



IDS 702: FINAL PROJECT

Aarushi Verma

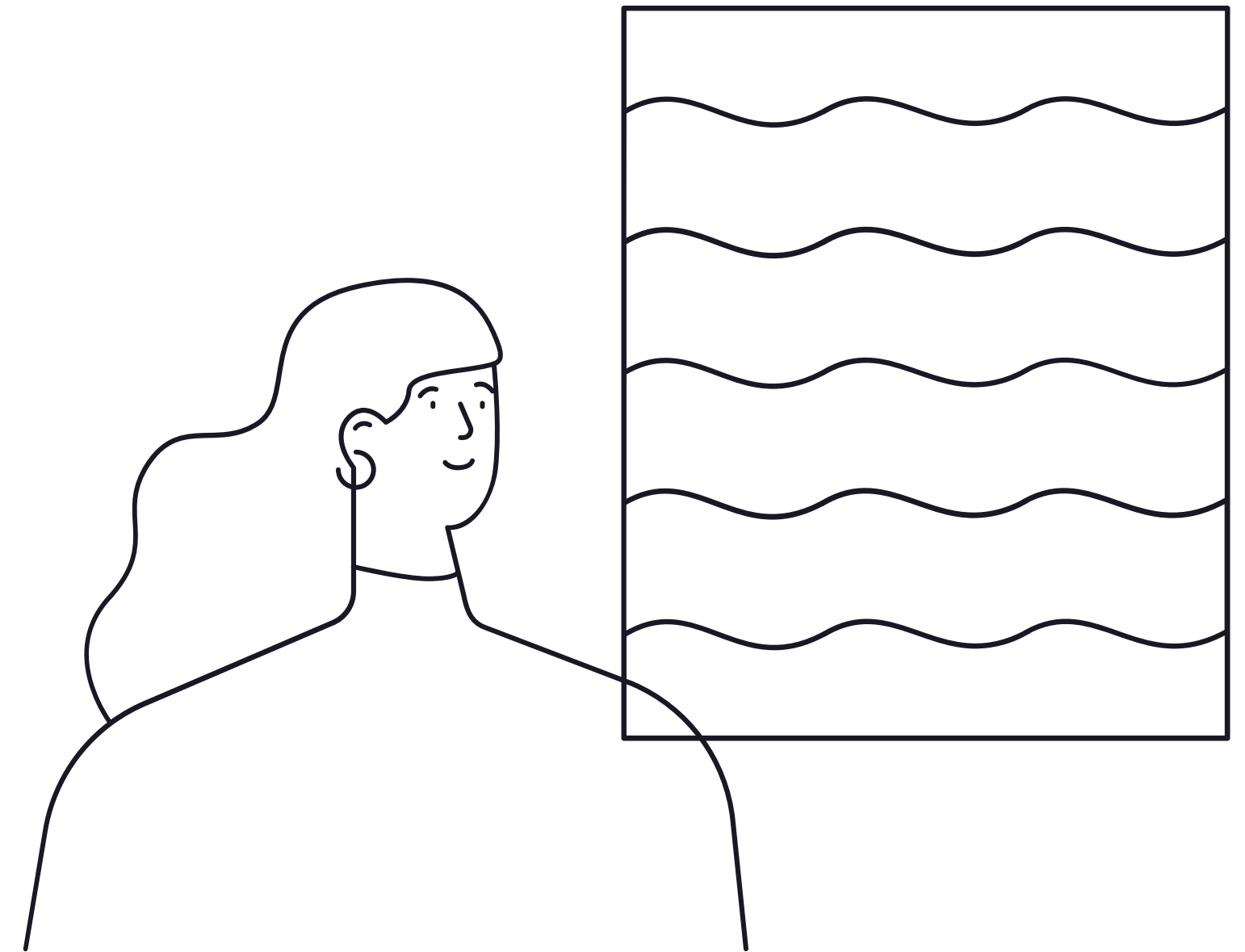
Introduction

Bayesian Framework for ML Research

- Building a classifier based on a short number of rules

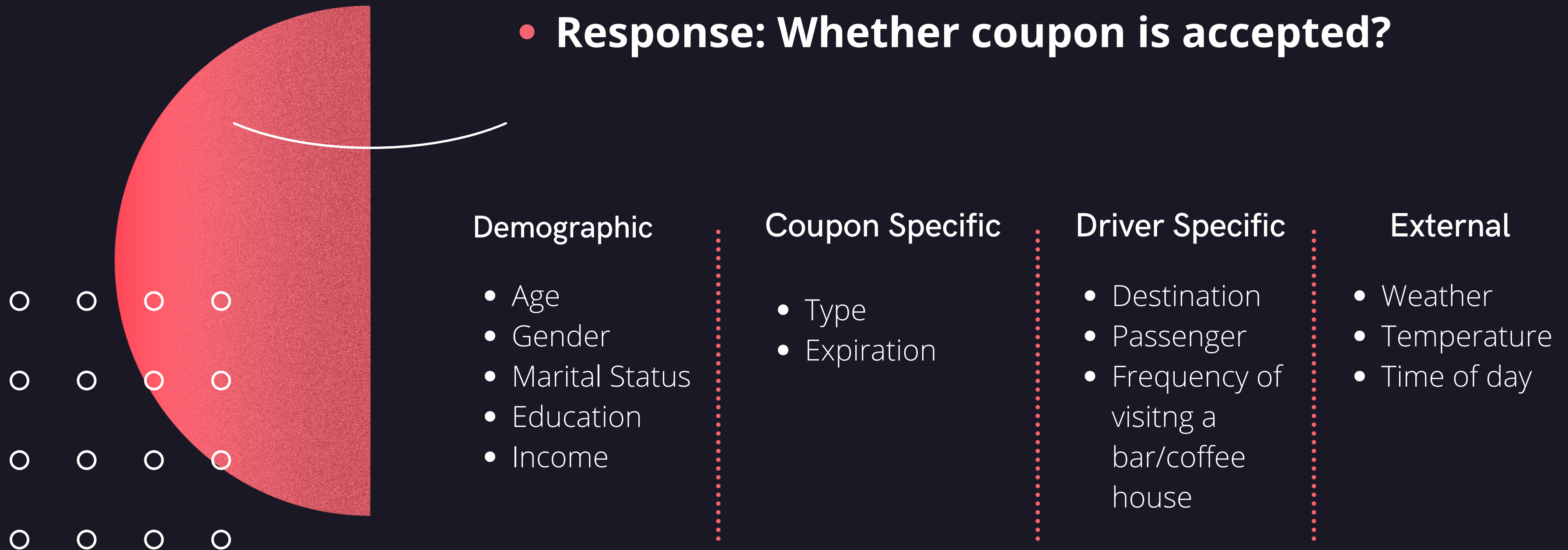
Amazon Mechanical Turk

- Crowd sourcing Market Place
- Survey conducted to record responses



About the data

- 12,684 observations
- 23 attributes
- Response: Whether coupon is accepted?



EDA

Demographic Factors

	Gender	
Y	Female	Male
No	0.4527722	0.4092014
Yes	0.5472278	0.5907986

	Marital Status				
Y	Single	Unmarried partner	Married partner	Divorced	Widowed
No	0.3941498	0.4387008	0.4570588	0.4709302	0.5230769
Yes	0.6058502	0.5612992	0.5429412	0.5290698	0.4769231

	Age							
Y	below21	21-25	26-30	31-35	36-40	41-45	46-50	50plus
No	0.3656307	0.4018093	0.4040641	0.4536538	0.464746	0.4272644	0.4241983	0.4910511
Yes	0.6343693	0.5981907	0.5959359	0.5463462	0.535254	0.5727356	0.5758017	0.5089489

Coupon Specific

	Expiration	
Y	2 hours	24 hours
No	0.5040229	0.3744183
Yes	0.4959771	0.6255817

	Coupon				
Y	Bar	Carry out & Take away	Coffee House	Restaurant(<20)	Restaurant(20-50)
No	0.5899851	0.2645215	0.5007508	0.292893	0.5589812
Yes	0.4100149	0.7354785	0.4992492	0.707107	0.4410188

EDA

Driver Specific

	Destination		
Y	Home	No Urgent Place	Work
No	0.493667	0.3662263	0.4977876
Yes	0.506333	0.6337737	0.5022124

	Passenger			
Y	Alone	Friends	Kids	Partner
No	0.4741958	0.3265616	0.4950298	0.4046512
Yes	0.5258042	0.6734384	0.5049702	0.5953488

External Factors

	Weather		
Y	Rainy	Snowy	Sunny
No	0.5371901	0.5295374	0.4052041
Yes	0.4628099	0.4704626	0.5947959

	Time				
Y	7AM	10AM	10PM	2PM	6PM
No	0.4977876	0.3916484	0.4915254	0.3384769	0.4154799
Yes	0.5022124	0.6083516	0.5084746	0.6615231	0.5845201

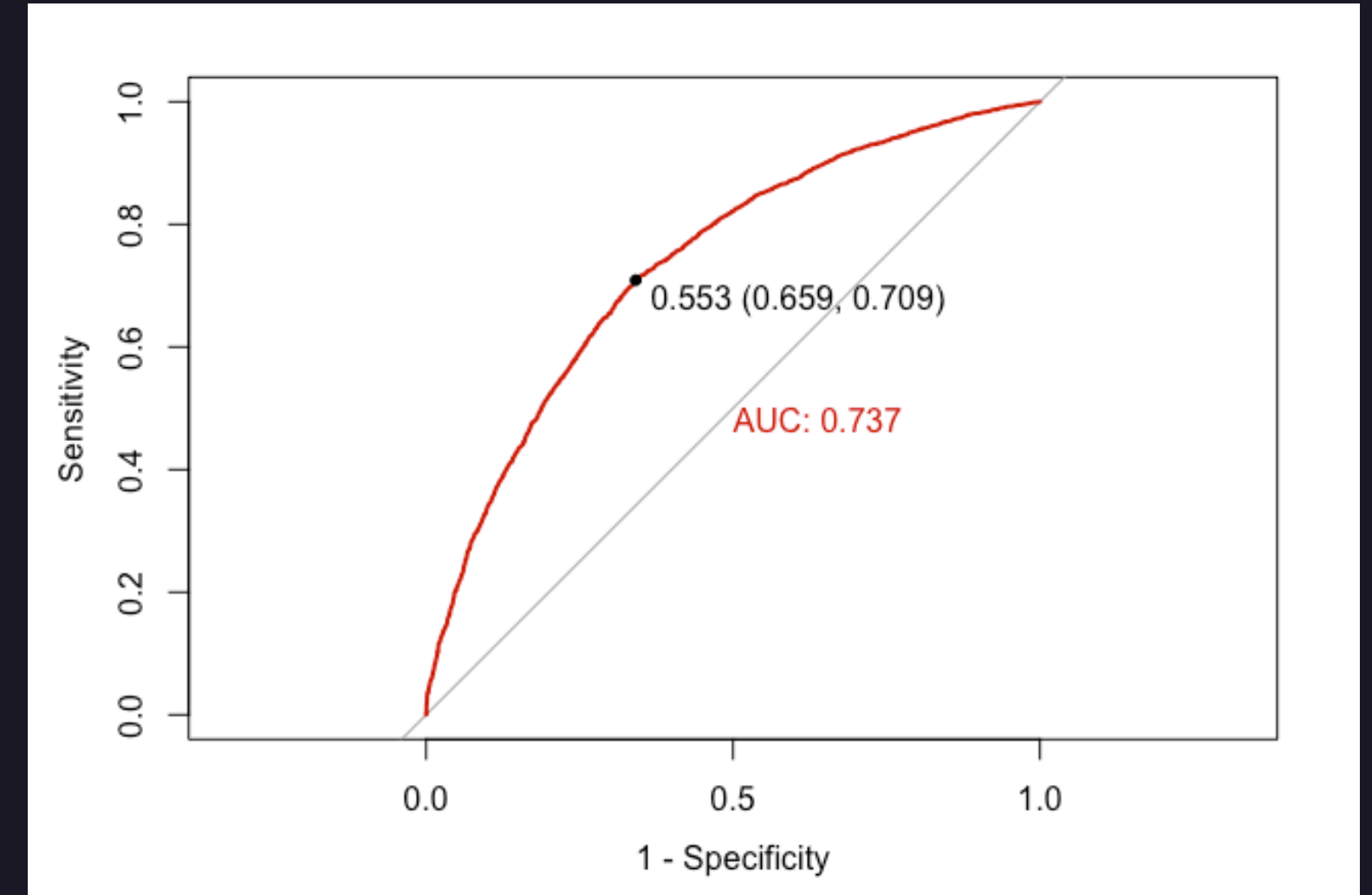
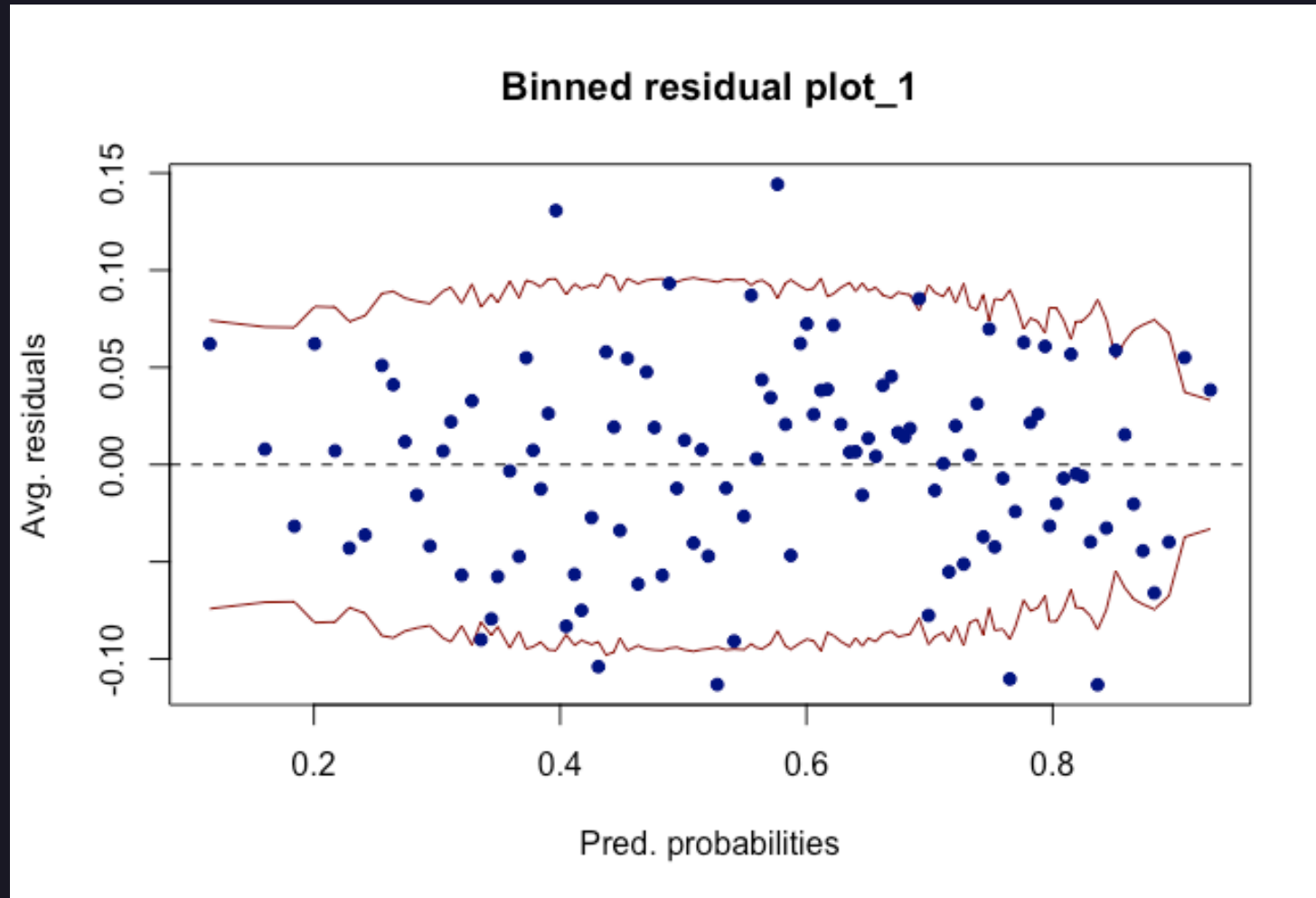
Model

04

- Logistic Regression
- AIC vs BIC
- Variables in the Final Model:
 - Destination
 - Passanger
 - Weather
 - Time
 - Coupon
 - Expiration
 - Gender
 - Coffee House



Model Assessment



Metric			
Accuracy	Sensitivity	Specificity	AUC
68.60%	70.71%	65.91%	0.737

INTERPRETATIONS

Demographic factors - Gender and Education

- The odds of a male driver accepting coupons is 1.3 times more than female driver
- The odds of someone in High School accepting a coupon is 2.01 times than someone with an Associate degree



External Factors - Weather and Time

- Compared to time 10AM, the odd of accepting coupon are 0.86 times or 13% lesser than time 10PM
- Compared to rainy weather the odds of accepting coupon is 0.84 times or 16% lesser in snowy weather whereas, it is 1.51 times or 50% higher in sunny weather



INTERPRETATIONS

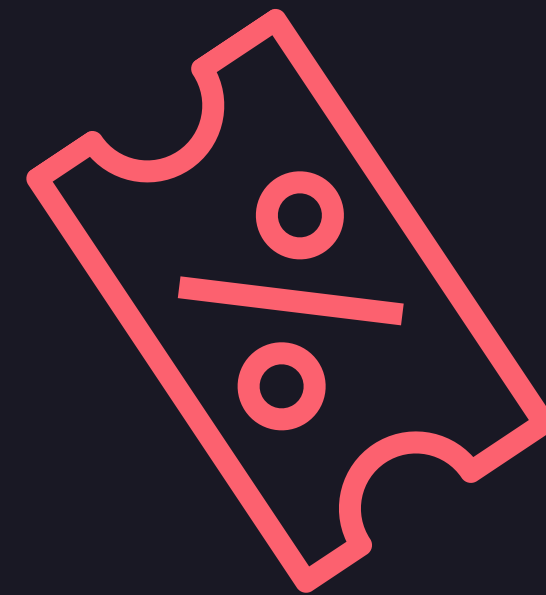
Driver Specific - Destination, Passenger

- Compared to destination being home the odds of accepting a coupon are 2.1 times higher for destination nowhere urgent and 1.02 times higher for destination Work
- The odds of driver accepting a coupon when with Friends as passenger 25% higher compared to when alone



Coupon Specific - Type of Coupon

- The odds of a driver accepting a coupon for Carry Out and Takeaway is 5.1 times compared to a coupon for a Bar



THANK YOU

