Machine Learning Concept Recommender System using PROLOG

THAPAR INSTITUTE
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(Deemed to be University)

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COBS-2

1. Summary

This project asks a series of yes and no questions that try to ultimately understand what the user is looking for (whether it is classification algorithms or evaluation metrics for regression etc.). Ultimately, it displays a list of the topics/algorithms that the user and explore and if asked, also provides the user with the link for the same.

2. Code Screenshots

```
:-dynamic known/2.

start:-introduction, recommend.

introduction:-write('Welcome! To get started, state your requirements
and we will give you a concept to start with!'),nl,nl,
write('Happy Machine Learning!'),retractall(known(_,_)).

/*-------------------------------------------------------------------------------------------------*/

type(evaluation_metrics_for_regression):- inquire(evaluation_metrics),
inquire(evaluation_metrics_for_regression).

type(evaluation_metrics_for_classification):-inquire(evaluation_metrics),
inquire(evaluation_metrics_for_classification).

type(classification):-inquire(models),inquire(supervised),inquire(classification).

type(regression):-inquire(models),inquire(supervised),inquire(regression).

type(time_series):-inquire(models),inquire(supervised),inquire(time_series).

type(clustering):-inquire(models),inquire(unsupervised),inquire(clustering).

type(association_rule_mining):-inquire(models),inquire(unsupervised),inquire(association_rule_mining).

/*-------------------------------------------------------------------------------------------------*/

options(evaluation_metrics_for_regression):-write('RMSE'),nl,write('MAE'),nl,
write('MSE'),nl,write('RMSLE'),nl,write('R-squared'),nl,write('Adjusted R-squared').

options(evaluation_metrics_for_classification):-write('Confusion matrix'),nl,
write('Precision'),nl,write('Recall'),nl,write('Specificity'),
nl,write('F1-score'),nl,write('Fbeta-score'),nl,write('ROC-Curve').

options(classification):-write('Naive Bayes'),nl,write('K-Nearest Neighbours'),nl,
write('Decision Trees'),nl,write('Random Forest'),nl,write('Logistic Regression'),nl,
write('Support Vector Machine'),nl,write('Artificial Neural Network'),nl.
```

```
options(regression):-write('Linear Regression'),nl,write('Polynimial Regression'),nl,
write('Ridge Regression'),nl,write('Lasso Regression'),nl,write('Quantile Regression'),nl,
write('Bayesian Linear Regression'),nl.

options(clustering):-write('Centroid-based Clustering Algorithm'),nl,
write('K-means Clustering Algorithm'),nl,
write('DBSCAN Clustering'),
nl,write('Gaussian Mixture Clustering Model'),nl,write('BIRCH Algorithm'),nl,
write('Affinity Propagation Clustering'),nl,write('Mean-Shift Clustering Algorithm'),
nl,write('OPTICS Clustering Algorithm'),
nl,write('Agglomerative Hierarchy Clustering Algorithm'),
nl,write('Spectral Clustering'),nl,write('Mini-Batch K-means'),
nl,write('Divisive Hierarchical').

options(association_rule_mining):-write('Apriori algorithm'),nl,write('Eclat algorithm'),nl,
write('FP-growth algorithm').

options(time_series):-write('Autoregressive (AR) Model'),nl,
write('Autoregressive Integrated Moving Average (ARIMA) Model'),nl,
write('Seasonal Autoregressive Integrated Moving Average (SARIMA) Model'),nl,
write('Exponential Smoothing (ES)'),nl,
write('Facebook-Prophet'),nl,write('LSTM (Deep Learning) Model'),nl,
write('DeepAR-Amazon'),nl,write('N-BEATS-Deep Learning algorithm'),nl,
write('Temporal Fusion Transformer (Google)').
```

```
/*-------------------------------------------------------------------------------------------------*/

inquire(Tag):-ask(Tag).
ask(Tag):-known(Tag, y),!.
ask(Tag):-known(Tag, n),!, fail.
ask(Tag):-nl,write( Tag) , write('?(y/n)'), read(Ans),
asserta(known(Tag,Ans)),Ans==y.

/*-------------------------------------------------------------------------------------------------*/

link(Type):-inquire("Do you want the links too"),known("Do you want the links too",y), showlinks(Type).

showlinks(evaluation_metrics_for_regression):-nl,nl,
write('https://www.analyticsvidhya.com/blog/2021/05/know-the-best-evaluation-metrics-for-your-regression-model/').

showlinks(evaluation_metrics_for_classification):-nl,nl,
write('https://www.analyticsvidhya.com/blog/2021/07/metrics-to-evaluate-your-classification-model-to-take-the-right-decisions/').

showlinks(classification):-nl,nl,
write('https://analyticsindiamag.com/7-types-classification-algorithms/').

showlinks(regression):-nl,nl,
write('https://www.jigsawacademy.com/popular-regression-algorithms-ml/').

showlinks(clustering):-nl,nl,
write('https://www.freecodecamp.org/news/8-clustering-algorithms-in-machine-learning-that-all-data-scientists-should-know/').

showlinks(association_rule_mining):-nl,nl,
write('https://en.wikipedia.org/wiki/Association_rule_learning').

showlinks(time_series):-nl,nl,
write('https://www.advancinganalytics.co.uk/blog/2021/06/22/10-incredibly-useful-time-series-forecasting-algorithms').
```

```
/*-------------------------------------------------------------------------------------------------*/

recommend:-nl,nl,type(Type),nl,nl,write('You can start with these concepts - '),nl,nl,options(Type),nl,nl,!,link(Type),!,nl.

recommend:-nl, write('This is all we have for now!').

/*-------------------------------------------------------------------------------------------------*/
```

3. Output Screenshots

Run #1

```
% c:/Users/Tanya/OneDrive/COLLEGE/AI 603/Lab/ML_Concept_Recommeder.pl compiled 0.00 sec, 30 clauses
?- start.
Welcome! To get started, state your requirements
and we will give you a concept to start with!

Happy Machine Learning!


evaluation_metrics?(y/n)y.

evaluation_metrics_for_regression?(y/n)|: n.

evaluation_metrics_for_classification?(y/n)|: y.


You can start with these concepts -

Confusion matrix
Precision
Recall
Specificity
F1-score
Fbeta-score
ROC-Curve


Do you want the links too?(y/n)|: y.


https://www.analyticsvidhya.com/blog/2021/07/metrics-to-evaluate-your-classification-model-to-take-the-right-decisions/
true.
```

Run #2

?- start.
Welcome! To get started, state your requirements
and we will give you a concept to start with!

Happy Machine Learning!

evaluation_metrics?(y/n)n.

models?(y/n)|: y.

supervised?(y/n)|: n.

unsupervised?(y/n)|: y.

clustering?(y/n)|: y.

You can start with these concepts -

Centroid-based Clustering Algorithm
K-means Clustering Algorithm
DBSCAN Clustering
Gaussian Mixture Clustering Model
BIRCH Algorithm
Affinity Propagation Clustering
Mean-Shift Clustering Algorithm
OPTICS Clustering Algorithm
Agglomerative Hierarchy Clustering Algorithm
Spectral Clustering
Mini-Batch K-means
Divisive Hierarchical

Do you want the links too?(y/n)|: n.

Run #3

```
?- start.
Welcome! To get started, state your requirements
and we will give you a concept to start with!

Happy Machine Learning!


evaluation_metrics?(y/n)n.

models?(y/n)|: n.

This is all we have for now!
true.
```

Run #4

```
?- start.
Welcome! To get started, state your requirements
and we will give you a concept to start with!

Happy Machine Learning!


evaluation_metrics?(y/n)m.

evaluation_metrics?(y/n)|: n.

models?(y/n)|: y.

supervised?(y/n)|: n.

unsupervised?(y/n)|: y.

clustering?(y/n)|: n.

association_rule_mining?(y/n)|: y.


You can start with these concepts -

Apriori algorithm
Eclat algorithm
FP-growth algorithm
```

```
Do you want the links too?(y/n)|: y.


https://en.wikipedia.org/wiki/Association_rule_learning
true.
```