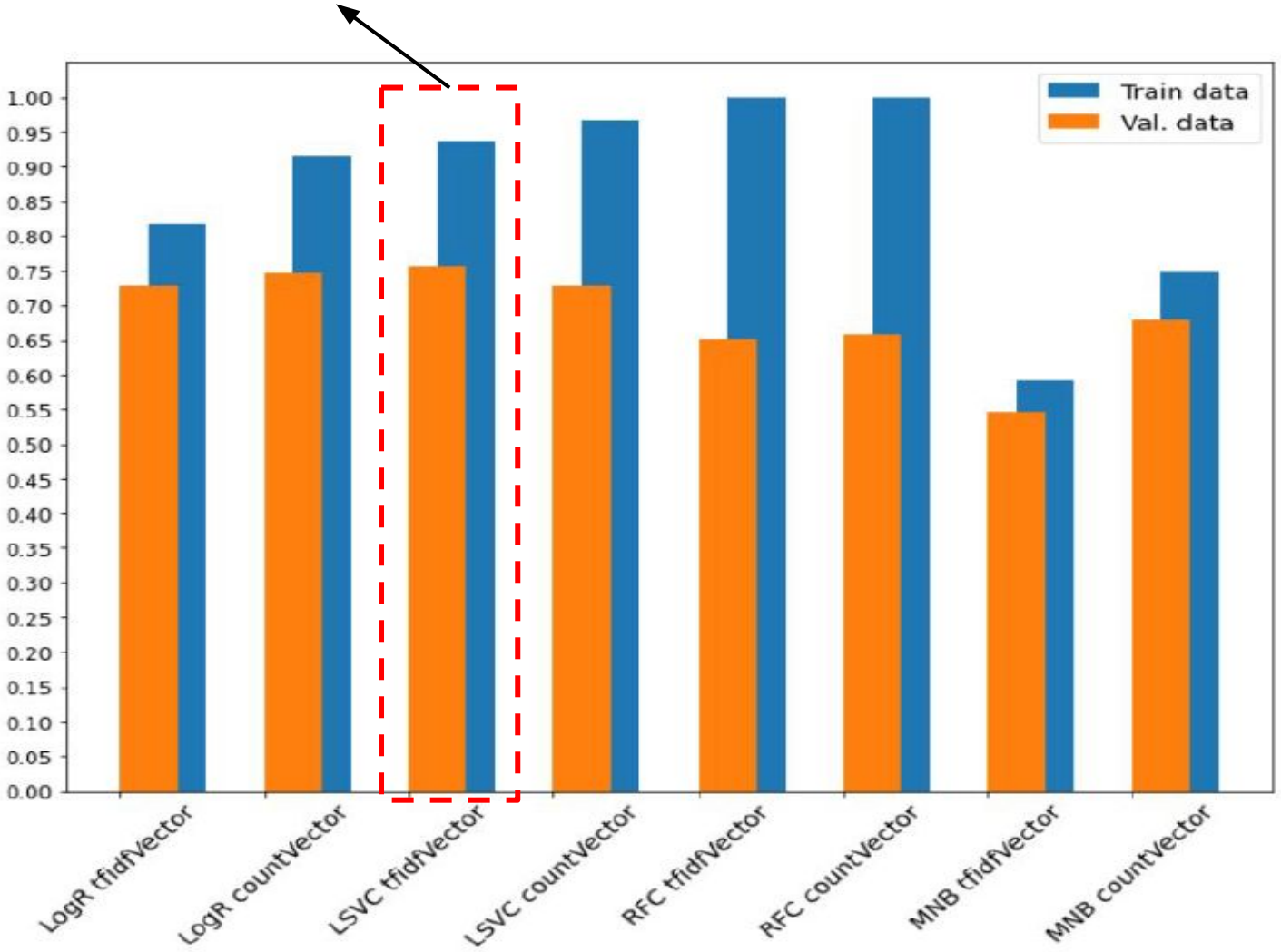
Approach

Finding the best baseline models and the target model



Baseline Model Exploration

Best baseline model: LSVC with Tf-idf vectorizer



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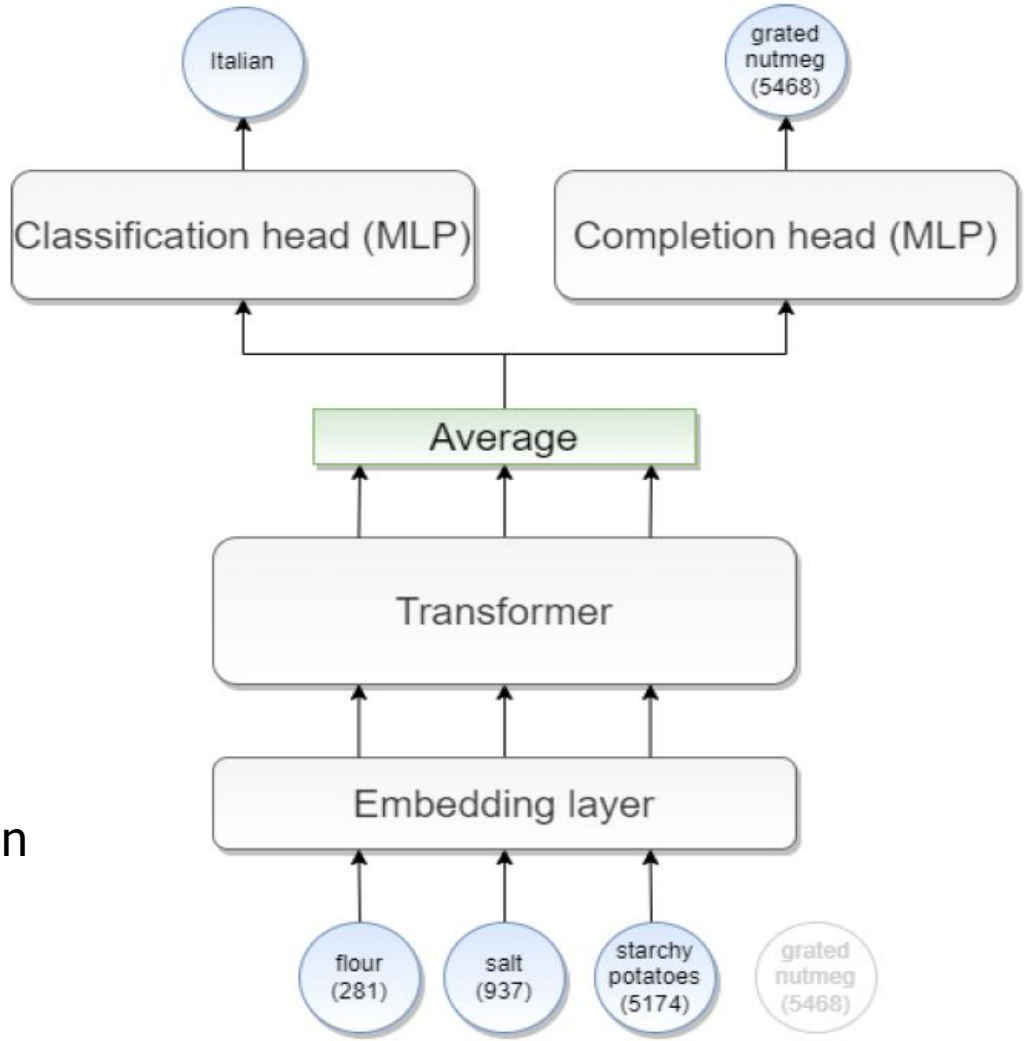
RecFormer: Recipe Transformer

Multi-task Transformer model

- The main building block is Transformer
- Can effectively deal with variable-length sequences
- Trains on both tasks simultaneously
- One model for both classification and completion



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Target model exploration

Finding the best architecture

- Multi-task model showing better performance than single-task model

Task (%)	Classification head	Completion head	Multitask
Classification	74.29	-	**76.08**
Completion	-	11.38	**12.44**

Table 2: Comparison of accuracy between single-task and multitask models. Accuracy is measured on the validation

- Pre-trained word embeddings (GloVe) improved accuracy to **76.63%** and **12.70%**

Accuracy comparison

RecFormer shows better or comparable accuracy

Dataset/Model	LSVC (%)	RecFormer (%)
Classification train	91.98	85.16
Classification val	78.05	76.63
Completion train	53.80	20.76
Completion val	13.66	12.70

Table 3: Comparison of accuracy of the RecFormer and the best baseline.

Ensemble model

Classification task	Completion task
79.20%	**14.74%**

Model/Task	Classification (%)	Completion (%)
LR count	76.61	-
LR TF-idf	76.41	-
RF count	69.28	-
RF TF-idf	69.07	-
MNB count	72.26	-
MNB TF-idf	70.77	-
Collaborative filtering	-	6.10
RecFormer	**76.63**	**12.70**

Table 4: Accuracy of different baseline models and RecFormer measured on validation data.

Final prediction model for the test data

Conclusion and improvements

Conclusion:

- We developed a novel Transformer-based model which can **effectively deal with both tasks**
- RecFormer is **better than most of the baselines**
- RecFormer shows **lower overfitting** than the best baseline model
- **Ensemble** of LSVC and RecFormer **provides the best accuracy**

Possible improvements:

- To increase the accuracy, we can tune hyperparameters
- Preprocessing of ingredients might improve the performance

Thank You