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INFORMATION
TECHNOLOGY

A human-centric approach to building a smarter and better parking application

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GROUP OF EIGHT AUSTRALIA

HUMANISE

Outline

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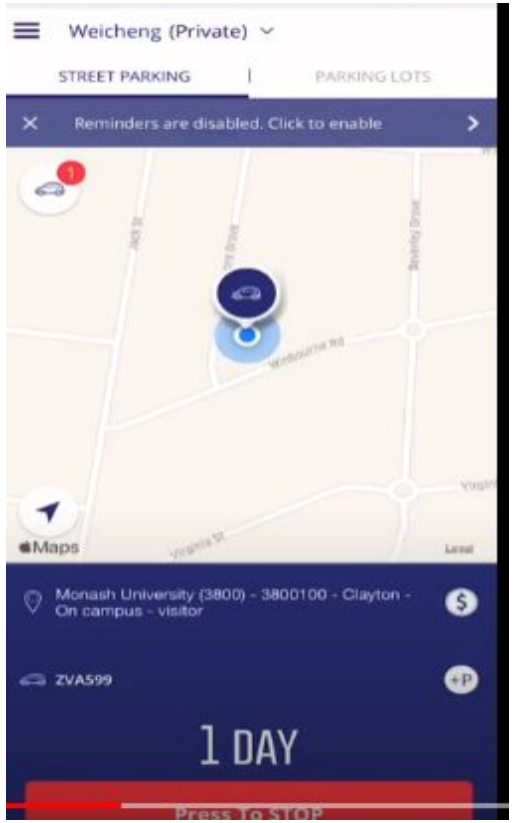
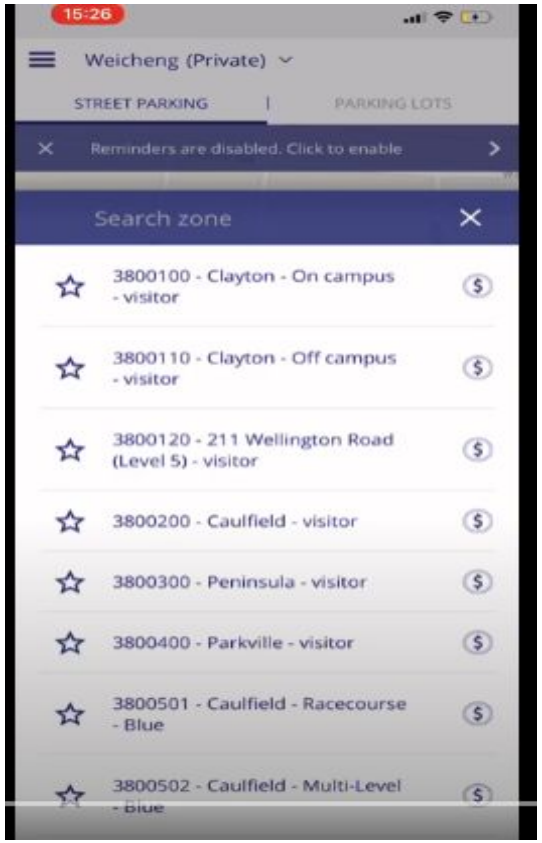
- Motivation
- Approach
- Personas
- User Stories
- Prototype
- Evaluation
- Key lessons learned
- Summary

Motivation

- Smart cities need to support very wide range of users
- Users have great diversity – personality, gender, age, mobility, physical challenges, language proficiency, socio-economic status, culture, emotionns, …
- Many apps targeted to smart city applications don't well-support this diversity
- Example – app we use for parking @ Monash University…





Research Questions

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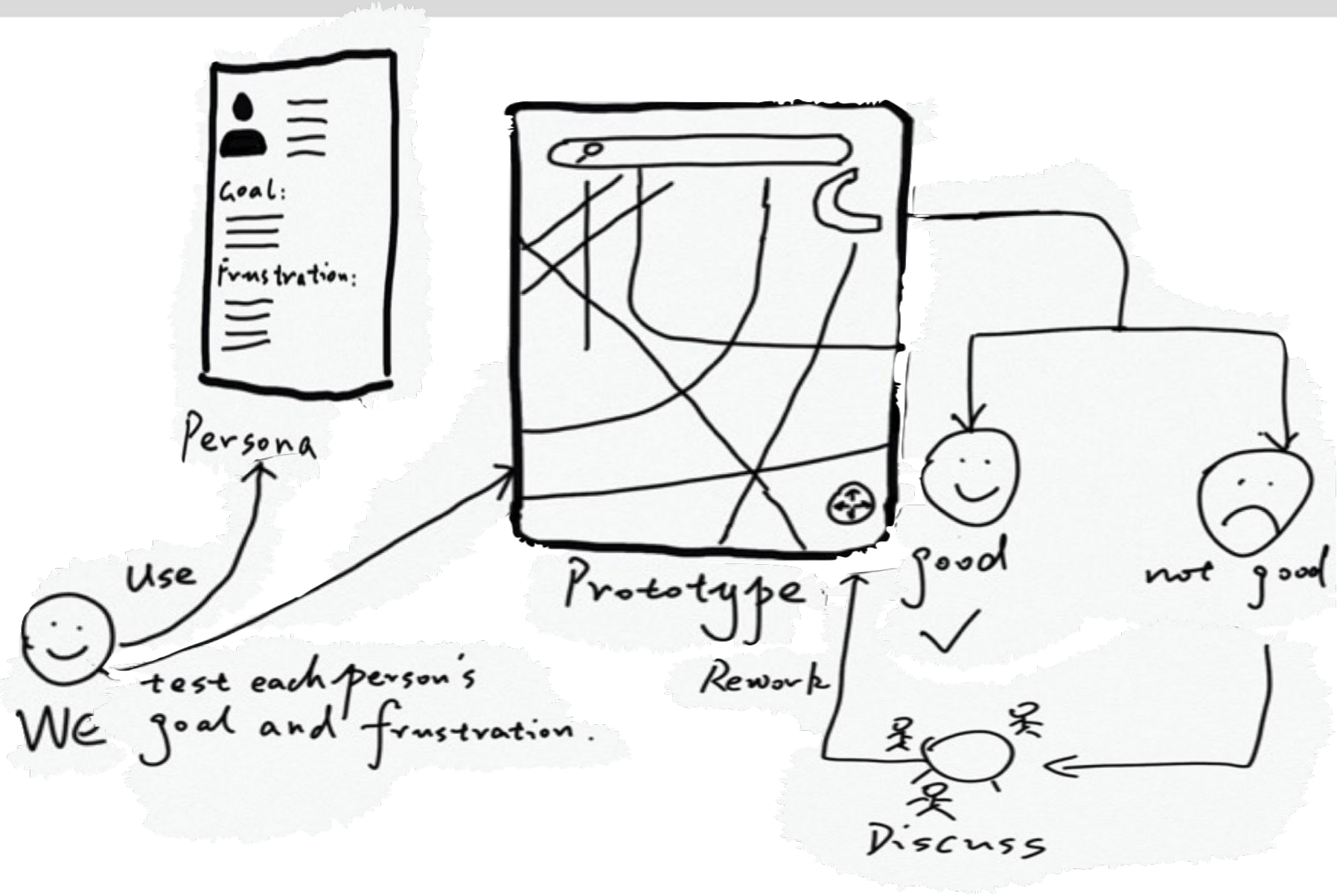
- RQ1 - What are the main human centric frustrations regarding current smart parking applications?
- RQ2 - How can a human centric smart parking application help make the parking process a seamless and less stressful experience?
- RQ3 - What is the influence of a human centric design of a smart parking app on the experience of its diverse end users?

Approach


Goal:
Frustration:
Persona
Use
Prototype
Good
not good
test each person's
WE goal and frustration.
Rework
Discuss

Personas

- Developed five to represent range of parking end users
- Different
  - Age
  - Gender
  - With/without children
  - Working/retired/not working
  - Non-English language
  - Dyslexic
  - Colour blind
  - Mobility challenge
  - …

Example

Name: Elizabeth Craw

Age: 68

Occupation: Retired

Family: Married, 2 kids, 1 granddaughter

Location: Clayton

Demographics

Context

Elizabeth recently retired from working as a counter attendant at Coles in Caulfield. Her two sons live in Melbourne city and she loves to go and visit them every weekend to spend some time with them and her grandchild. She loves travelling to other countries but has been unable to in in the past two years as her husband has fallen sick and she has been taking care of him.

Particular challenges

Elizabeth suffers from protanopia (colour-blindness red weakness) and now from a bit of vision impairment but that has not discouraged her from learning to drive since she was young. She loves to be able to move around the city and thus being able to drive was very important for her as she also needs to bring her husband to doctor visits every now and then. However, it has always been a struggle for her to find a parking when she goes to the city especially during busy hours.

Limitations of tech

With the rise in technology use in the past decade, her sons have gifted her a smartphone on her 65th birthday. She is a quick learner and has found out how useful a smartphone can be for her. She has tried multiple applications to help her drive around and find a parking spot when needed but none of them had all the functionalities and the support for vision impaired / colour-blind people as she wanted. She once even got fined when using one of those parking applications even though she did nothing wrong, as she misinterpreted a '0' for an 'O' in the parking application when registering her vehicle's plate number for parking.

Goals:

- Wants to visit her children and grandkid every weekend
- Being able to find a parking spot easily even during peak hours
- Be able to bring her husband to the hospital every week
- Be able to use her phone and parking applications despite her vision issues
- Be able to reserve and pay for a parking spot on her phone before reaching her destination.

Goals	Frustrations
Wants to visit her children and grandkid every weekend	She does not like applications that are too complicated to use on the application
Being able to find a parking spot easily even during peak hours	Needs the application to have a color-blind mode
Be able to bring her husband to the hospital every week	Font size too small for her to be able to read
Be able to use her phone and parking applications despite her vision issues	Scared of getting fined for misunderstanding / misinterpreting something
Be able to reserve and pay for a parking spot on her phone before reaching her destination.	Not being able to find a car park in the city when visiting her children

User Stories for each persona

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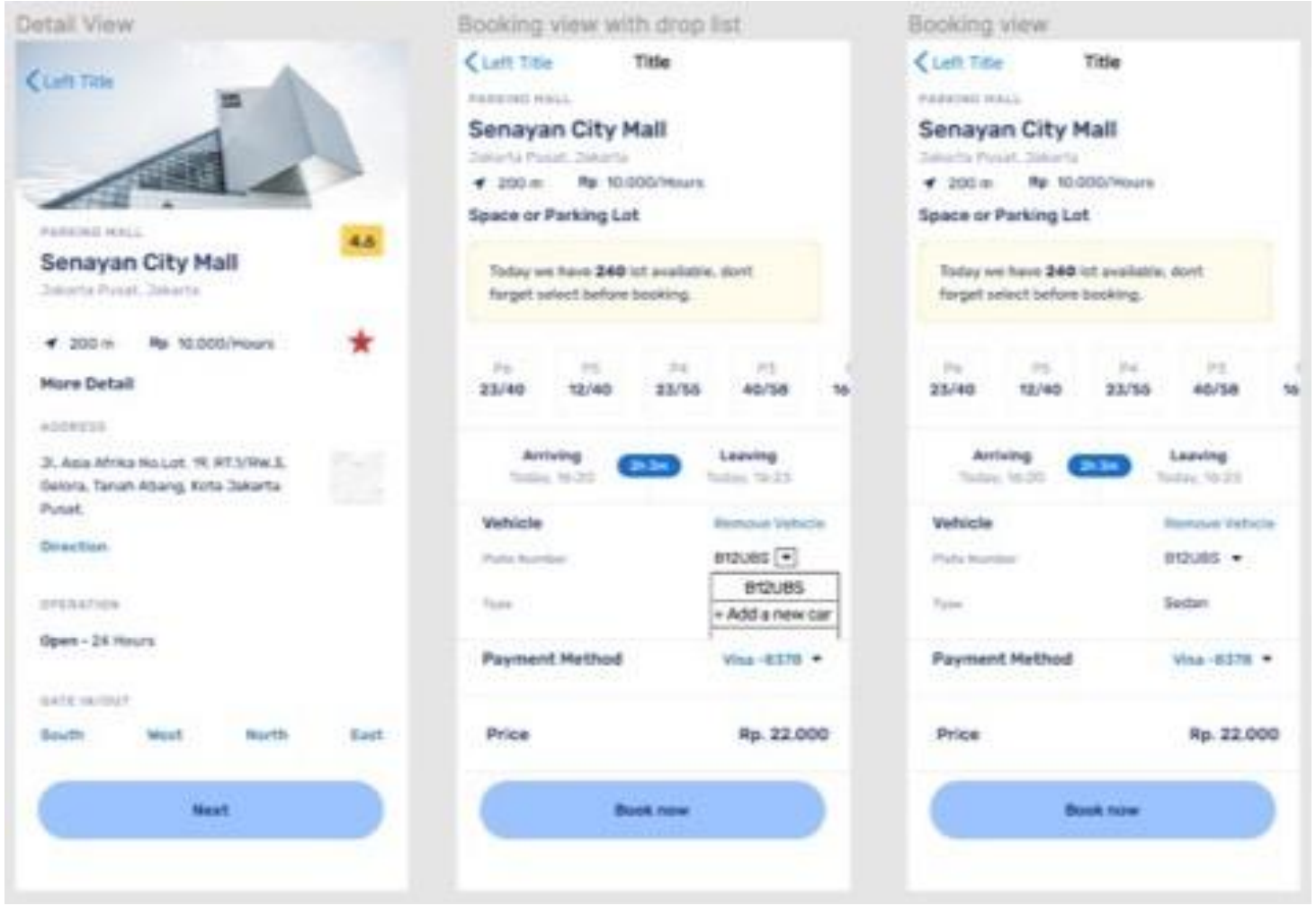
- Built a set of user stories for each
- Some very similar, some quite different
- Some achieve same goal but in different ways
- Examples:
  - As a food deliverer, I want to be able to easily switch vehicles so that I can use multiple vehicles to do my delivery.
  - As a non-technical background person, I want to have straightforward and user-friendly UI design so that I do not have to spend time on learning new technology.
  - As a user of the application I want to be able to see multiple parking options near my destination and be able to book them so that I can find a car park easily when going to my destination.

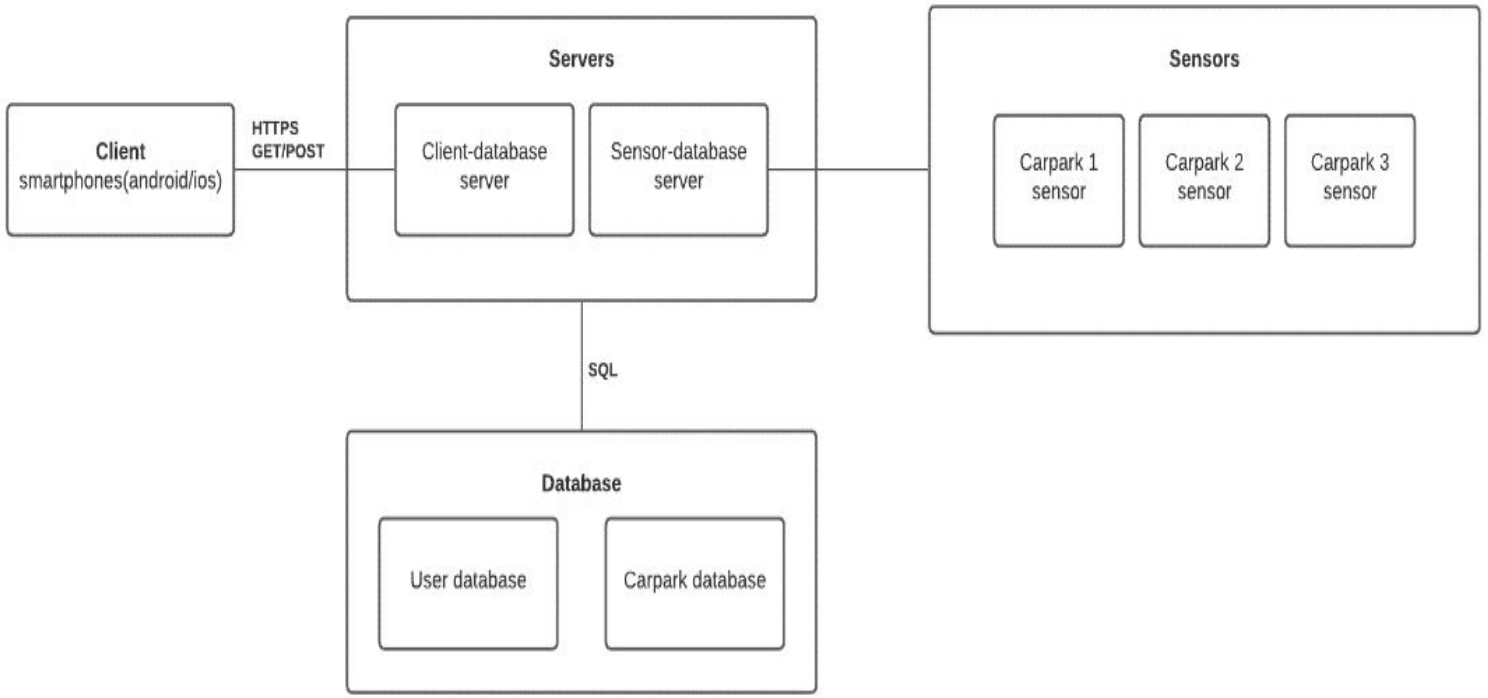
Figma Designs

- Using personas and user stories, worked up set of Figma designs
- Tried out designs with cognitive walkthroughs
- Refined designs
- Ensure all user stories met, all (most) persona frustrations met

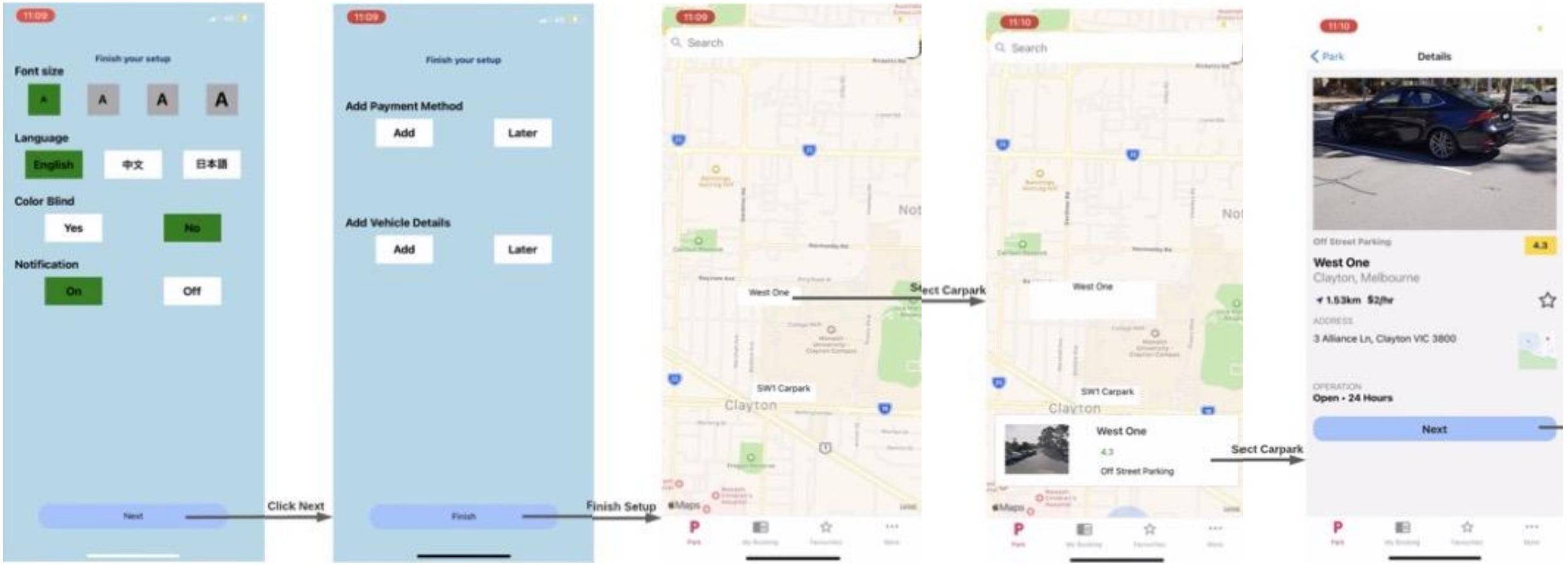


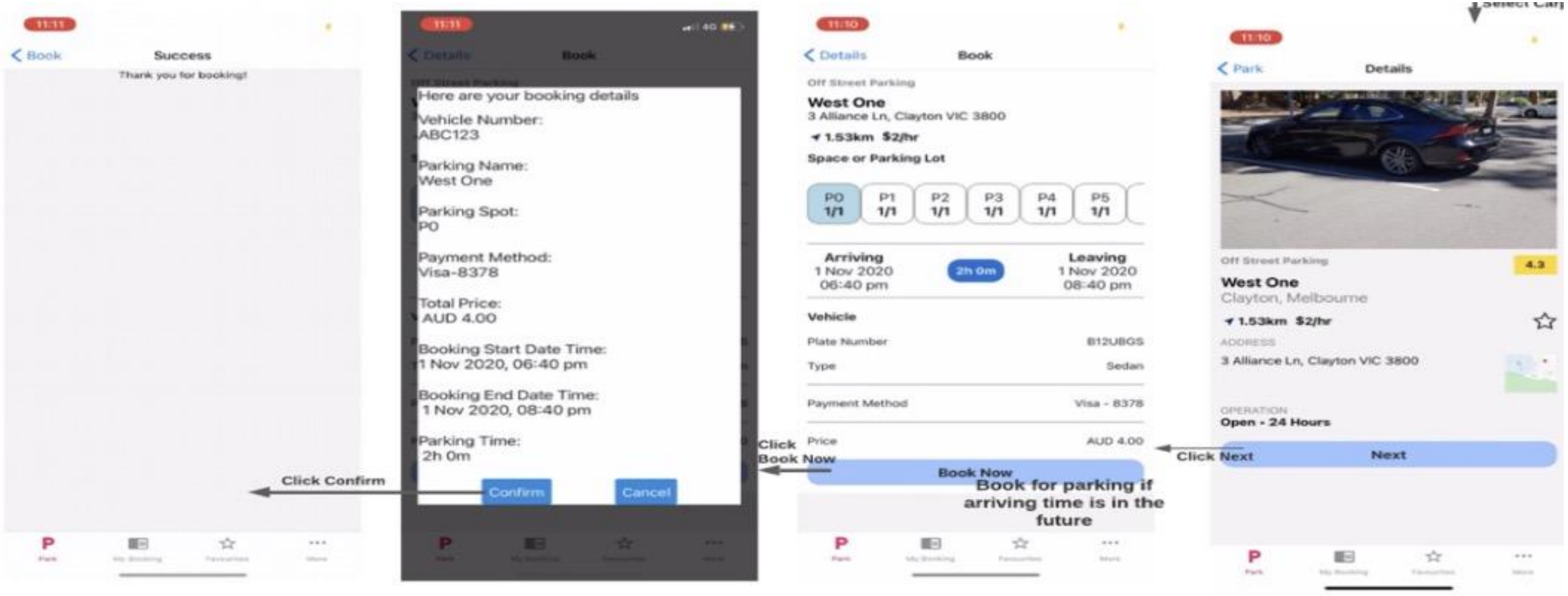
Prototype

- Client app
- Server
- User & carpark databases
- Car park sensors
- Implemented client app based on Figma designs
- Wanted to connect to real council carpark DB but COVID-19 issues prevented
- Ditto wanted to support park sensors on related smart city project

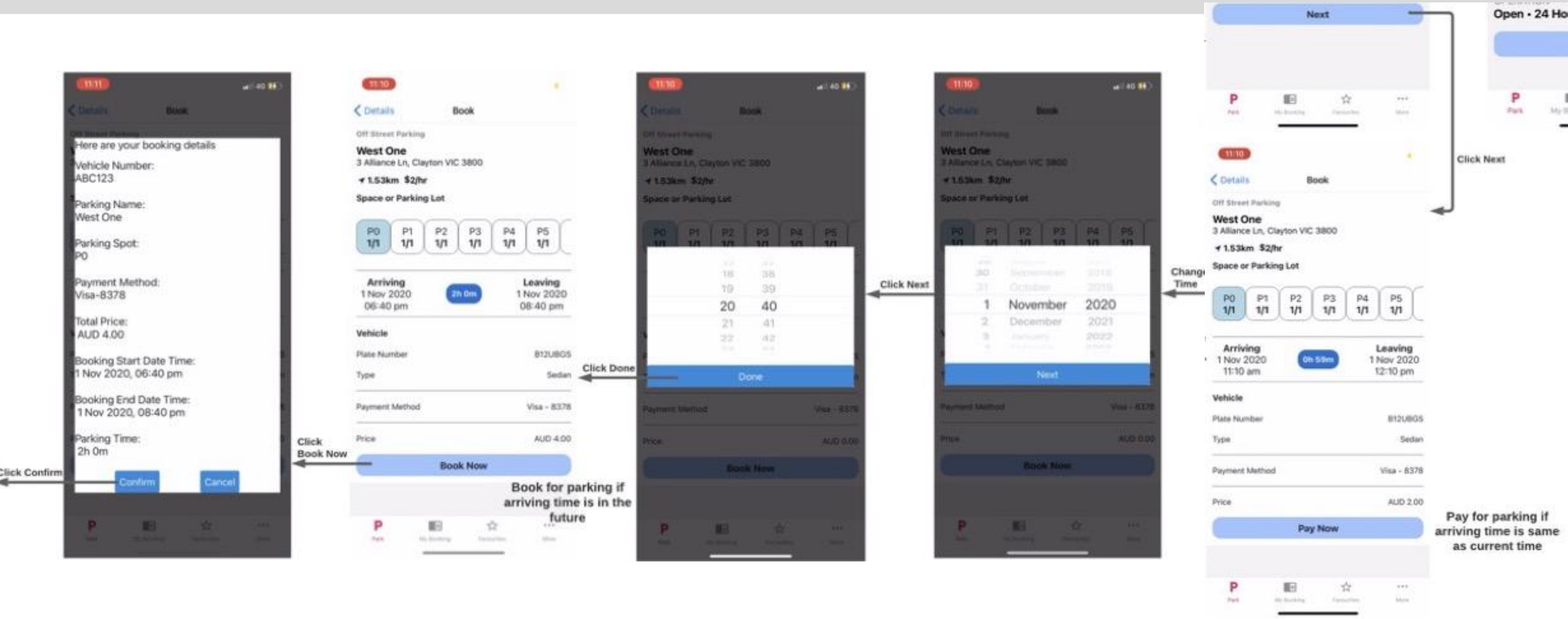


Usage Example 1

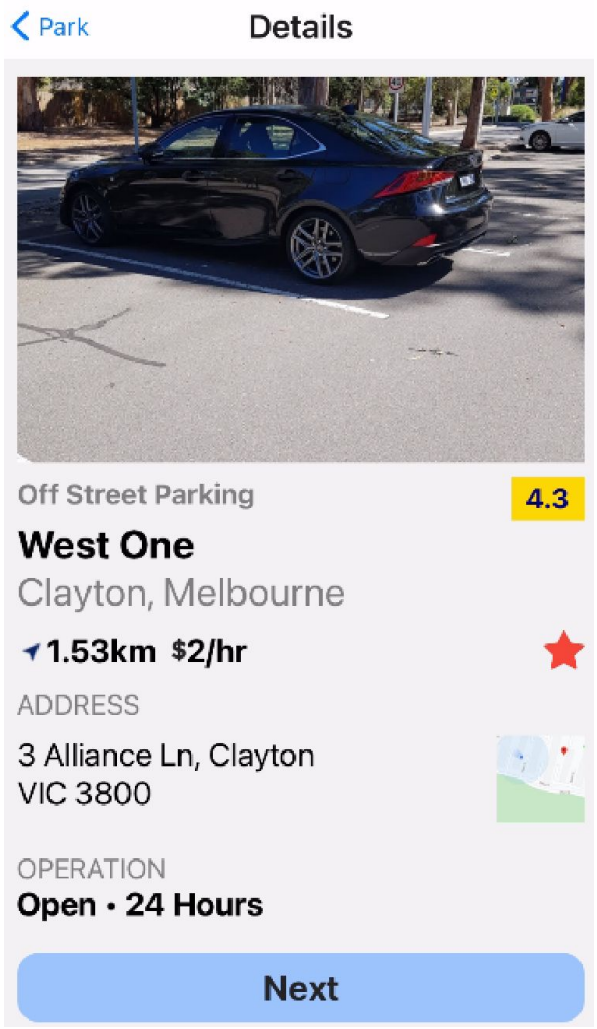


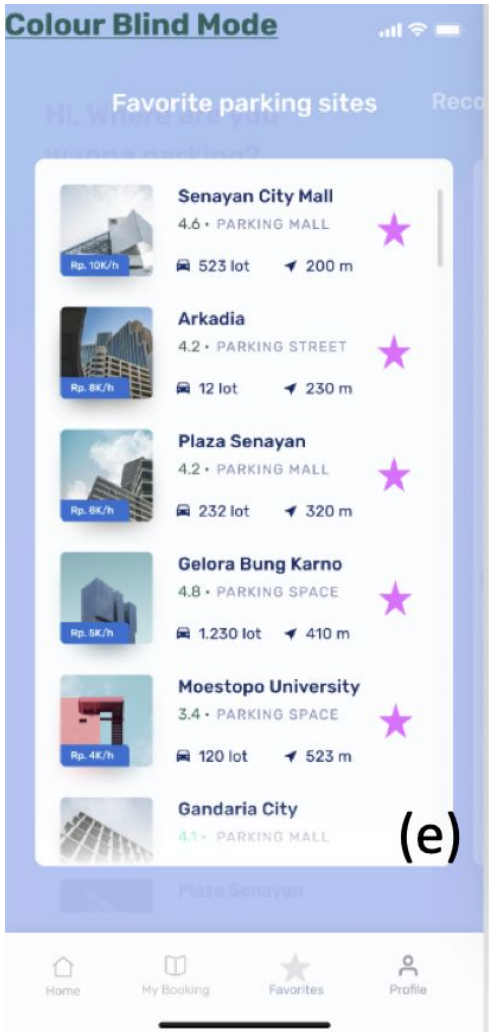

Book
Success
Thank you for booking!
Click Confirm
Details
Book
Here are your booking details
Vehicle Number:
ABC123
Parking Name:
West One
Parking Spot:
P0
Payment Method:
Visa-8378
Total Price:
AUD 4.00
Booking Start Date Time:
1 Nov 2020, 06:40 pm
Booking End Date Time:
1 Nov 2020, 08:40 pm
Parking Time:
2h 0m
Confirm
Cancel
Click Book Now
Details
Book
Off Street Parking
West One
3 Alliance Ln, Clayton VIC 3800
1.53km $2/hr
Space or Parking Lot
P0 1/1
P1 1/1
P2 1/1
P3 1/1
P4 1/1
P5 1/1
Arriving
1 Nov 2020
06:40 pm
2h 0m
Leaving
1 Nov 2020
08:40 pm
Vehicle
Plate Number
B12UBGS
Type
Sedan
Payment Method
Visa - 8378
Price
AUD 4.00
Book Now
Book for parking if arriving time is in the future
Click Next
Park
Details
Off Street Parking
4.3
West One
Clayton, Melbourne
1.53km $2/hr
ADDRESS
3 Alliance Ln, Clayton VIC 3800
OPERATION
Open - 24 Hours
Next

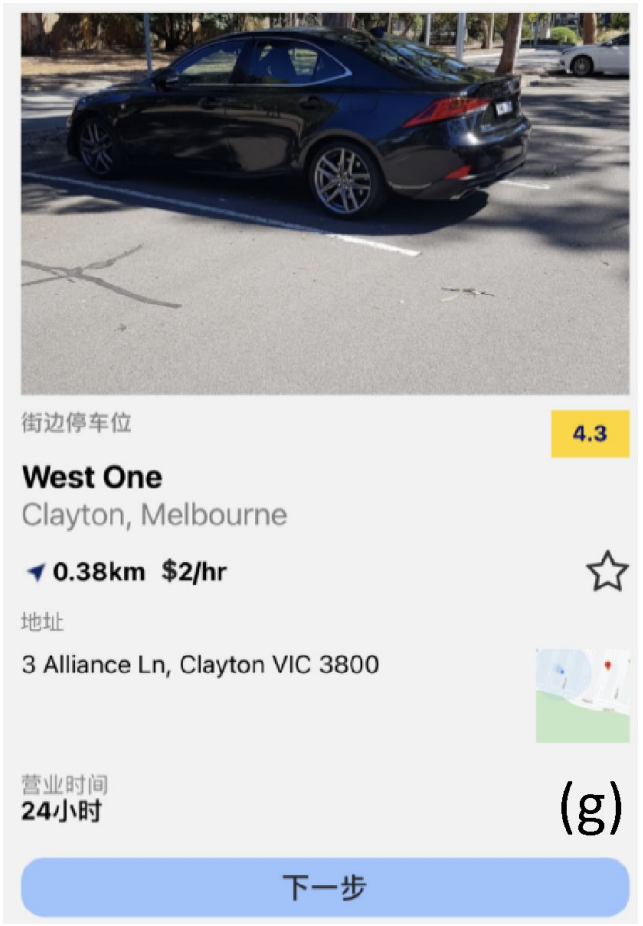
Usage Example 2



Various supports for diverse end users…







Evaluation

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- Due to COVID-19 couldn't easily access representatives of each persona
- Cognitive walkthrough of app with each persona
- Tried out each user story, checked each frustration and goal
- Most user stories able to be met (vs example app) and most frustrations reduced
- Some key issues found:
  - No guaranteed carpark (reservation) in current prototype (requires some way to book actual parks)
  - Not all first languages supported in multi-lingual support
  - Disabled parking spaces not identified (need to be in carparking database)
  - Payment history review needed
  - User guide/tutorial needed
  - Search function needs improvement
  - Needs better feedback support (see our Human-centric defect reporting paper… ☺)

Key Lessons

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- Need diverse range of users during requirements gathering for smart city apps
- Need support for performing same tasks in multiple ways
- Accessibility needs to be designed in from the start
- Some tasks need very different approach for different user groups
- App reviews help build personas, user stories

Summary

- Smart city / smart living applications need to support very diverse range of users
- Many of these users have needs very different from each other
- Need to build understanding of range of goals, frustrations, different user stories required to support
- Need to be able to support same tasks in very different ways in same app

Happy parking!!!!