

# An Exploratory Analysis of **Human-centric Issues** **in Parking Solutions** Using Surveys and Mobile Parking App Reviews

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# What is the current parking situation?



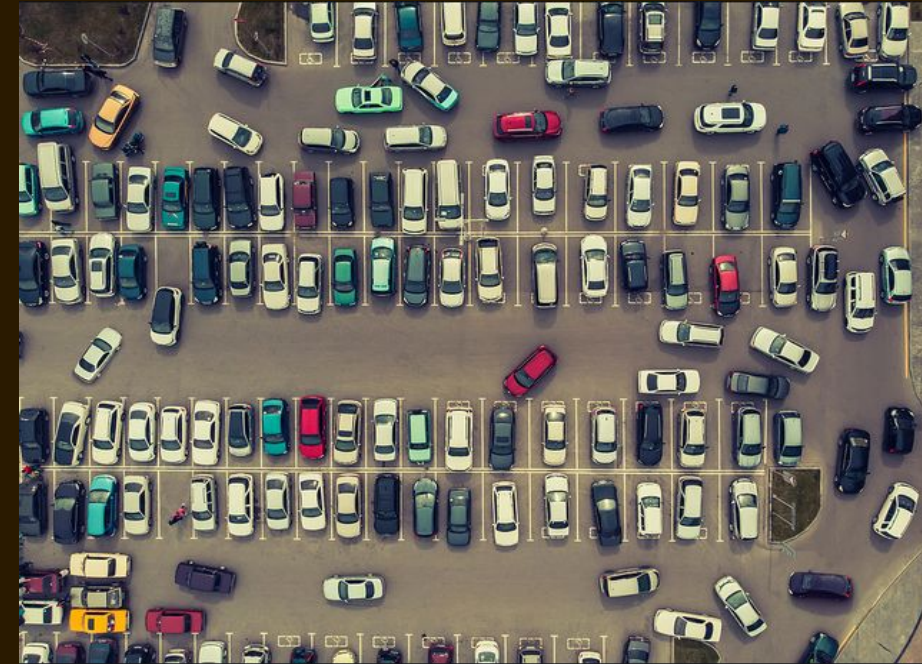
With the imbalance between the demand and supply of parking spaces, parking has become difficult



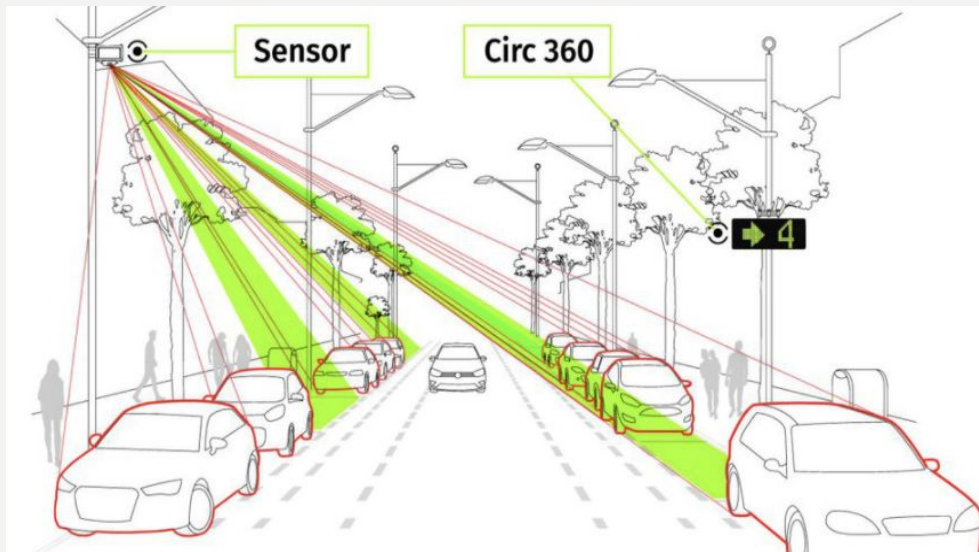
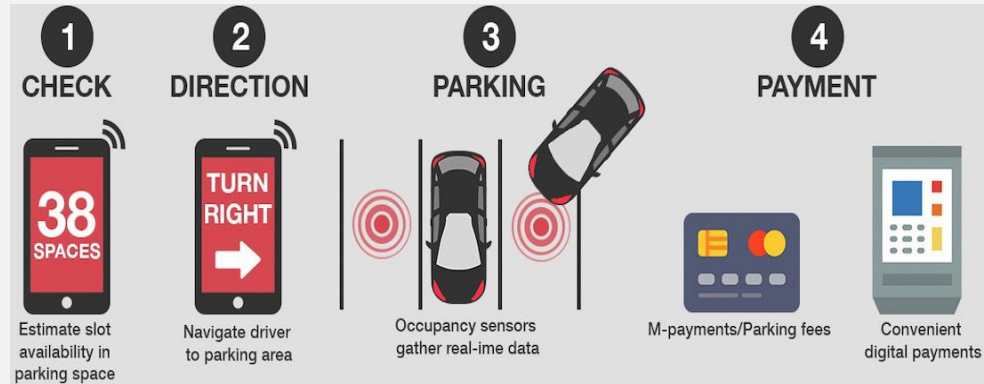
Time-consuming parking processes negatively impact traffic situations, air pollution, and energy waste.



Various parking solutions have been developed to alleviate parking difficulties



# What are the challenges facing current parking solutions?



(Examples of the current parking solution)



The impact of the different car users on the parking difficulty is unclear

Human-centric aspects include:



- 1) Parking experience of different car users
- 2) Human-centric and functional issues in current parking apps
- 3) The relationship between functional and human-centric issues in user reviews

# How to solve the problem?

## Approach I: Online Survey

Data Collection:  
189 survey responses

Data Analysis:  
Chi-square independence test  
multinomial logistic regression model

### Section 1 of 4

The study for exploring Human-centric  
Issues on Parking Preferences

### Section 2 of 4

Part A-Introduction to personal information  
(The questions of this part focus on your  
basic personal information)

### Section 3 of 4

Part B-Parking experiences (The questions  
of this part focus on your previous parking  
experiences. Please answer all the

### Section 4 of 4

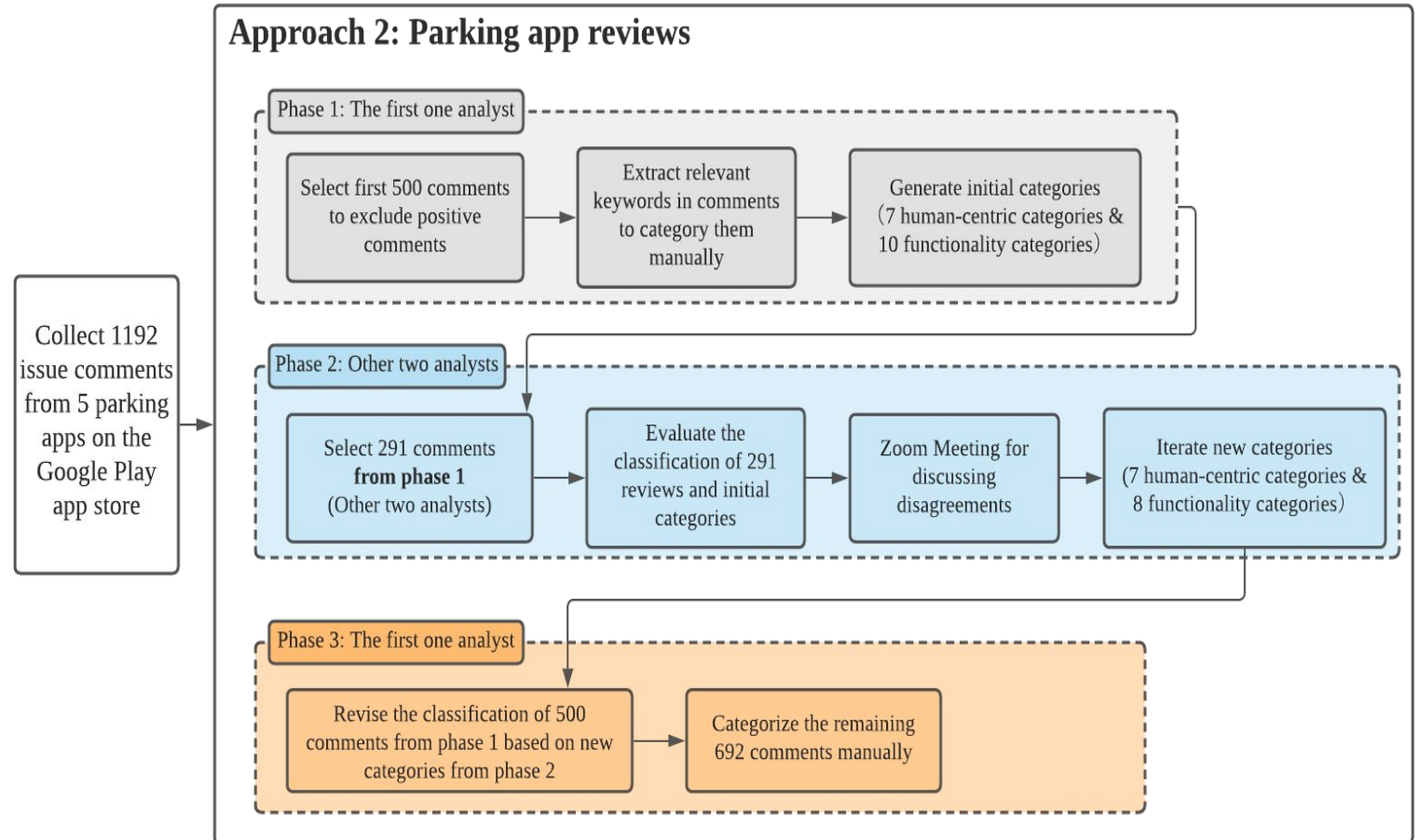
Part C-Parking recommendations (The  
questions of this part focus on your  
previous experiences of existing parking  
apps and your parking recommendations)

# How to solve the problem?

## Approach 2 Parking App Reviews Analysis

Data Collection:  
1,192 reviews of current  
parking apps on Google Play

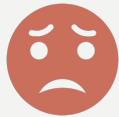
Data Analysis:  
Open coding method





# What did we find from the survey?

- **The relationship between human-centric aspect - Emotion and Overall Perception of Parking Difficulties**



Car users who found parking difficult had more negative emotions in the parking process

Annoyed ( $p = 0.005$ ), Exhausted ( $p = 0.039$ )



Car users who think parking is easy will have calm emotions when parking ( $p < 0.0001$ )

- **Various human-centric aspects affect Parking search time**

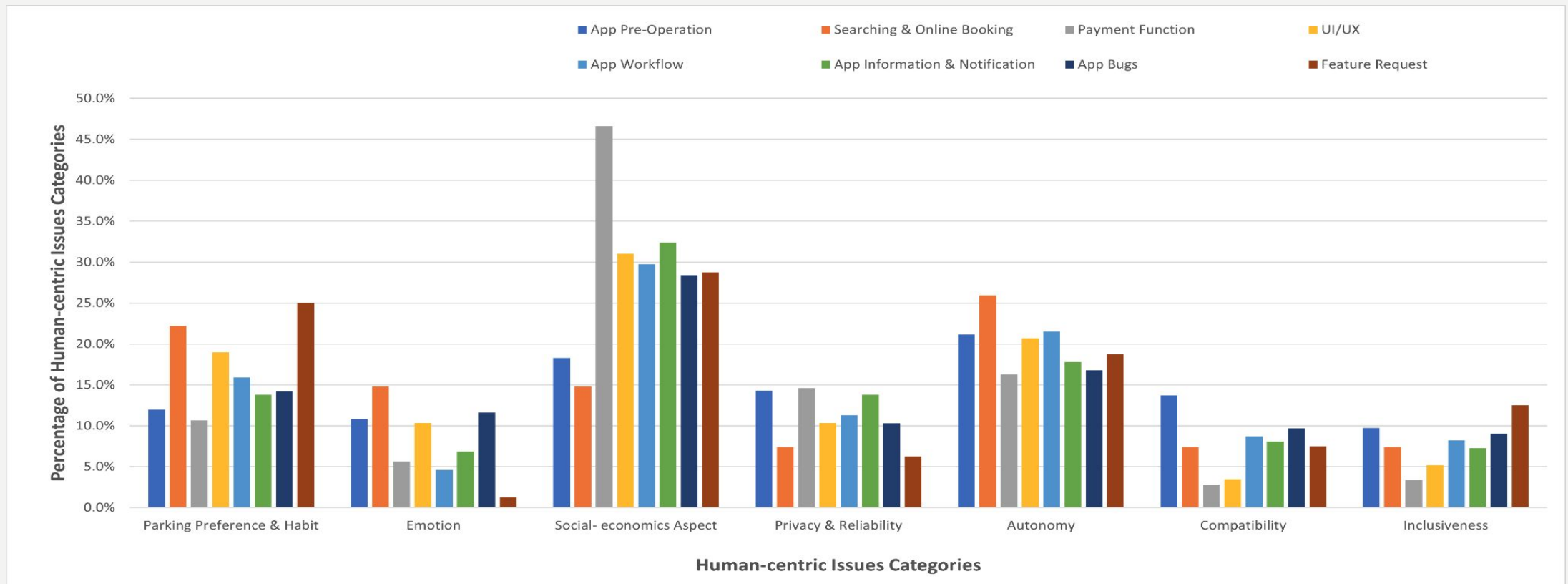


Gender, age, country, preferred parking space types, and the acceptable parking search time significantly affected people's search time when parking



# What did we find from parking app reviews?

- Seven human-centric issues categories and Eight functionality issue categories were explored
- Functional issues and human-centric issues are interrelated



# Conclusion

- People with different human-centric characteristics have different parking experiences and difficulties when parking
- Developers are not aware of the difference in parking difficulties, which may ignore the unique requirements of specific user groups
- Many human-centric and functional problems were discussed in user reviews, and the needs of diverse users were not completely satisfied in the current parking apps

## Future work

- Co-Design: get users involved in the process of small parking app development
- Collecting more parking app reviews from other app stores and platforms