

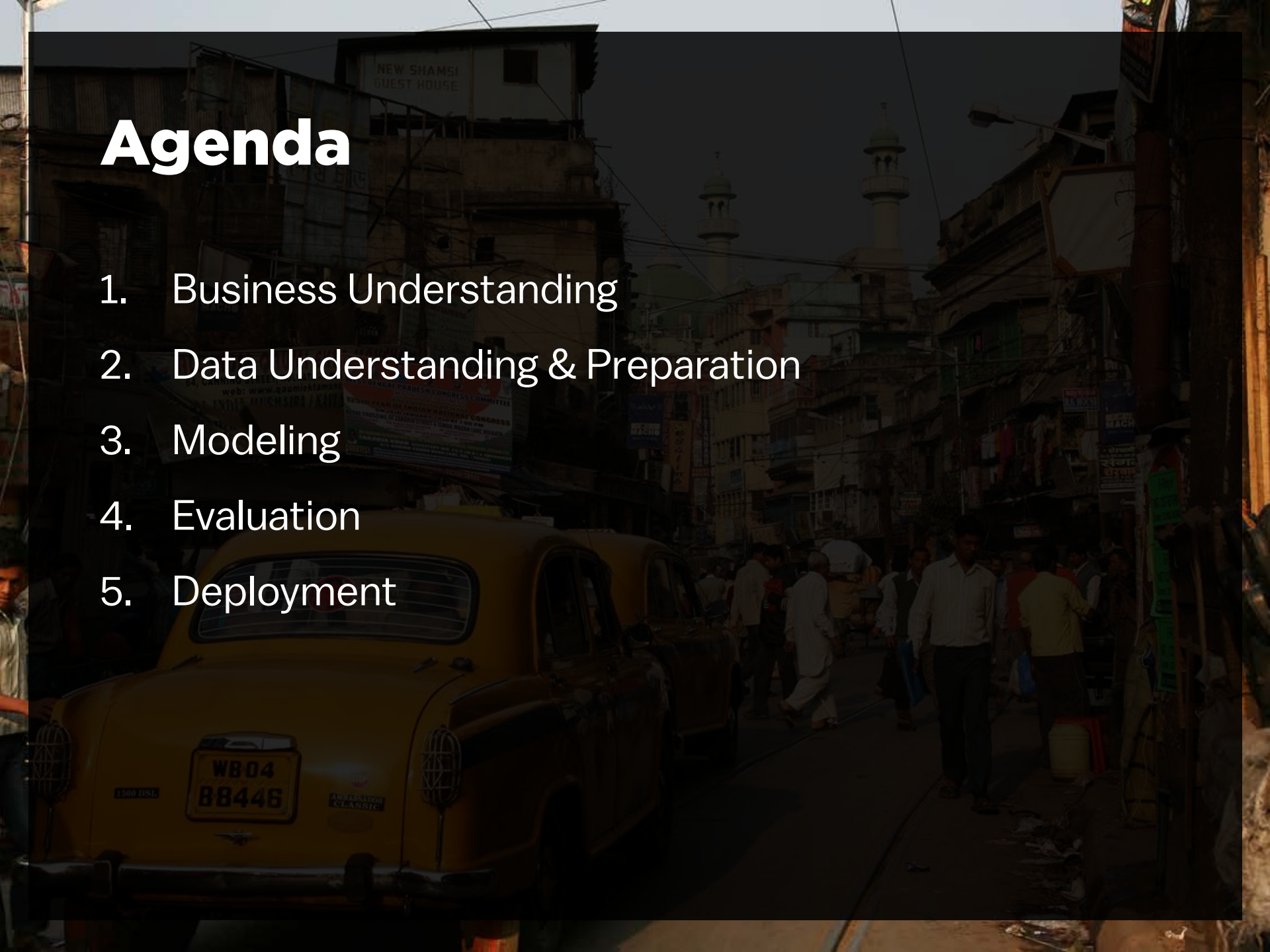
# Predicting Cab Booking Cancellations





# Agenda

1. Business Understanding
2. Data Understanding & Preparation
3. Modeling
4. Evaluation
5. Deployment





# 1. Business Understanding



# 1. Business Understanding

The screenshot shows the 'YourCabs.com' website for Bangalore. The header includes the logo, the city 'BANGALORE', a phone number '(080) 30 600 600', and an 'EMAIL US' link. The main heading is 'Book a Cab in 3 steps.' followed by the instructions 'Search, Select & Book. Online or by Phone.' and 'Pay in cash after your trip.' On the left sidebar, there are links for 'HAPPY HOURS' (with an 'AIRPORT OFFER' sub-link), 'ANDROID APP', and 'CUSTOMER SPEAK'. The main content area is titled 'LOCAL & OUTSTATION' and 'BANGALORE'. It instructs users to 'Book Outstation, City & Airport cabs in BANGALORE' and provides a text box for 'PICKUP LOCATION IN BANGALORE' with dropdown options: 'Airport', 'City Railway Stn.', and 'MG Road'. Below this is a 'DESTINATION - LOCAL OR OUTSTATION' section with dropdown options: 'Airport', 'City Railway Stn.', 'MG Road', 'Mysore', 'Ooty', and 'Tirupati'. At the bottom, there are input fields for the date '30 Sep 2014, Tuesday' and time '12:00 AM', a 'Discount Code?' field, and a green 'FIND CABS' button.

Cab Service in BANGALORE x

www.yourcabs.com/bangalore

YOURcabs.com BANGALORE Phone Bookings + Helpline: (080) 30 600 600 EMAIL US

## Book a Cab in 3 steps.

Search, Select & Book. Online or by Phone.  
Pay in cash after your trip.

**HAPPY HOURS**  
AIRPORT OFFER  
ANDROID APP  
CUSTOMER SPEAK

Rides starting from Rs. 12/km on  
Midnights & Afternoons. Why take an  
auto?  
[Read More.](#)

**LOCAL & OUTSTATION** **HOURLY PACKAGES**

Book Outstation, City & Airport cabs in **BANGALORE**

Enter your pickup and destination location, or choose from one of the Quick Entry options. For outstation cabs, you need to enter the city name in the Destination field. If you need a cab for a few hours, choose 'Hourly Packages' tab above.

**PICKUP LOCATION IN BANGALORE**  
Airport City Railway Stn. MG Road

**DESTINATION - LOCAL OR OUTSTATION**  
Airport City Railway Stn. MG Road Mysore Ooty Tirupati

30 Sep 2014, Tuesday 12:00 AM

Discount Code? **FIND CABS**



# 1. Business Understanding

LOCAL & OUTSTATION

HOURLY PACKAGES

Book a cab by the hour, in **BANGALORE**

If you are looking to book a cab by the hour, choose one of the packages below. A 4hrs. - 40kms. package, for example, will let you hold the cab for 4 hours and drive around for 40kms. Any extra in kms. or hours will be charged. If you just need a cab between two locations, choose 'Local & Outstation' tab above.

☒ 4 hours – 40 kms

☐ 6 hours – 60 kms

☐ 8 hours – 80 kms

☐ 10 hours – 100 kms

☐ 12 hours – 120 kms

ENTER PICKUP LOCATION IN BANGALORE

Airport

City Railway Stn.

MG Road

30 Sep 2014, Tuesday

12:00 AM

Discount Code?

FIND CABS

# 1. Business Understanding



**Bhar Dwaj** ▸ **YourCabs**

July 13 · Bangalore, India · 🌐

I am a regular customer of Yourcabs. Always book cabs from yourcabs and very frequently. Today I booked a cab for 20KM distance and I got call that there is no cab available. Just for ~~fucking~~ few more bugs you cancelled my booking. Might you got a customer with long distance.

Request all user don't trust this ~~fucking~~ cab within the city. These jerks can cancel your booking any time.

[Like](#) · [Comment](#) · [Share](#)



A close-up, low-angle shot of the front of a bright yellow taxi. The car's headlight, grille, and bumper are visible. In the background, a person is walking on a street, and there are colorful flags or banners hanging from a structure. A dark horizontal band across the middle of the image contains white text.

## **2. Data Understanding & Preparation**

## 2. Data Understanding & Preparation

- Kaggle.com
- Contained 43,431 transactions and 20 variables
- Target variable = “Car\_Cancellation”
  - If car was cancelled – 1
  - If car not cancelled – 0
- “Null” values & ID’s



## 2. Data Understanding & Preparation

- Existing Variables:

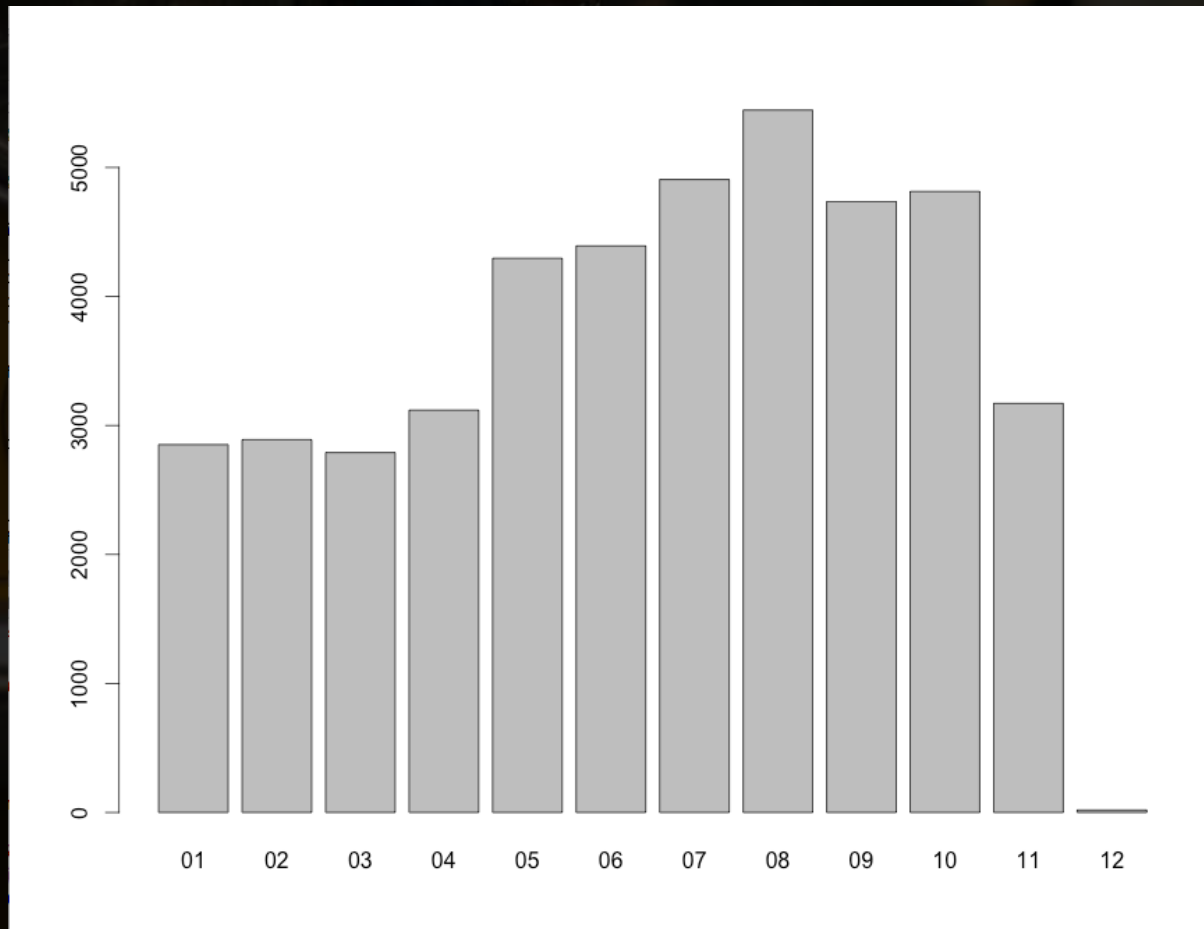
- vehicle\_model\_id
- package\_id
- travel\_type\_id
- from\_date
- online\_booking
- mobile\_site\_booking
- booking\_created

- New Variables:

- difftime
- month\_booked\_for
- dayofweek\_booked\_for
- hour\_booked\_for

## 2. Data Understanding & Preparation

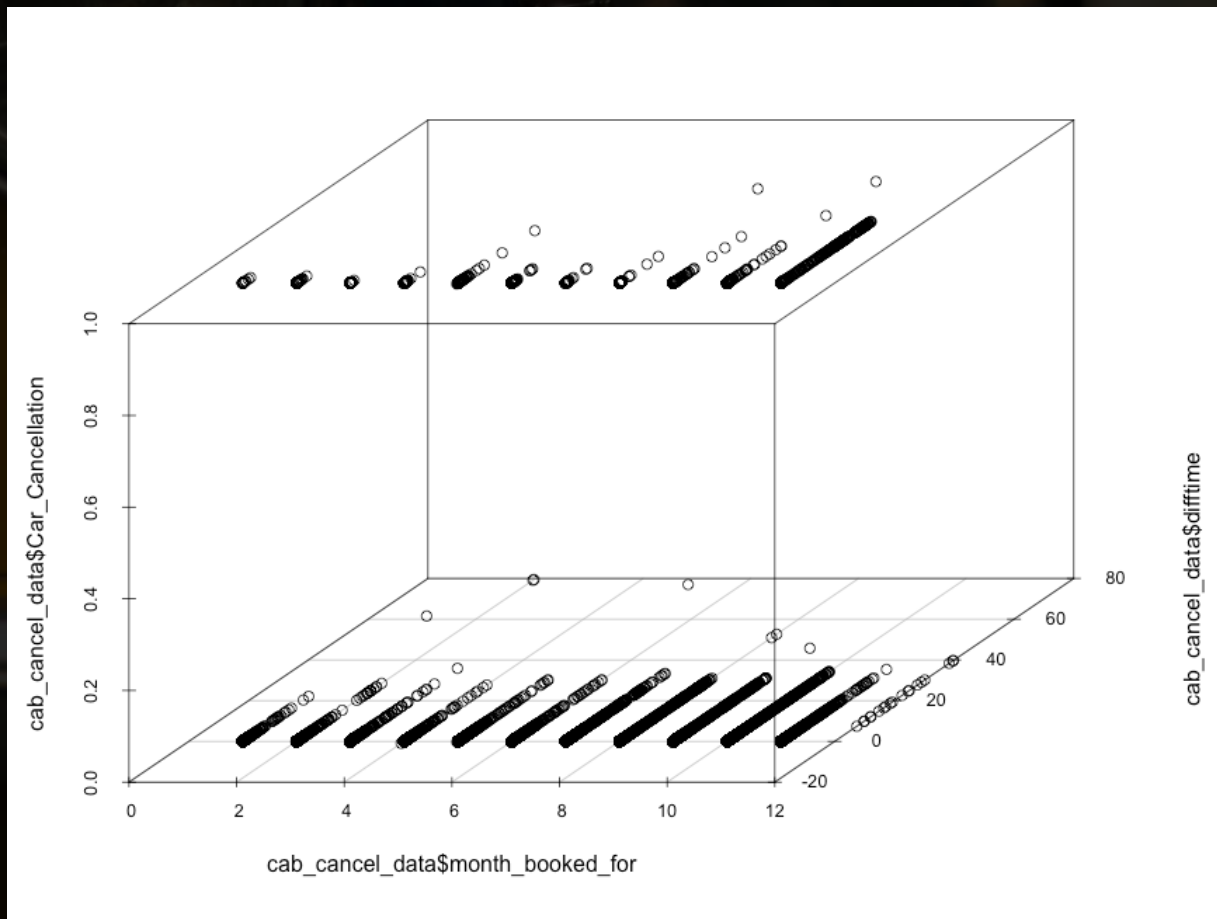
Frequency of Months when Bookings are Created For





## 2. Data Understanding & Preparation

How does DiffTime and Month Booked For Effect Car Cancellation?



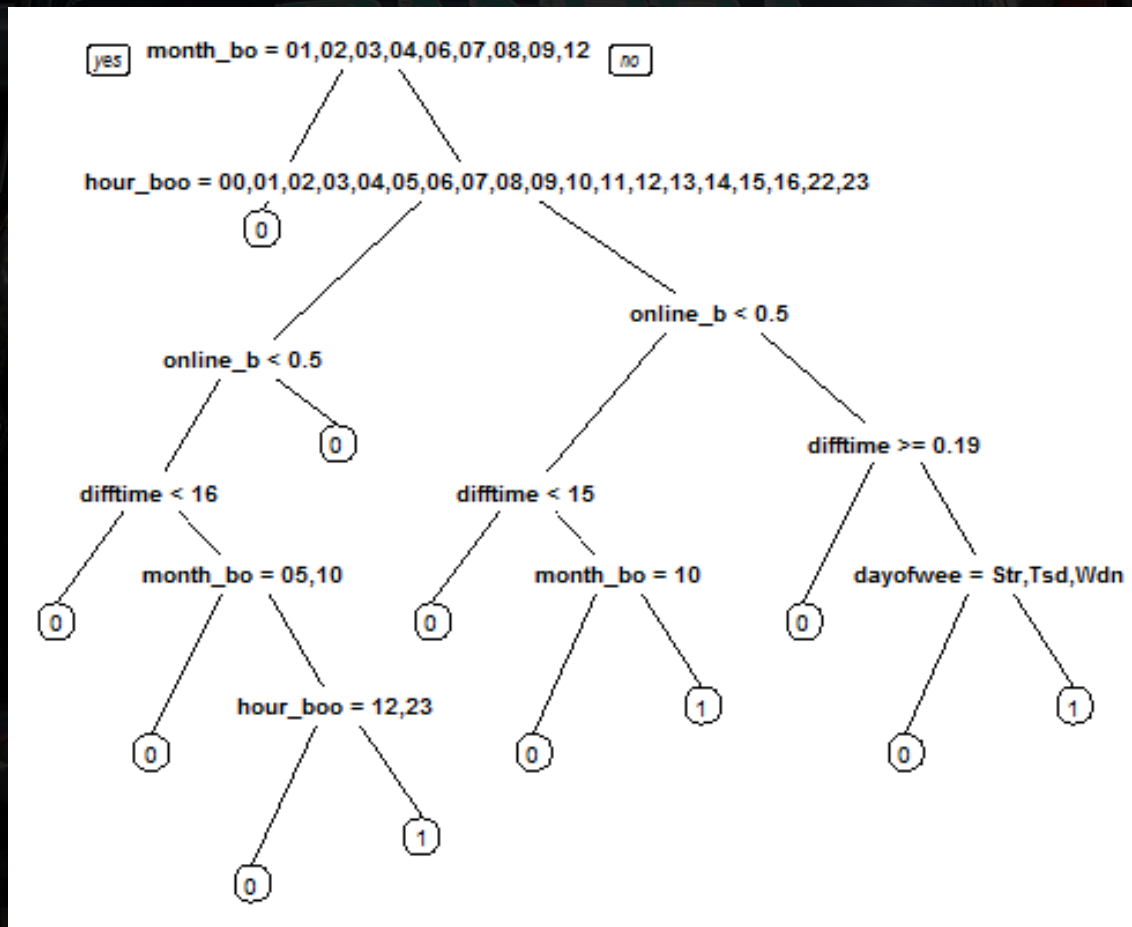
### 3. Modeling





# 3. Modeling

## Decision Tree for Car Cancellation Dataset



# 3. Modeling

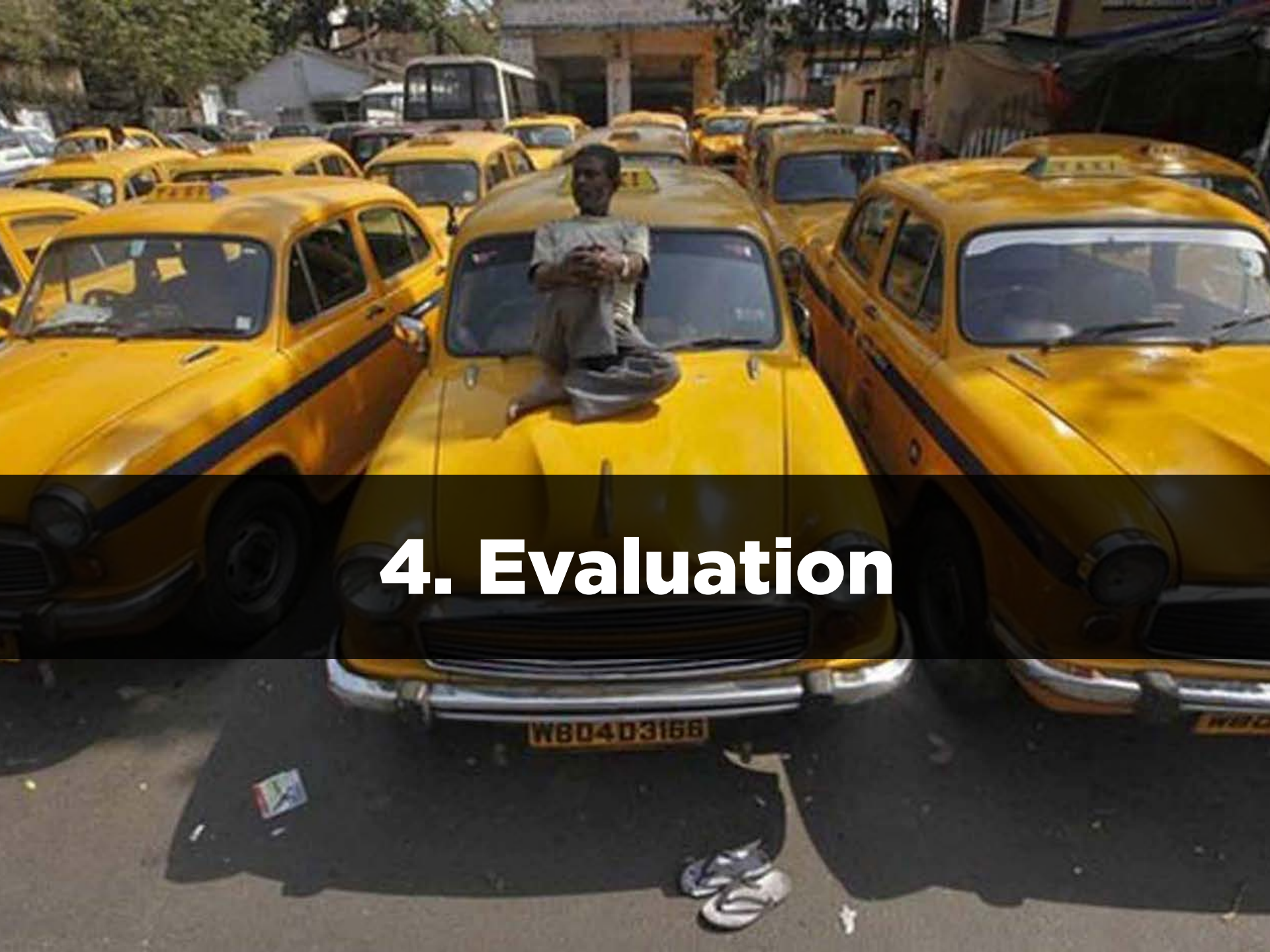
- Decision Tree for Car Cancellation Dataset

```
> print(training_dt_model)      # model results
n= 43431

node), split, n, loss, yval, (yprob)
      * denotes terminal node

  1) root 43431 3132 0 (0.92788561 0.07211439)
    2) month_booked_for=01,02,03,04,06,07,08,09,12 31150 1368 0
(0.95608347 0.04391653) *
      3) month_booked_for=05,10,11 12281 1764 0 (0.85636349 0.14363651)
        6)
hour_booked_for=00,01,02,03,04,05,06,07,08,09,10,11,12,13,14,15,16,22,23
9523 1085 0 (0.88606532 0.11393468)
          12) online_booking< 0.5 5674 442 0 (0.92210081 0.07789919)
            24) difftime< 15.85868 5446 350 0 (0.93573265 0.06426735) *
            25) difftime>=15.85868 228 92 0 (0.59649123 0.40350877)
```





## 4. Evaluation

# 4. Evaluation

- “Cost\_of\_error” – cost incurred if booking is misclassified
  - Un-cancelled booking, cost = 1
  - Cancelled booking, cost = function of the cancellation time relative to the trip start time

- Cost / Benefit Information:

	<i>Actual</i>		
<i>Predicted</i>		Cancel	No Cancel
	Cancel	8	-1
	No Cancel	0	0

- $p_R(x) > 0.1111$ 
  - Expected benefit calculation: we should target bookings as long as the estimated probability of cancellation is greater than 11%.



## 4. Evaluation

```
> table(test$dt_pred_class_error)
```

```
FALSE  TRUE  
7270   1416
```

- Accuracy =  $7270 / (1416 + 7270) = 83.70\%$
- Confusion Matrix:

	<i>Actual</i>		
<i>Predicted</i>		0	1
	False	6987	366
	True	1050	283

- Expected Profit =  $0.80 \cdot 8 + 0.04 \cdot (-1) = \$6.39$

A photograph of a busy street in India. In the foreground, a yellow taxi is driving towards the camera. Behind it, another yellow taxi is visible. To the left, a person is riding a bicycle. The background shows multi-story buildings with various signs, including 'ZEE TRADING CO.' and 'Citizen'. The text '5. Deployment' is overlaid on the bottom half of the image.

## 5. Deployment



# 5. Deployment

- Months: new traffic patterns needed?

## 5. Deployment

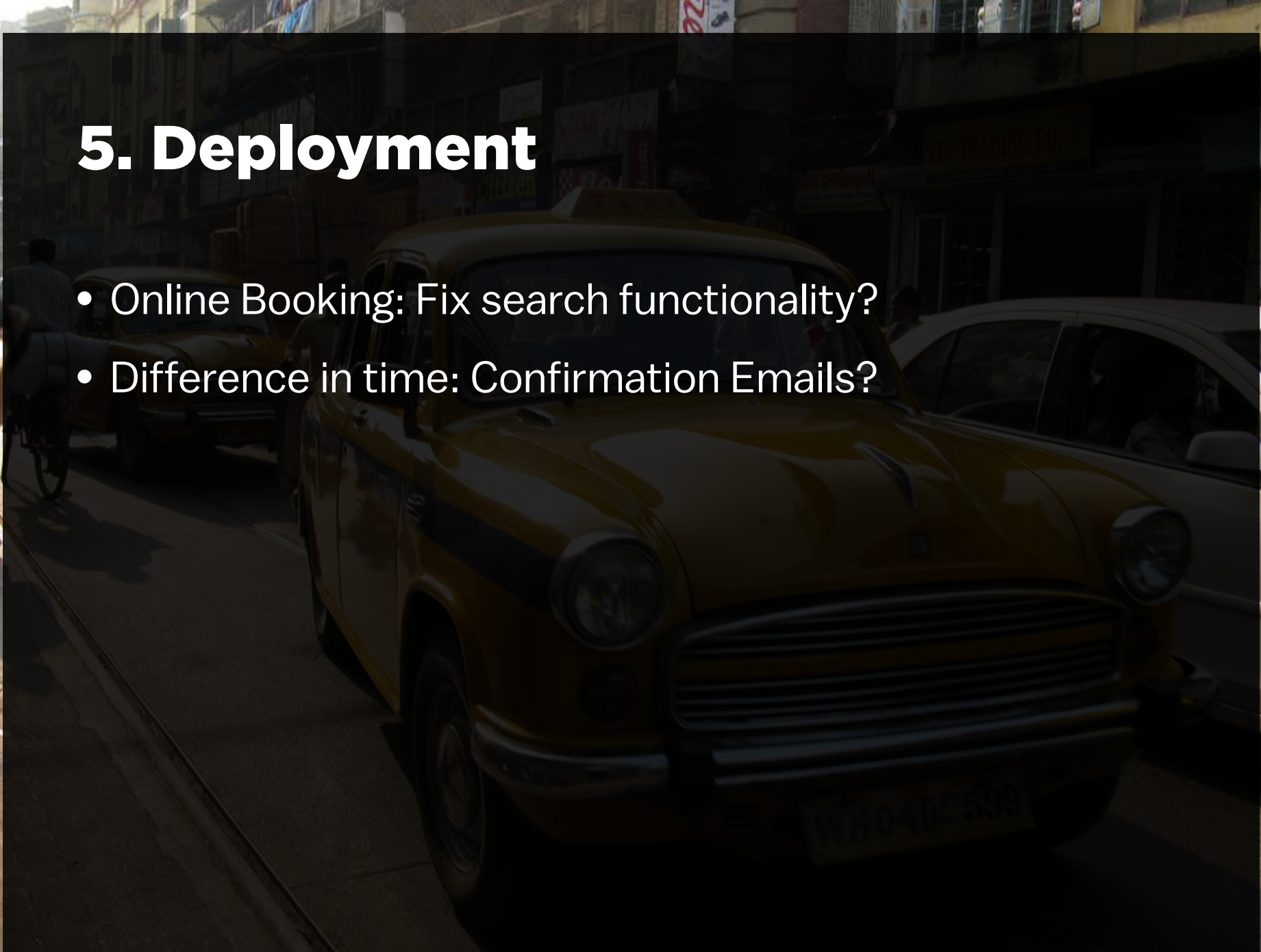
- Hours: Fare increase during peak times?





## 5. Deployment

- Online Booking: Fix search functionality?
- Difference in time: Confirmation Emails?



# 5. Deployment

- Problems:
  - Manipulating Customer does not address the entire problem
  - Privacy concerns
  - Supply side?

## ATTENTION

We have temporarily suspended our operations and will not be accepting any bookings until further notice.





**Questions?**