Sherpa™

Your Reliable Parking Partner™

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Executive Summary

Sherpa™ uses Autonomous Mobile Robots (AMRs) equipped with Tesla's proven self-driving AI to upgrade the traditional valet experience. Sherpa™ AMRs pick up a patron's car from a venue and transport the car to a predetermined parking location – or can even circle in a loop on a public roadway if a parking space is not available. With the Sherpa Ticketless Valet™ app, patrons can check in their car, lock it, continuously verify the location of their car via GPS, call for their car to be delivered by an AMR when they are ready to leave, and process valet payment - all of which greatly increase the customer experience and reduce required valet staffing, thus saving the venue money for staffing and driving repeat business due to increased customer satisfaction. Sherpa™ allows more cars to be processed faster than a typical valet team – and only requires about half of the typical number of valets.

Background

Parking management in dense urban environments presents a host of unique challenges. Traditional valet-based parking management begins with an establishment's valet taking possession of a car and its keys. The valet then drives the car to a parking spot contracted with the establishment, either rented or owned, which is often not co-located with the establishment. The valet then travels by foot back to the establishment with the gar keys. Once the valet has returned to the establishment, the valet can repeat the process for another car. When the time comes for the customer to leave the establishment, the customer informs the valet, the valet retrieves the keys, travels by foot back to the car, and then drives the car back to the establishment where he turns over the keys and the car to the customer.

This system leaves much to be desired both in terms of customer service as well as establishment profitability. First of all, the valet takes actual possession of the car keys/key fob and actually drives the car. However, many customers don't like other people driving their cars. Also, many newer cars do not require keys – such as Tesla[1], Lincoln, and Volvo[2] to name a few – which means that the drivers often forget that they need to bring keys so that the valet can do their job. Additionally, the valet may lose or damage the car key/fob while it is in their possession – and the valets have to keep track of which car keys go to which customer, often using a large key board and a system of paper tickets.

Also, with regard to staffing, it takes time for the valet to drive the car, park it, and then walk back – and the venue has to be sure to staff enough valets so that customers can park promptly and then leave promptly without waiting too long. Unfortunately, the nature of many

[1] https://www.cnbc.com/2019/11/09/the-demise-of-the-car-key-tesla-lincoln-ditch-keys-for-mobile-entry.html
[2] https://www.volvocars.com/intl/media/press-releases/1D7BC4EB0F68336A/

establishments is the customer traffic is "bunchy" where spikes of customers may want to leave at the same time – which means that the valet staffing needs to be great enough to accommodate peak traffic reasonably, which in turn leads to valets sitting around during lower traffic, and increased valet expense due to more valets. Although valet costs can vary widely per market, an estimated cost of $30/valet/hour is reasonable. For a restaurant with lunch and dinner service open average hours of 12 hours/day over a 7 day week, one month (30 days) of a single valet costs $10,800. For a typically-required minimal team of two that is $21,600/month – and many locations require teams of 4 to process customers in and out efficiently. This is obviously a major expense for the venue.

For the customer experience, an average mid/large size restaurant includes about 40 tables, with about a 1-hour turnover time. It is very common for at least 10% (4 tables – sometimes 20%) to turn over at the same time – at which point valets must service BOTH the departing customers and arriving customers (8 customers). Valets often try to achieve economies such as taking the car for an arriving customer and driving it to the parting site while also bringing along the keys for a departing customer so that they can drive that customer's car back to save walking time. However, this leaves the venue with the difficult choice as to how much to invest in the valet service to keep the customer experience good to drive repeat customers. Customers that have to wait for a slow valet often don't come back.

Further, the venue has to own or rent the spots for the cars to be parked. Unfortunately, in a dense urban environment, renting a single parking space with street access often exceeds $5,000/year for secondary markets like Chicago and can exceed $50,000/year for expensive markets such as New York or London. Of course, the more distant the parking facility from the venue, typically lower the price –but then the greater valet travel time and thus greater valet costs

due to having to increase the number of valets. Also, the number of spots must be chosen to reflect peak demand – or else the valet will not be able to accept the car. For an average mid/large size restaurant including about 40 tables, that typically means about 50 spots are required. At $5,000/year/spot, that is $250,000/year or about $20,000/month. Again, this is obviously a major expense for the venue.

As a venue-owner, imagine the impact on your bottom line if you could cut your cut your valet expense from $20,000/month to $10,000/month! Imagine if you could do the same with your parking lot expenses. Think about how your P&L would look with an additional $20,000/month. Now let Sherpa™ carry you there!

Sherpa™ – Your Reliable Parking Partner™

Proprietary Sherpa™ technology allows venues to park more cars – faster – and with fewer parking spots and fewer valets – while increasing the customer experience by allowing customers to secure their cars and minimize their wait time for their car when leaving.

AI-Driven Car-Moving Robot

The Sherpa™ system starts with an AI-driven car-moving robot. We start with the AutoMoverBot [3] [4] [5] Autonomous Mobile Robot (AMR). The AutoMoverBot is currently in use in controlled environments such as a single parking lot and can pick up and move cars along a predefined path – or from a predefined spot to another predefined spot. The AMR has optical sensors that allow it to avoid obstacles and sense its location.

However, the Sherpa™ system extends the functionality of the AMR from the parking lot to the road! We have licensed Tesla's self-driving AI and modified the AMR to be able to drive on commercial roads from the venue to the parking site and back. More specifically, we have added Tesla-specific, high-definition cameras that can sense red/green lights and stop signs[6] – as well as improved obstacle tracking and avoidance capability. We also improved the transmission to add a 4th gear to allow the AMR to travel up to 15MPH, which in many municipalities is the minimum speed to drive on the street. Also, the AMR has been outfitted with front and tail lights for signaling, which are typically required by municipalities, as well as working headlights for nighttime safety. These are under control of the Tesla AI and work just like Tesla's self-

[3] https://automoverbot.com/product/semi-automatic-vehicle-moving-autonomous-mobile-robot-amr/
[4] https://automoverbot.com/powerful-semi-automatic-car-mover-ai-robot-works/
[5] https://automoverbot.com/what-is-amr-autonomous-mobile-robot/
[6] https://www.tesla.com/support/videos/watch/traffic-light-and-stop-sign-control

Front Headlight/signal modules

with Tesla HD camera and GPS/Cellular

Tail signal modules

driving cars would. Further, GPS and cellular systems have been added for improved location and data communication – and are also used by the Tesla AI.

Basically, we turn the AMR into a Tesla-based self-driving car that is capable of driving another car from a pickup location to a dropoff location. We only need the basics of the Tesla AI because we are always picking up from the same location (in front of the venue) and then moving along a fixed route (either to a parking location or a continuous loop).

Parking Lot Placement (PLP)

Once the AMR reaches the parking lot, it will move to the predetermined space that has been assigned for the car. Car space locations have been previously identified in our application using GPS positioning and the lines between spaces are detected by the AMRs on-board cameras for proper space positioning. Sherpa™ can then work in one of three selected modes. First, the AMR can just stay with the car and wait for the car to be recalled. Second, after dropping off the car, the AMR can travel to one of our SherpaHuts™ that is located at parking lot and plug in for charging. That AMR may then join a queue to be used to return cars to the venue. Finally, the AMR may immediately return to the venue to pick up another car.

Continuous Loop Mode (CLM)

In Continuous Loop Mode, the AMR will just drive along a predetermined path on commercial roads in a loop until the car is called for. The loop path is preferably made up of only right turns for safety. Basically, the AMR just drives “around the block” until the car-owner calls for their car using our app The loop path can be set by the venue using our app and is preferably around 5 minutes long (not just around a single block). The AMR follows all

driving laws due to the Tesla AI control. Continuous Loop Mode (CLM) allows the venue to greatly cut down on its parking lot expenses – or potentially eliminate them if enough AMRs are purchased/rented so that all valeted cars simply occupy road space.

CLM can also be used in combination with PLP so that when the parking lot is full, the AMRs just start using CLM until a spot in the parking lot opens up.

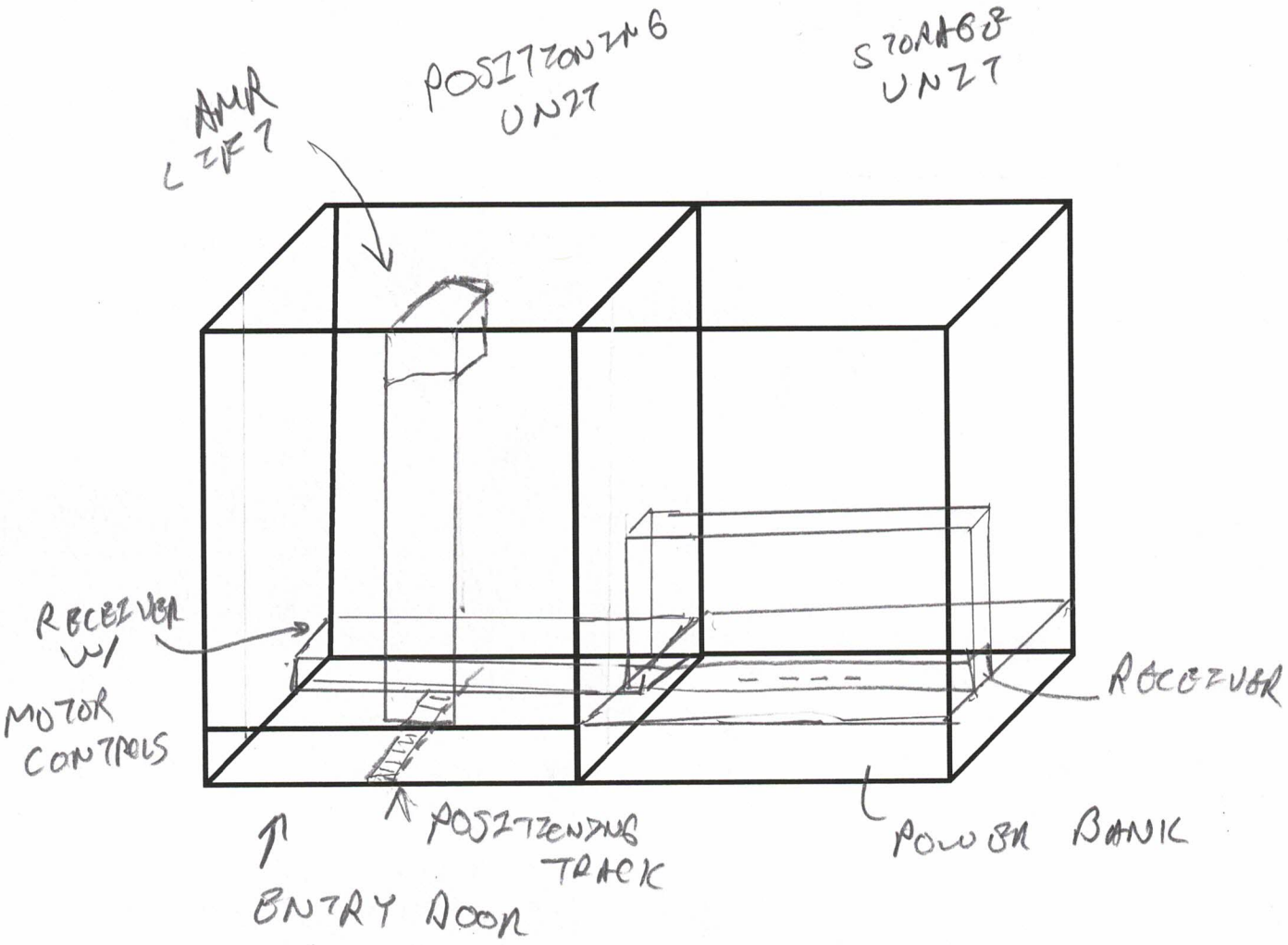
The SherpaHut™

The SherpaHut™ is basically an AMR jukebox/charging station. The Storage Unit allows for either 10 or 20 AMRs to be stored in a vertical configuration. The Positioning Unit receives the AMR, gets it into a receiver and the lifts one end to get the AMR vertical, positions the AMR with a linear electric motor, and then inserts the receiver into one of the receiver positions in the Storage Unit. The receiver makes electrical contact with the AMR on its top side and includes a contact surface on its bottom that comes into contact with an electrical charging contact surface in all of the receiver positions. The Positioning Unit can access and retrieve any of the AMRs that are stored by reversing the process. The charging level of the AMRs can be monitored and the most charged AMR selected. The SherpaHut™ can be built at the venue or in the parking lot –or even at a third party location. When AMRs are not in use, they can be stored in the SherpaHut™ for charging.

Sherpa Ticketless Valet™

We licensed the Ticketless Valet[7] app [8]from Summon and upgraded it to make our Sherpa Ticketless Valet™. The Sherpa Ticketless Valet™ lets customers quickly and efficiently

[7] https://getsummon.com/ticketless-valet
[8] https://www.youtube.com/shorts/k98kR0Ldlpc


ARM LIFT
POSITIONING UNIT
STORAGE UNIT
RECEIVER W/ MOTOR CONTROLS
RECEIVER
POWER BANK
POSITIONING TRACK
ENTRY DOOR

check in their cars –and check out, including payment – from their phones. The Sherpa Ticketless Valet™ takes the functionality of the Summon system and assigns an AMR to the car at the time of check-in and then assigns either a specific spot or CLM. The app records the GPS locations of each of the cars when parked and can verify the location of the car in transit using the GPS on the AMR.

Because we know the distance between the venue location and the spot where the car is parked, we can provide a time estimate for the car's arrival. For CLM for example, the AMR's GPS allows us to know where the car is and how long it will take for the loop to deliver the car back to the venue. Once the car has been returned to the venue and payment has been verified, the AMR is disengaged and the car is then free to go!

NextGen Sherpa™ Improvements

Virtual Parking Garage

A SherpaHut™ can be positioned anywhere there is a high-power connection available for charging and can be positioned on a temporary, removable basis. It can also be positioned up to a mile away from a pickup/delivery point – it does not have to be in close proximity. A municipality or event can establish a Virtual Parking Garage by just choosing a pickup location and having AMRs be available at that location from a SherpaHut™ that is in range. The AMRs can operate in PLP or CLM. The municipality or event can just start collecting revenue from their Virtual Parking Garage without having the massive capital expense of actually building a bricks-and-mortar parking garage. VPGs can also be set up on a temporary basis when parking is not available as a venue. One example is the ARC Music Festival[9] in Chicago's Union Park – there are no public parking facilities nearby, so a VPG can be set up on site to receive cars from concertgoers and then either relocate them to a remote lot of CLM –and then return the cars to the dropoff site when called for. Also, the dropoff site can be different from the pickupsite for improved traffic control.

Rent Out Unused AMRs

If a venue has more AMRs than they are currently using, then they can "rent-out" AMRs to people looking for parking. This might include price differences for PLP or CLM modes. Once significant AMRs are available in a city, we are anticipating launching an online parking service similar to SpotHero.[10]

[9] https://arcmusicfestival.com/
[10] https://spothero.com/

Other Patents

The CEO passed on your recommendation to search the PTO's website, so I did. I made a list of the patents that I found below. The CEO says that all of these patents look pretty close to what we came up with. However, the CEO says that you are the best patent attorney around and that you will be able to find a way to get us our patent without infringing on these other patents.

Patents:

US 11360490 B2

US 20250390113 A1

US 20230392403 A1