Faculty of Computing

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SECJ3553 Artificial Intelligence

Section 07

Progress 1: Design Thinking Oriented Proposal

Project Theme:

Smart City - Traffic & Parking Advisor Application (Parkora.ai)

Team: TriSpark Tech

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1.0   Introduction

As cities continue to grow and the number of private vehicles increases, traffic congestion and parking difficulties have become critical issues in the development of smart cities. In Malaysia, especially, drivers frequently waste time circling busy areas such as universities, shopping malls, and commercial districts just to find a parking space. Research indicates that up to 30% of urban traffic is caused by vehicles searching for parking, resulting in fuel wastage, air pollution, and unnecessary stress among road users. Although navigation and parking applications are available today, many still provide limited or static information, lacking accurate, real-time updates on parking space availability and traffic conditions. As a result, drivers rely on guesswork, which leads to further congestion and inefficiencies in city mobility.

This issue affects everyday drivers, students, visitors, delivery workers, parking operators and even local councils who must address increasing road congestion near popular hotspots. To tackle this problem, TriSpark Tech proposes Parkora.ai, an AI-powered Traffic & Parking Advisor designed to simplify navigation and optimise parking decisions through real-time intelligence. The name "Parkora" blends the words "Parking" and "Aurora," symbolising a guiding light that helps users effortlessly locate the best parking spot, while ".ai" emphasises the integration of artificial intelligence in the system. Parkora.ai applies AI components, including knowledge representation for mapping urban routes and parking areas, state space search algorithms such as Dijkstra or A* to compute the most efficient path, and predictive models to estimate parking availability at different times.

With these capabilities, Parkora.ai aims to reduce traffic congestion caused by parking searches, minimise fuel consumption and emissions, and improve user convenience by making their journey faster and more efficient. Ultimately, this solution supports the advancement of smart city initiatives in Malaysia by encouraging sustainable mobility and better urban traffic planning. Parkora.ai positions itself as a modern and intelligent platform that contributes to a smoother, cleaner and smarter driving experience for everyone.

2.0   AI Solution

We propose Parkora.ai, which is an application that uses artificial intelligence to provide real-time guidance on both available parking spaces and dynamic traffic conditions. The system receives and processes data from IoT-enabled parking sensors and APIs such as Google Maps to analyse city traffic flow and parking availability. By integrating Google Maps data, Parkora.ai can access live traffic updates, nearby parking locations and travel time information. This integration enables the AI model to make accurate, data-driven decisions for route and parking optimisation.

AI components applied in Parkora.ai include:

- **Knowledge Representation**
  Maps, parking lots and traffic networks are modelled as structured data to allow the system to understand the urban layouts.

- **Search Algorithm (Dijkstra's / A*)**
  These algorithms are dynamically employed to calculate the fastest and most efficient routes to available parking spaces based on live data.

- **Predictive Analysis (Machine Learning)**
  Utilising historical and real-time trends, the machine learning models predict parking availability at specific times or areas based on historical and live data trends.

- **Smart Notification**
  Users can receive alerts about nearby available parking spots and immediate traffic updates to make efficient driving decisions.

Thus, Parkora.ai acts as an intelligent and real-time navigator that helps drivers locate available parking spaces and avoid congested routes. Furthermore, it can enhance overall travel efficiency by providing predictive insights, minimising travel time and reducing fuel consumption through optimised route planning.

3.0   Goal of AI Solution

- To assist users in finding nearby available parking efficiently.
- To reduce traffic congestion caused by drivers circling or cruising for parking spaces.
- To minimise time, stress and fuel consumption through real-time AI guidance.
- To promote sustainable mobility in Malaysia's smart city development.
- To improve overall driving experiences through intelligent navigation and prediction systems.
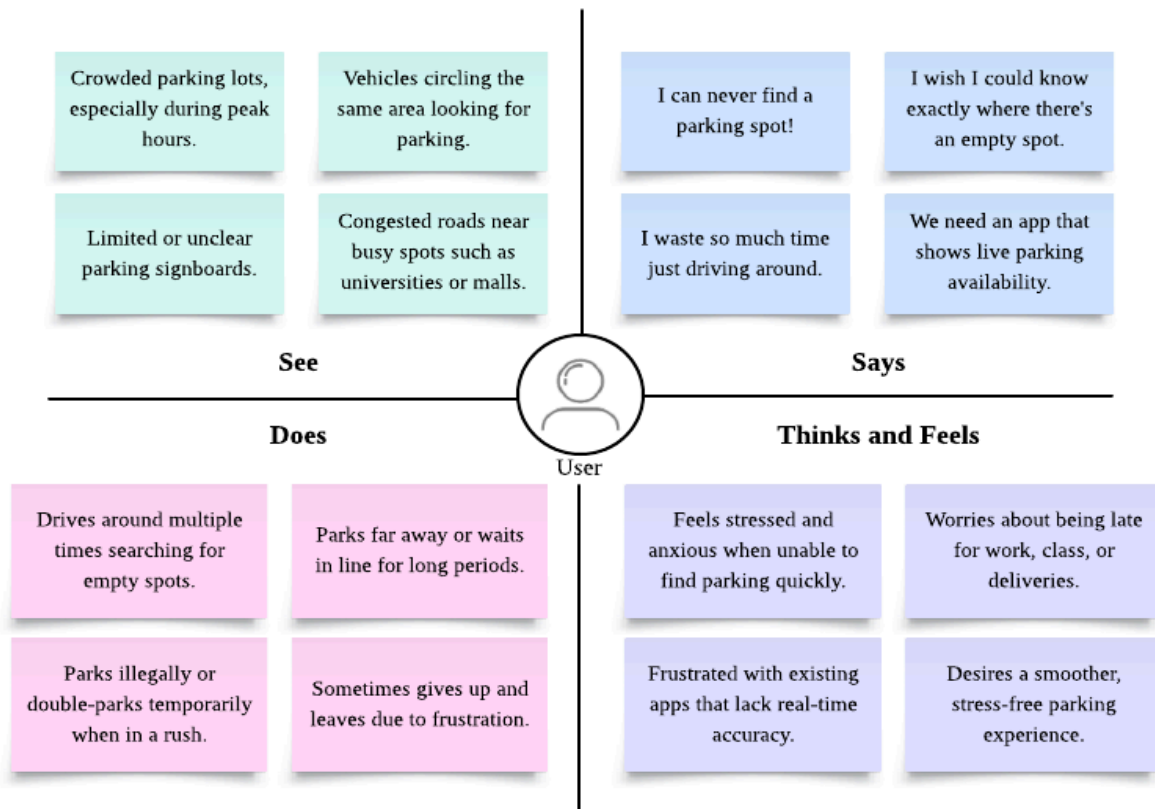
4.0 Process of Empathise in Design Thinking

See	Says
Crowded parking lots, especially during peak hours.	I can never find a parking spot!
Vehicles circling the same area looking for parking.	I wish I could know exactly where there's an empty spot.
Limited or unclear parking signboards.	I waste so much time just driving around.
Congested roads near busy spots such as universities or malls.	We need an app that shows live parking availability.

User

Does	Thinks and Feels
Drives around multiple times searching for empty spots.	Feels stressed and anxious when unable to find parking quickly.
Parks far away or waits in line for long periods.	Worries about being late for work, class, or deliveries.
Parks illegally or double-parks temporarily when in a rush.	Frustrated with existing apps that lack real-time accuracy.
Sometimes gives up and leaves due to frustration.	Desires a smoother, stress-free parking experience.

Figure 4.0: Empathy Map for Parkora.ai Target Users

5.0   Process of Define in Design Thinking

Table 5.0: Define Stage – User, Need and Insight Analysis

User	Need	Insight
A visitor who frequently travels to crowded areas such as shopping malls or commercial areas.	To know the best route to available parking before arriving at the destination.	The user wants a stress-free experience by having an intelligent app that combines navigation and parking predictions to avoid last-minute frustration.
A daily commuter who drives to work in urban areas.	To find an available parking space quickly without wasting time circling crowded streets.	The user feels anxious about punctuality and appreciates an AI system that can predict available parking spots and suggest the most time-efficient route.
A delivery driver who needs short-term parking for quick stops.	To locate temporary or nearby parking spots in real time to complete deliveries or pick-ups efficiently.	The user appreciates convenience and time accuracy; having live parking data would reduce delays and meet their job demands effectively.
A student or lecturer who regularly drives to campus where parking is limited.	To know real-time parking availability around the campus to avoid circling and being late for class.	The user desires a reliable and live-updating system that helps them plan and park without stress, especially during school peak hours.