2020

CAB430 Assignment 2

N9720316

PATRIC MARCHANT

Contents

Statement of Completeness

Task 1	Yes
Task 2	Yes
Task 3	Yes
Task 4	Prediction 3 not predicting correctly

Task 1: Designing Mining Structures

For this task, one mining structure is sufficient, as we can include all the relevant columns from 4 of the tables in CarRental_XYZ, we will later be able to create mining structures and include/exclude any columns depending on the prediction.

For the overall mining structure, only one ID is used as a key, as any other IDs do not give any helpful information to the algorithm, and should thus not be included, similar fields such as Customer_Address, and Store_State_Name/Store_City (Store_Name is sufficient)

```
CREATE MINING STRUCTURE [Car_Renter]
(
	[Order_ID] LONG KEY,
	[Customer_Age] LONG DISCRETIZED(Automatic,10),
	[Customer_Gender]TEXT DISCRETE,
	[Customer_Occupation] TEXT DISCRETE,
	[Car_MakeName]TEXT DISCRETE,
	[Car_Model]TEXT DISCRETE,
	[Car_Series] TEXT DISCRETE,
	[Car_SeriesYear] LONG DISCRETE,
	[Store_Name] TEXT DISCRETE
)
WITH HOLDOUT (30 PERCENT or 1000 CASES)
```

Task 2: Designing mining models

//inputs: Customer info, Car info

//outputs: Predicted Customer_Occupation

```
ALTER MINING STRUCTURE [Car_Renter]
ADD MINING MODEL [Prediction_1]
(
      [Order_ID],
      [Customer_Age],
      [Customer_Gender],
      [Customer_Occupation] PREDICT,
      [Car_MakeName],
      [Car_Model],
      [Car_Series],
      [Car_SeriesYear]
)USING Microsoft_Association_Rules
WITH DRILLTHROUGH
```

//inputs: Car info

//outputs: Predicted Customer Info

```
ALTER MINING STRUCTURE [Car_Renter]
ADD MINING MODEL [Prediction_2]
(
      [Order_ID],
      [Customer_Age] PREDICT_ONLY,
      [Customer_Gender] PREDICT_ONLY,
      [Customer_Occupation] PREDICT_ONLY,
      [Car_MakeName],
      [Car_Model],
      [Car_Series],
      [Car_SeriesYear]
)USING Microsoft_Association_Rules
WITH DRILLTHROUGH
```

//inputs: Customer info, Car info

//outputs: Predicted Store_Name

```
ALTER MINING STRUCTURE [Car_Renter]
ADD MINING MODEL [Prediction_3]
(
      [Order_ID],
      [Customer_Age],
      [Customer_Gender],
      [Customer_Occupation],
      [Car_MakeName],
```

```
	[Car_Model],
	[Car_Series],
	[Car_SeriesYear],
	[Store_Name] PREDICT_ONLY
)USING Microsoft_Association_Rules
WITH DRILLTHROUGH
```

//inputs: Car info, Customer info

//outputs: Predicted Car info

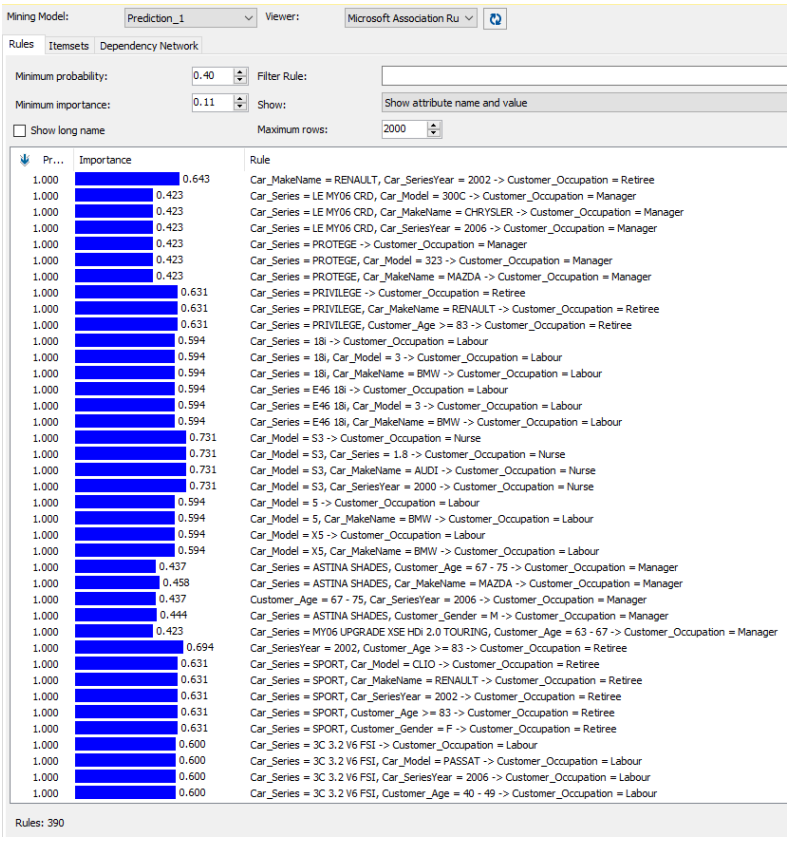
```
ALTER MINING STRUCTURE [Car_Renter]
ADD MINING MODEL [Prediction_4]
(
	[Order_ID],
	[Customer_Age],
	[Customer_Gender],
	[Customer_Occupation],
	[Car_MakeName] PREDICT,
	[Car_Model] PREDICT,
	[Car_Series] PREDICT,
	[Car_SeriesYear] PREDICT
)USING Microsoft_Association_Rules
WITH DRILLTHROUGH
```

Task 3: Processing your mining structures and mining models

// filling Mining structure with data and generating test and training sets

```
INSERT INTO MINING STRUCTURE [Car_Renter]
(
[Order_ID] ,
[Customer_Age],
[Customer_Gender],
[Customer_Occupation],
[Car_MakeName],
[Car_Model],
[Car_Series],
[Car_SeriesYear],
[Store_Name]
)
OPENQUERY(CarRentalXYZ,
'SELECT [Order_ID], cst.Customer_Age, cst.Customer_Gender, cst.Customer_Occupation,
car.Car_MakeName, car.Car_Model, car.Car_Series, car.Car_SeriesYear, str.Store_Name
FROM dbo.XYZ_RentalOrder AS fct
LEFT JOIN dbo.XYZ_Customer AS cst ON cst.Customer_ID = fct.Order_Customer
LEFT JOIN dbo.XYZ_Car AS car ON car.Car_ID = fct.Order_Car
LEFT JOIN dbo.XYZ_Store AS str ON str.Store_ID = fct.Order_Store')
```

Prediction 1



Mining Model: Prediction_1 Viewer: Microsoft Association Ru

Rules | Itemsets | Dependency Network

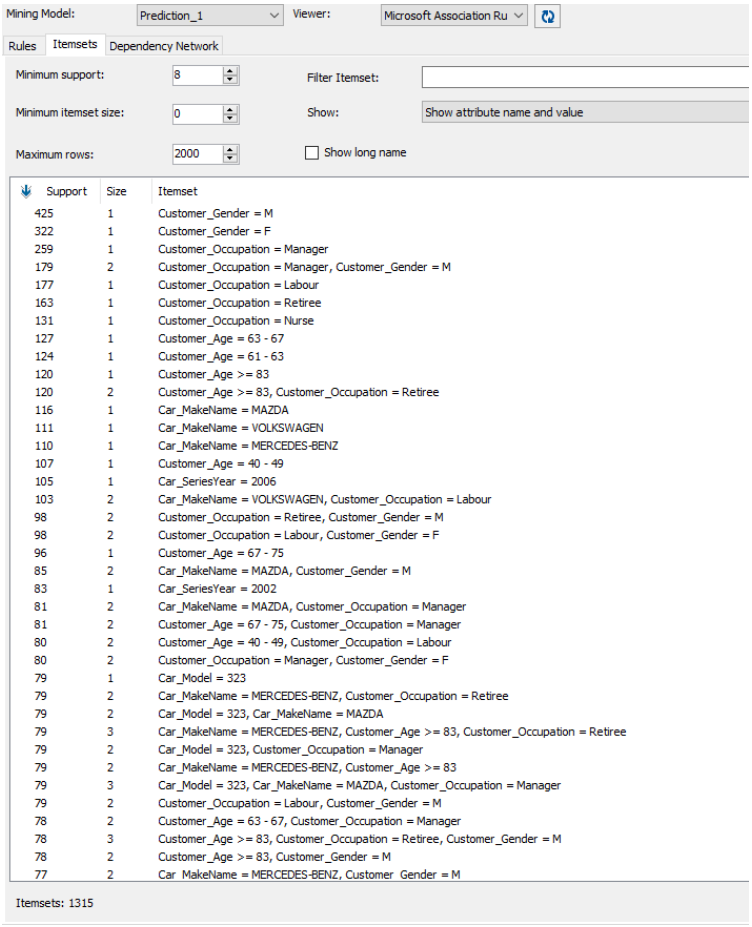
Minimum probability: 0.40 Filter Rule:

Minimum importance: 0.11 Show: Show attribute name and value

Show long name Maximum rows: 2000

Pr...	Importance	Rule
1.000	0.643	Car_MakeName = RENAULT, Car_SeriesYear = 2002 -> Customer_Occupation = Retiree
1.000	0.423	Car_Series = LE MY06 CRD, Car_Model = 300C -> Customer_Occupation = Manager
1.000	0.423	Car_Series = LE MY06 CRD, Car_MakeName = CHRYSLER -> Customer_Occupation = Manager
1.000	0.423	Car_Series = LE MY06 CRD, Car_SeriesYear = 2006 -> Customer_Occupation = Manager
1.000	0.423	Car_Series = PROTEGE -> Customer_Occupation = Manager
1.000	0.423	Car_Series = PROTEGE, Car_Model = 323 -> Customer_Occupation = Manager
1.000	0.423	Car_Series = PROTEGE, Car_MakeName = MAZDA -> Customer_Occupation = Manager
1.000	0.631	Car_Series = PRIVILEGE -> Customer_Occupation = Retiree
1.000	0.631	Car_Series = PRIVILEGE, Car_MakeName = RENAULT -> Customer_Occupation = Retiree
1.000	0.631	Car_Series = PRIVILEGE, Customer_Age >= 83 -> Customer_Occupation = Retiree
1.000	0.594	Car_Series = 18i -> Customer_Occupation = Labour
1.000	0.594	Car_Series = 18i, Car_Model = 3 -> Customer_Occupation = Labour
1.000	0.594	Car_Series = 18i, Car_MakeName = BMW -> Customer_Occupation = Labour
1.000	0.594	Car_Series = E46 18i -> Customer_Occupation = Labour
1.000	0.594	Car_Series = E46 18i, Car_Model = 3 -> Customer_Occupation = Labour
1.000	0.594	Car_Series = E46 18i, Car_MakeName = BMW -> Customer_Occupation = Labour
1.000	0.731	Car_Model = S3 -> Customer_Occupation = Nurse
1.000	0.731	Car_Model = S3, Car_Series = 1.8 -> Customer_Occupation = Nurse
1.000	0.731	Car_Model = S3, Car_MakeName = AUDI -> Customer_Occupation = Nurse
1.000	0.731	Car_Model = S3, Car_SeriesYear = 2000 -> Customer_Occupation = Nurse
1.000	0.594	Car_Model = 5 -> Customer_Occupation = Labour
1.000	0.594	Car_Model = 5, Car_MakeName = BMW -> Customer_Occupation = Labour
1.000	0.594	Car_Model = X5 -> Customer_Occupation = Labour
1.000	0.594	Car_Model = X5, Car_MakeName = BMW -> Customer_Occupation = Labour
1.000	0.437	Car_Series = ASTINA SHADES, Customer_Age = 67 - 75 -> Customer_Occupation = Manager
1.000	0.458	Car_Series = ASTINA SHADES, Car_MakeName = MAZDA -> Customer_Occupation = Manager
1.000	0.437	Customer_Age = 67 - 75, Car_SeriesYear = 2006 -> Customer_Occupation = Manager
1.000	0.444	Car_Series = ASTINA SHADES, Customer_Gender = M -> Customer_Occupation = Manager
1.000	0.423	Car_Series = MY06 UPGRADE XSE HDi 2.0 TOURING, Customer_Age = 63 - 67 -> Customer_Occupation = Manager
1.000	0.694	Car_SeriesYear = 2002, Customer_Age >= 83 -> Customer_Occupation = Retiree
1.000	0.631	Car_Series = SPORT, Car_Model = CLIO -> Customer_Occupation = Retiree
1.000	0.631	Car_Series = SPORT, Car_MakeName = RENAULT -> Customer_Occupation = Retiree
1.000	0.631	Car_Series = SPORT, Car_SeriesYear = 2002 -> Customer_Occupation = Retiree
1.000	0.631	Car_Series = SPORT, Customer_Age >= 83 -> Customer_Occupation = Retiree
1.000	0.631	Car_Series = SPORT, Customer_Gender = F -> Customer_Occupation = Retiree
1.000	0.600	Car_Series = 3C 3.2 V6 FSI -> Customer_Occupation = Labour
1.000	0.600	Car_Series = 3C 3.2 V6 FSI, Car_Model = PASSAT -> Customer_Occupation = Labour
1.000	0.600	Car_Series = 3C 3.2 V6 FSI, Car_SeriesYear = 2006 -> Customer_Occupation = Labour
1.000	0.600	Car_Series = 3C 3.2 V6 FSI, Customer_Age = 40 - 49 -> Customer_Occupation = Labour

Rules: 390



Mining Model: Prediction_1 Viewer: Microsoft Association Ru

Rules | Itemsets | Dependency Network

Minimum support: 8 Filter Itemset:

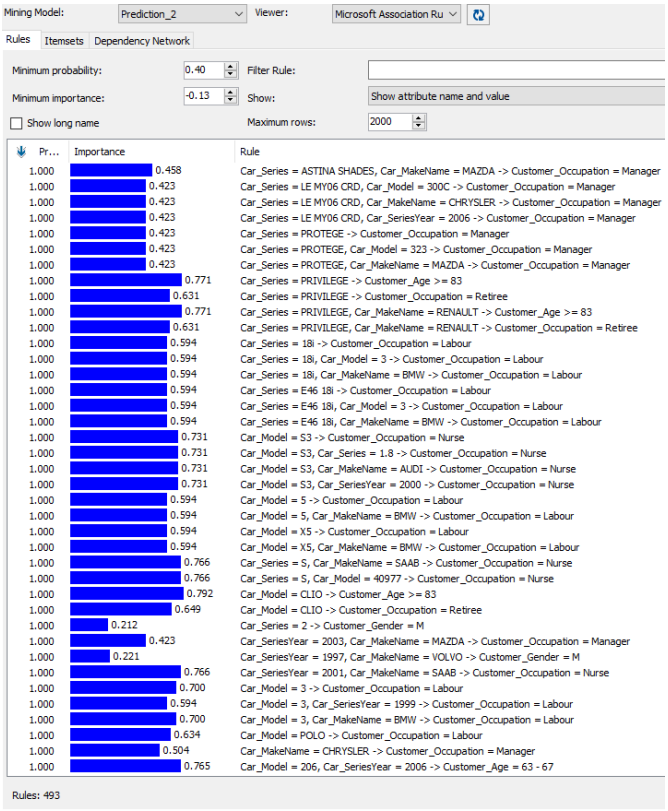
Minimum itemset size: 0 Show: Show attribute name and value

Maximum rows: 2000 Show long name

Support	Size	Itemset
425	1	Customer_Gender = M
322	1	Customer_Gender = F
259	1	Customer_Occupation = Manager
179	2	Customer_Occupation = Manager, Customer_Gender = M
177	1	Customer_Occupation = Labour
163	1	Customer_Occupation = Retiree
131	1	Customer_Occupation = Nurse
127	1	Customer_Age = 63 - 67
124	1	Customer_Age = 61 - 63
120	1	Customer_Age >= 83
120	2	Customer_Age >= 83, Customer_Occupation = Retiree
116	1	Car_MakeName = MAZDA
111	1	Car_MakeName = VOLKSWAGEN
110	1	Car_MakeName = MERCEDES-BENZ
107	1	Customer_Age = 40 - 49
105	1	Car_SeriesYear = 2006
103	2	Car_MakeName = VOLKSWAGEN, Customer_Occupation = Labour
98	2	Customer_Occupation = Retiree, Customer_Gender = M
98	2	Customer_Occupation = Labour, Customer_Gender = F
96	1	Customer_Age = 67 - 75
85	2	Car_MakeName = MAZDA, Customer_Gender = M
83	1	Car_SeriesYear = 2002
81	2	Car_MakeName = MAZDA, Customer_Occupation = Manager
81	2	Customer_Age = 67 - 75, Customer_Occupation = Manager
80	2	Customer_Age = 40 - 49, Customer_Occupation = Labour
80	2	Customer_Occupation = Manager, Customer_Gender = F
79	1	Car_Model = 323
79	2	Car_MakeName = MERCEDES-BENZ, Customer_Occupation = Retiree
79	2	Car_Model = 323, Car_MakeName = MAZDA
79	3	Car_MakeName = MERCEDES-BENZ, Customer_Age >= 83, Customer_Occupation = Retiree
79	2	Car_Model = 323, Customer_Occupation = Manager
79	2	Car_MakeName = MERCEDES-BENZ, Customer_Age >= 83
79	3	Car_Model = 323, Car_MakeName = MAZDA, Customer_Occupation = Manager
79	2	Customer_Occupation = Labour, Customer_Gender = M
78	2	Customer_Age = 63 - 67, Customer_Occupation = Manager
78	3	Customer_Age >= 83, Customer_Occupation = Retiree, Customer_Gender = M
78	2	Customer_Age >= 83, Customer_Gender = M
77	2	Car_MakeName = MERCEDES-BENZ, Customer_Gender = M

Itemsets: 1315

Prediction 2



Mining Model: Prediction_2 Viewer: Microsoft Association Ru

Rules | Itemsets | Dependency Network

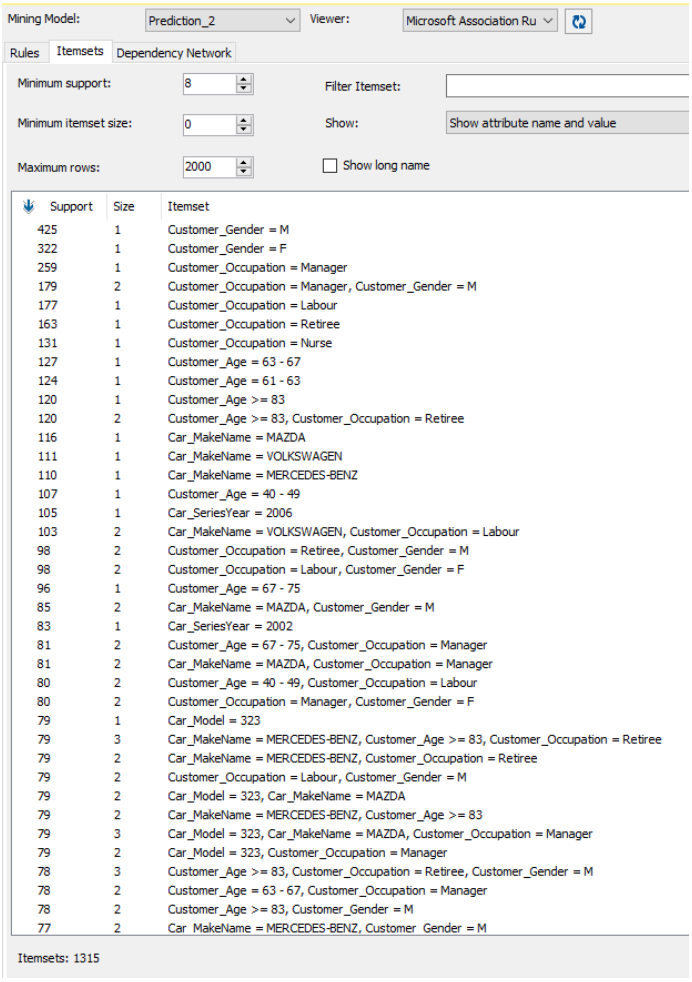
Minimum probability: 0.40 Filter Rule:

Minimum importance: -0.13 Show: Show attribute name and value

Show long name Maximum rows: 2000

Pr...	Importance	Rule
1.000	0.458	Car_Series = ASTINA SHADES, Car_MakeName = MAZDA -> Customer_Occupation = Manager
1.000	0.423	Car_Series = LE MY06 CRD, Car_Model = 300C -> Customer_Occupation = Manager
1.000	0.423	Car_Series = LE MY06 CRD, Car_MakeName = CHRYSLER -> Customer_Occupation = Manager
1.000	0.423	Car_Series = LE MY06 CRD, Car_SeriesYear = 2006 -> Customer_Occupation = Manager
1.000	0.423	Car_Series = PROTEGE -> Customer_Occupation = Manager
1.000	0.423	Car_Series = PROTEGE, Car_Model = 323 -> Customer_Occupation = Manager
1.000	0.423	Car_Series = PROTEGE, Car_MakeName = MAZDA -> Customer_Occupation = Manager
1.000	0.771	Car_Series = PRIVILEGE -> Customer_Age >= 83
1.000	0.631	Car_Series = PRIVILEGE -> Customer_Occupation = Retiree
1.000	0.771	Car_Series = PRIVILEGE, Car_MakeName = RENAULT -> Customer_Age >= 83
1.000	0.631	Car_Series = PRIVILEGE, Car_MakeName = RENAULT -> Customer_Occupation = Retiree
1.000	0.594	Car_Series = 18i -> Customer_Occupation = Labour
1.000	0.594	Car_Series = 18i, Car_Model = 3 -> Customer_Occupation = Labour
1.000	0.594	Car_Series = 18i, Car_MakeName = BMW -> Customer_Occupation = Labour
1.000	0.594	Car_Series = E46 18i -> Customer_Occupation = Labour
1.000	0.594	Car_Series = E46 18i, Car_Model = 3 -> Customer_Occupation = Labour
1.000	0.594	Car_Series = E46 18i, Car_MakeName = BMW -> Customer_Occupation = Labour
1.000	0.731	Car_Model = S3 -> Customer_Occupation = Nurse
1.000	0.731	Car_Model = S3, Car_Series = 1.8 -> Customer_Occupation = Nurse
1.000	0.731	Car_Model = S3, Car_MakeName = AUDI -> Customer_Occupation = Nurse
1.000	0.731	Car_Model = S3, Car_SeriesYear = 2000 -> Customer_Occupation = Nurse
1.000	0.594	Car_Model = 5 -> Customer_Occupation = Labour
1.000	0.594	Car_Model = 5, Car_MakeName = BMW -> Customer_Occupation = Labour
1.000	0.594	Car_Model = X5 -> Customer_Occupation = Labour
1.000	0.594	Car_Model = X5, Car_MakeName = BMW -> Customer_Occupation = Labour
1.000	0.766	Car_Series = S, Car_MakeName = SAAB -> Customer_Occupation = Nurse
1.000	0.766	Car_Series = S, Car_Model = 40977 -> Customer_Occupation = Nurse
1.000	0.792	Car_Model = CLIO -> Customer_Age >= 83
1.000	0.649	Car_Model = CLIO -> Customer_Occupation = Retiree
1.000	0.212	Car_Series = 2 -> Customer_Gender = M
1.000	0.423	Car_SeriesYear = 2003, Car_MakeName = MAZDA -> Customer_Occupation = Manager
1.000	0.221	Car_SeriesYear = 1997, Car_MakeName = VOLVO -> Customer_Gender = M
1.000	0.766	Car_SeriesYear = 2001, Car_MakeName = SAAB -> Customer_Occupation = Nurse
1.000	0.700	Car_Model = 3 -> Customer_Occupation = Labour
1.000	0.594	Car_Model = 3, Car_SeriesYear = 1999 -> Customer_Occupation = Labour
1.000	0.700	Car_Model = 3, Car_MakeName = BMW -> Customer_Occupation = Labour
1.000	0.634	Car_Model = POLO -> Customer_Occupation = Labour
1.000	0.504	Car_MakeName = CHRYSLER -> Customer_Occupation = Manager
1.000	0.765	Car_Model = 206, Car_SeriesYear = 2006 -> Customer_Age = 63 - 67

Rules: 493



Mining Model: Prediction_2 Viewer: Microsoft Association Ru

Rules | Itemsets | Dependency Network

Minimum support: 8 Filter Itemset:

Minimum itemset size: 0 Show: Show attribute name and value

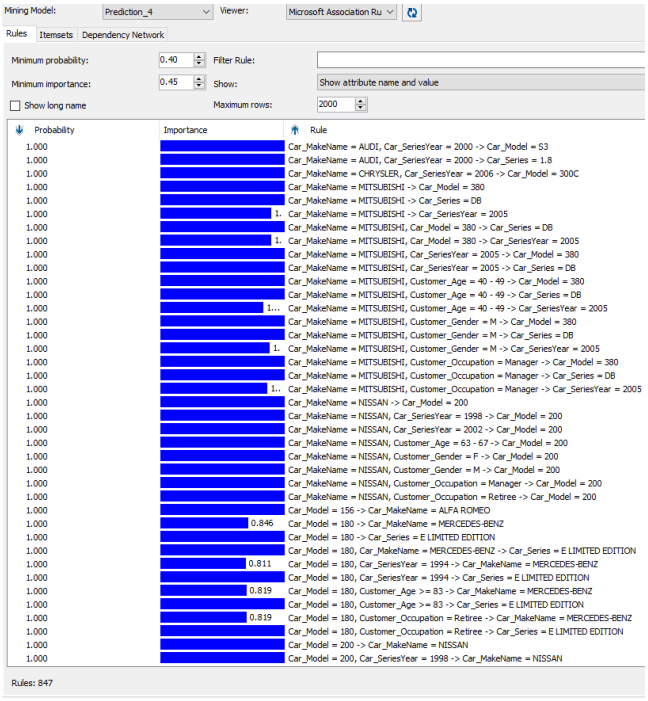
Maximum rows: 2000 Show long name

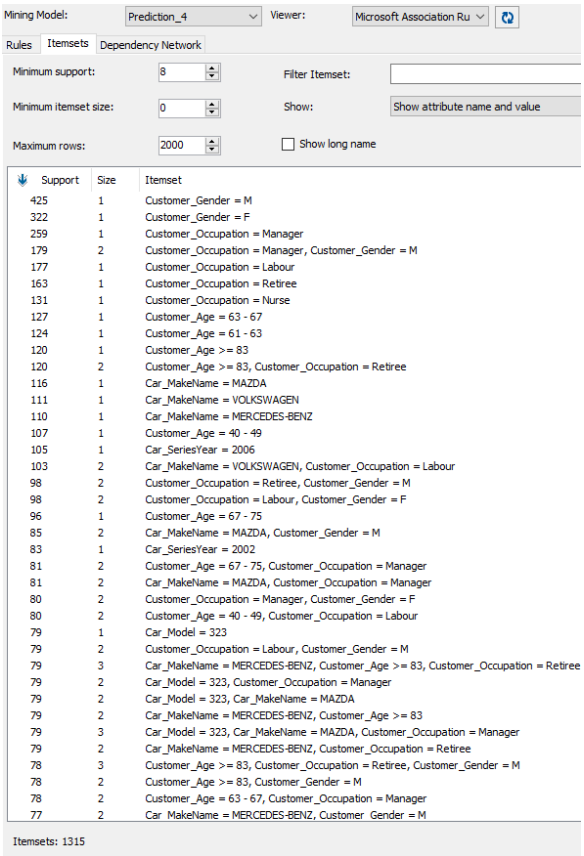
Support	Size	Itemset
425	1	Customer_Gender = M
322	1	Customer_Gender = F
259	1	Customer_Occupation = Manager
179	2	Customer_Occupation = Manager, Customer_Gender = M
177	1	Customer_Occupation = Labour
163	1	Customer_Occupation = Retiree
131	1	Customer_Occupation = Nurse
127	1	Customer_Age = 63 - 67
124	1	Customer_Age = 61 - 63
120	1	Customer_Age >= 83
120	2	Customer_Age >= 83, Customer_Occupation = Retiree
116	1	Car_MakeName = MAZDA
111	1	Car_MakeName = VOLKSWAGEN
110	1	Car_MakeName = MERCEDES-BENZ
107	1	Customer_Age = 40 - 49
105	1	Car_SeriesYear = 2006
103	2	Car_MakeName = VOLKSWAGEN, Customer_Occupation = Labour
98	2	Customer_Occupation = Retiree, Customer_Gender = M
98	2	Customer_Occupation = Labour, Customer_Gender = F
96	1	Customer_Age = 67 - 75
85	2	Car_MakeName = MAZDA, Customer_Gender = M
83	1	Car_SeriesYear = 2002
81	2	Customer_Age = 67 - 75, Customer_Occupation = Manager
81	2	Car_MakeName = MAZDA, Customer_Occupation = Manager
80	2	Customer_Age = 40 - 49, Customer_Occupation = Labour
80	2	Customer_Occupation = Manager, Customer_Gender = F
79	1	Car_Model = 323
79	3	Car_MakeName = MERCEDES-BENZ, Customer_Age >= 83, Customer_Occupation = Retiree
79	2	Car_MakeName = MERCEDES-BENZ, Customer_Occupation = Retiree
79	2	Customer_Occupation = Labour, Customer_Gender = M
79	2	Car_Model = 323, Car_MakeName = MAZDA
79	2	Car_MakeName = MERCEDES-BENZ, Customer_Age >= 83
79	3	Car_Model = 323, Car_MakeName = MAZDA, Customer_Occupation = Manager
79	2	Car_Model = 323, Customer_Occupation = Manager
78	3	Customer_Age >= 83, Customer_Occupation = Retiree, Customer_Gender = M
78	2	Customer_Age = 63 - 67, Customer_Occupation = Manager
78	2	Customer_Age >= 83, Customer_Gender = M
77	2	Car_MakeName = MERCEDES-BENZ, Customer_Gender = M

Itemsets: 1315

Prediction 3

Prediction 4

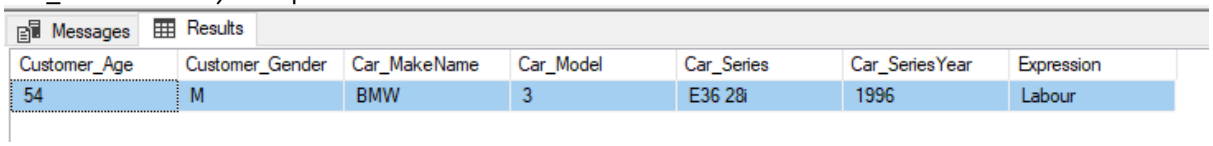




Task 4: Prediction Queries

Prediction 1

```
SELECT q.Customer_Age, q.Customer_Gender, q.Car_MakeName, q.Car_Model, q.Car_Series,
q.Car_SeriesYear,
       PREDICT([Customer_Occupation] AS [[Prediction on Car_Renter])
From
       [Prediction_1]
NATURAL PREDICTION JOIN
(SELECT 54 AS Customer_Age, 'M' AS Customer_Gender, '3' AS Car_Model, 'Professional'
AS Occupation, 'BMW' AS Car_MakeName, 'E36 28i' AS Car_Series, '1996' AS
Car_SeriesYear ) AS q
```



Messages | Results

Customer_Age	Customer_Gender	Car_MakeName	Car_Model	Car_Series	Car_SeriesYear	Expression
54	M	BMW	3	E36 28i	1996	Labour

Prediction 2

```
SELECT t.Car_MakeName, t.Car_Model, t.Car_Series, t.Car_SeriesYear,
  PREDICT([Customer_Age] AS [Prediction on Car_Renter]),
  PREDICT([Customer_Gender] AS [Prediction on Car_Renter]),
  PREDICT([Customer_Occupation] AS [Prediction on Car_Renter])
FROM
  [Prediction_2]
NATURAL PREDICTION JOIN
(SELECT * FROM [Prediction_2].CASES WHERE IsTestCase()
 ) AS t
```

Messages Results

Car_MakeName	Car_Model	Car_Series	Car_SeriesYear	Expression	Expression	Expression
BMW	3	E46 18i EXECU...	2001	65	F	Labour
BMW	3	E36 28i	1996	65	M	Labour
BMW	3	18i	1995	65	F	Labour
DATSUN	FAIRLADY	SPORTS	1964	65	M	Manager
MAZDA	121	SHADES	1997	62	M	Manager
BMW	3	18i	1994	65	F	Labour
BMW	3	E46 16ti	2004	65	F	Labour
MAZDA	121	METRO SHADES	2002	62	M	Manager
BMW	3	E46 18i SPORT	2005	65	F	Labour
BMW	3	E46 18i SPORT	2005	65	F	Labour
BMW	5	28i	1997	65	M	Labour
BMW	3	18i	1991	65	F	Labour
MAZDA	121	METRO SHADES	2001	62	M	Manager
BMW	7	35iL EXECUTIVE	1988	65	M	Labour
BMW	X5	E53 3.0i	2001	65	M	Labour
BMW	3	E46 18i EXECU...	2000	65	F	Labour
BMW	3	18i	1986	65	F	Nurse
BMW	X5	E53 3.0d	2005	65	M	Labour
BMW	3	E46 16ti	2002	65	F	Labour
BMW	5	25i	1991	65	M	Labour
VOLKSWAGEN	JETTA	1KM 2.0 TURB...	2007	56	F	Labour
VOLKSWAGEN	GOLF	1K GT	2007	56	F	Labour
VOLKSWAGEN	MULTIVAN	T5 COMFORTL...	2006	44	F	Labour
VOLKSWAGEN	TOUAREG	7L R5 TDi LUX...	2006	44	F	Labour
VOLKSWAGEN	JETTA	1KM 2.0 TURB...	2006	56	F	Labour
VOLKSWAGEN	GOLF	1K 2.0 FSI SPO...	2006	56	F	Labour
VOLKSWAGEN	TOUAREG	7L R5 TDi LUX...	2006	44	F	Labour
VOLKSWAGEN	JETTA	1KM 2.0 TDI	2006	56	F	Labour
VOLKSWAGEN	GOLF	GL	1998	56	F	Labour
VOLKSWAGEN	MULTIVAN	T5 HIGHLINE	2006	44	F	Labour
VOLKSWAGEN	TRANSPORTER	T5 MY08 CRE...	2008	44	F	Labour
VOLKSWAGEN	GOLF	1K 2.0 FSI SPO...	2006	56	F	Labour
VOLKSWAGEN	JETTA	1KM 2.0 TDI	2006	56	F	Labour

Prediction 3

```
SELECT t.Car_MakeName, t.Car_Model, t.Car_Series, t.Car_SeriesYear, t.Customer_Age,
t.Customer_Gender, t.Customer_Occupation,
  PREDICT([Store_Name] AS [Prediction on Car_Renter])
FROM
  [Prediction_3]
NATURAL PREDICTION JOIN
 OPENQUERY(CarRentalXYZ,'SELECT [Order_ID], cst.Customer_Age, cst.Customer_Gender,
cst.Customer_Occupation, car.Car_MakeName, car.Car_Model, car.Car_Series,
car.Car_SeriesYear, str.Store_Name
FROM dbo.XYZ_RentalOrder AS fct
LEFT JOIN dbo.XYZ_Customer AS cst ON cst.Customer_ID = fct.Order_Customer
LEFT JOIN dbo.XYZ_Car AS car ON car.Car_ID = fct.Order_Car
LEFT JOIN dbo.XYZ_Store AS str ON str.Store_ID = fct.Order_Store') AS t
```

Messages Results

Car_MakeName	Car_Model	Car_Series	Car_SeriesYear	Customer_Age	Customer_Gender	Customer_Occu...	Expression
BMW	3	E46 18i	1999	52	M	Labour	St. Leonards_store
BMW	3	E36 18is SPORT	1998	52	M	Labour	St. Leonards_store
BMW	3	E46 18i	1999	52	M	Labour	St. Leonards_store
BMW	3	E36 18is SPORT	1998	52	M	Labour	St. Leonards_store
BMW	3	E36 28i	1996	53	M	Labour	St. Leonards_store
BMW	3	E46 18i EXECU...	2001	53	M	Labour	St. Leonards_store
BMW	3	18i	1995	53	M	Labour	St. Leonards_store
BMW	X5	E53 MY06 UPG...	2006	53	M	Labour	St. Leonards_store
BMW	3	E36 28i	1996	53	M	Labour	St. Leonards_store
BMW	3	18i	1995	53	M	Labour	St. Leonards_store
BMW	X5	E53 MY06 UPG...	2006	53	M	Labour	St. Leonards_store
BMW	X5	E53 3.0d	2004	48	F	Labour	St. Leonards_store
BMW	3	18i	1997	48	F	Labour	St. Leonards_store
BMW	3	E46 18i	1999	48	F	Labour	St. Leonards_store
BMW	3	E46 18i	1999	48	F	Labour	St. Leonards_store
BMW	3	E46 18i	1999	48	F	Labour	St. Leonards_store
BMW	X5	E53 3.0d	2004	48	F	Labour	St. Leonards_store
BMW	3	18i	1997	48	F	Labour	St. Leonards_store
BMW	3	E46 18i	1999	48	F	Labour	St. Leonards_store
BMW	3	E90 20i	2006	48	M	Labour	St. Leonards_store
BMW	3	E90 20i	2006	48	M	Labour	St. Leonards_store
BMW	5	E39 23i	1996	48	M	Labour	St. Leonards_store
BMW	5	E39 30i SPORT	2002	48	M	Labour	St. Leonards_store
DATSUN	FAIRLADY	SPORTS	1964	48	M	Labour	St. Leonards_store
MAZDA	121	SHADES	1997	48	M	Labour	St. Leonards_store
BMW	5	E39 30i SPORT	2002	48	M	Labour	St. Leonards_store
DATSUN	FAIRLADY	SPORTS	1964	48	M	Labour	St. Leonards_store
MAZDA	121	SHADES	1997	48	M	Labour	St. Leonards_store
BMW	5	E39 23i	1996	48	M	Labour	St. Leonards_store
BMW	3	18is	1996	37	F	Labour	St. Leonards_store
BMW	3	E46 16ti	2004	37	F	Labour	St. Leonards_store
BMW	3	18i	1994	37	F	Labour	St. Leonards_store
DATSUN	180B	SSS	1977	37	F	Labour	St. Leonards_store
BMW	3	18i	1994	37	F	Labour	St. Leonards_store
DATSUN	180B	SSS	1977	37	F	Labour	St. Leonards_store
BMW	3	18is	1996	37	F	Labour	St. Leonards_store
BMW	3	E46 16ti	2004	37	F	Labour	St. Leonards_store

Prediction 4

```
SELECT t.Car_MakeName, t.Car_Model, t.Car_Series, t.Car_SeriesYear, t.Customer_Age,
t.Customer_Gender, t.Customer_Occupation,
  PREDICT([Car_MakeName] AS [Prediction on Car_Renter]),
  PREDICT([Car_Model] AS [Prediction on Car_Renter]),
  PREDICT([Car_Series] AS [Prediction on Car_Renter]),
  PREDICT([Car_SeriesYear] AS [Prediction on Car_Renter])
FROM
  [Prediction_4]
NATURAL PREDICTION JOIN
 OPENQUERY(CarRentalXYZ,'SELECT [Order_ID], cst.Customer_Age, cst.Customer_Gender,
cst.Customer_Occupation, car.Car_MakeName, car.Car_Model, car.Car_Series,
car.Car_SeriesYear, str.Store_Name
FROM dbo.XYZ_RentalOrder AS fct
LEFT JOIN dbo.XYZ_Customer AS cst ON cst.Customer_ID = fct.Order_Customer
LEFT JOIN dbo.XYZ_Car AS car ON car.Car_ID = fct.Order_Car
LEFT JOIN dbo.XYZ_Store AS str ON str.Store_ID = fct.Order_Store') AS t
```

Messages Results

Car_MakeName	Car_Model	Car_Series	Car_SeriesYear	Customer_Age	Customer_Gender	Customer_Occu...	Expression	Expression	Expression	Expre
BMW	3	E46 18i	1999	52	M	Labour	BMW	3	ASTINA	2006
BMW	3	E36 18is SPORT	1998	52	M	Labour	BMW	3	ASTINA	2006
BMW	3	E46 18i	1999	52	M	Labour	BMW	3	ASTINA	2006
BMW	3	E36 18is SPORT	1998	52	M	Labour	BMW	3	ASTINA	2006
BMW	3	E36 28i	1996	53	M	Labour	BMW	3	ASTINA	2006
BMW	3	E46 18i EXECU...	2001	53	M	Labour	BMW	3	ASTINA	2006
BMW	3	18i	1995	53	M	Labour	BMW	3	ASTINA	2006
BMW	X5	E53 MY06 UPG...	2006	53	M	Labour	BMW	JETTA	ASTINA	2006
BMW	3	E36 28i	1996	53	M	Labour	BMW	3	ASTINA	2006
BMW	3	18i	1995	53	M	Labour	BMW	3	ASTINA	2006
BMW	X5	E53 MY06 UPG...	2006	53	M	Labour	BMW	JETTA	ASTINA	2006
BMW	X5	E53 3.0d	2004	48	F	Labour	BMW	3	ASTINA	2006
BMW	3	18i	1997	48	F	Labour	BMW	3	ASTINA	2006
BMW	3	E46 18i	1999	48	F	Labour	BMW	3	ASTINA	2006
BMW	3	E46 18i	1999	48	F	Labour	BMW	3	ASTINA	2006
BMW	3	E46 18i	1999	48	F	Labour	BMW	3	ASTINA	2006
BMW	X5	E53 3.0d	2004	48	F	Labour	BMW	3	ASTINA	2006
BMW	3	18i	1997	48	F	Labour	BMW	3	ASTINA	2006
BMW	3	E46 18i	1999	48	F	Labour	BMW	3	ASTINA	2006
BMW	3	E90 20i	2006	48	M	Labour	BMW	PASSAT	ASTINA	2006
BMW	3	E90 20i	2006	48	M	Labour	BMW	PASSAT	ASTINA	2006
BMW	5	E39 23i	1996	48	M	Labour	BMW	3	ASTINA	2006
BMW	5	E39 30i SPORT	2002	48	M	Labour	BMW	3	ASTINA	2006
DATSUN	FAIRLADY	SPORTS	1964	48	M	Labour	VOLKSWAGEN	323	ASTINA	2006
MAZDA	121	SHADES	1997	48	M	Labour	VOLVO	323	ASTINA	2006
BMW	5	E39 30i SPORT	2002	48	M	Labour	BMW	3	ASTINA	2006
DATSUN	FAIRLADY	SPORTS	1964	48	M	Labour	VOLKSWAGEN	323	ASTINA	2006
MAZDA	121	SHADES	1997	48	M	Labour	VOLVO	323	ASTINA	2006
BMW	5	E39 23i	1996	48	M	Labour	BMW	3	ASTINA	2006
BMW	3	18is	1996	37	F	Labour	BMW	3	ASTINA	2006
BMW	3	E46 16ti	2004	37	F	Labour	BMW	3	ASTINA	2006
BMW	3	18i	1994	37	F	Labour	BMW	3	ASTINA	2006
DATSUN	180B	SSS	1977	37	F	Labour	BMW	3	ASTINA	2006
BMW	3	18i	1994	37	F	Labour	BMW	3	ASTINA	2006
DATSUN	180B	SSS	1977	37	F	Labour	BMW	3	ASTINA	2006
BMW	3	18is	1996	37	F	Labour	BMW	3	ASTINA	2006
BMW	3	E46 16ti	2004	37	F	Labour	BMW	3	ASTINA	2006

Results

While predictions 1, 2, and 4 ran successfully and generated meaningful output, due to missing rules in task 3, prediction 3 ran, but gave a false positive output, i.e. it recommended the same store to every row in the batch prediction.