

# AutoPark - An Intelligent Engine that Powers the Autonomous Car Parking

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## Abstract

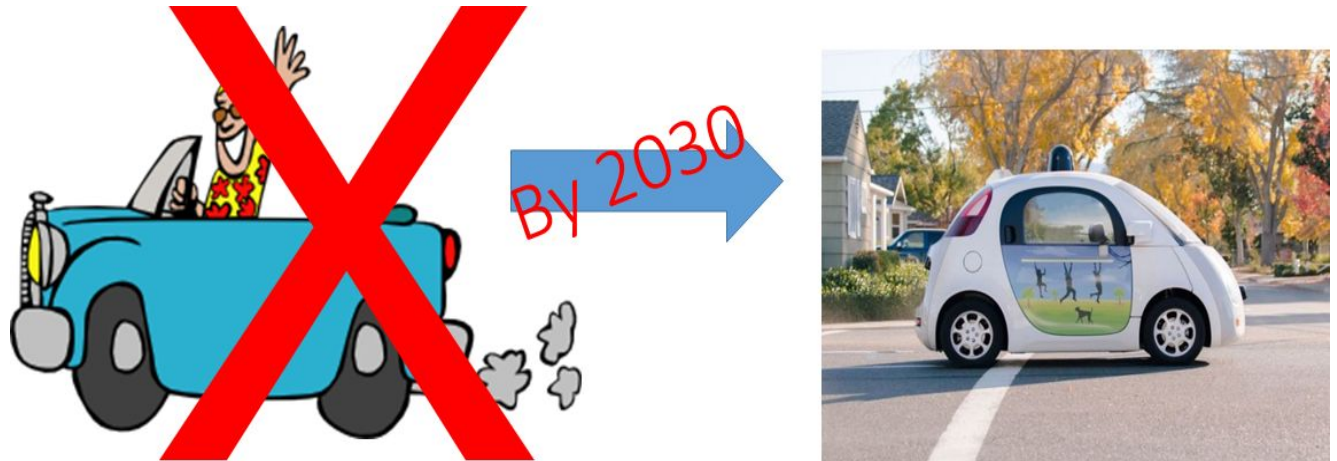
Uber, Tesla, Google and other potential autonomous car fleet owners are planning to disrupt the ridesharing industry by introducing autonomous vehicles as a service. These autonomous cars are expected to hit the road pretty soon and the autonomous car ecosystem will be different from the current ride-sharing ecosystem in several ways. The most important unsolved problem of this new ecosystem is going to be the parking logistics for the autonomous vehicles when they are not in demand. This is particularly an important issue because we don't want all the autonomous cars on the road all the time. To solve this parking problem, our start-up company, AutoPark, will develop a service to connect the fleet owners with numerous parking lots and garages across the geographical breadth. AutoPark will provide an API for the fleet owners to discover the parking spot for their autonomous cars in real-time, and on the other hand, it will provide an easy to use app to the parking lot owners to rent out their excess parking spots. AutoPark's API to the fleet owners will also be aware about where the demand is and will make smart recommendation of the parking lots that are closer to the demand so that the time to service is optimized. AutoPark will also work with the fleet companies to develop automatic charging solutions for electric autonomous cars and have them installed in the parking lots. We have done comprehensive evaluation of the business model and we ask for \$10M and we projecting to be a profitable company by year 4.

## Autonomous Cars are the Future

**The trends are clear.** Whether we believe it or not, there is a tectonic shift in the way that we move around. This includes every form of transportation that we know of today – be it long distance trucking, cars that we use to move around, or the numerous ride sharing businesses that are moving people around.

The move to self-driving vehicles has been afoot for a while. Google has heavily invested in this technology for over five years now. GM has invested over 500 Million USD in Lyft, and bought a self-driving technology startup Cruise Automation for over a Billion USD. This move by GM is a foray into self-driving taxis using Lyft and Cruise Automation. Others are not far behind. Uber is doing trials currently in Pittsburgh and has invested over 680 Million USD in Otto.

The self-driving technology is maturing and autonomous cars are going to hit the roads in a big way in the not so distant future. By the year 2020, one in every 10 vehicles on the road will be autonomous [1]. By the year 2030, it is expected that one in every 4 vehicles will be autonomous.



**Figure 1.** By 2020, one in 10 cars, and by 2030, one in 4 cars are projected to be autonomous

## Car Ownership is So Yesterday

The move towards a service oriented model in the auto industry has been afoot for over several years with the rise of likes of Uber and Lyft. More and more people have moved towards using the services of the companies rather than having to deal with the multitude of problems that arise from having to drive their own car.

The shift towards autonomous cars and the ride-sharing are creating major disruptions in the auto industry, and the confluence of these two trends would create even bigger disruptions. As has been apparent from the trends, it is very likely that fewer people will own cars, and the likes of Uber and Lyft will continue to see a rising demand for their services. If one needs to get from Point A to Point B, it is very likely that he or she will not be driving to get to Point B, and it is also very likely that the person will use the services of an autonomous car to get to Point B.

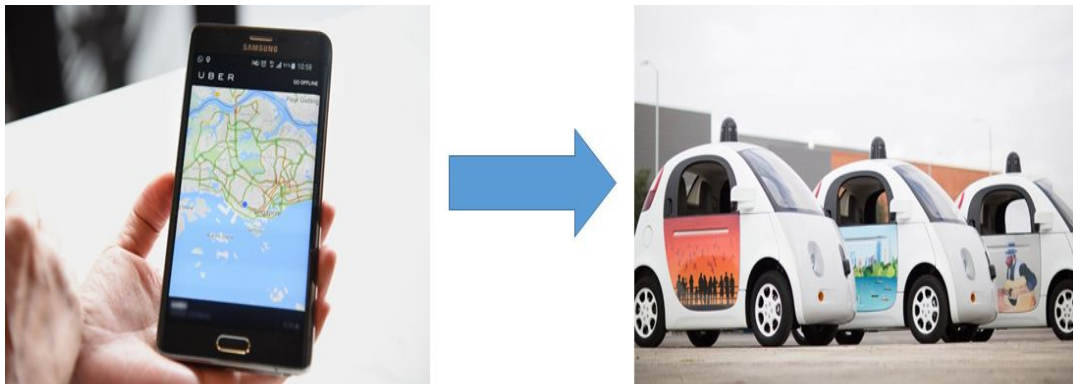
Today when one needs to get to their work, or go out to a shopping mall, they order a ride-sharing car, get a car within a few minutes and drive off to their destination. People have come to expect this level of service. When we move towards autonomous cars driving people around, they will have to come expect the same level of service. They shouldn't have to wait long to get into their autonomous cars.

## Service Availability is the Key

So, how do we provide the same level of service with autonomous cars driving people around? The answer is to have the autonomous cars closer to the customer. When people sit in their homes and ask for an autonomous car to help them get to their destination, they expect that the autonomous car will get to their home right away.

The above level of service implies that autonomous cars need to be parked and be available very close to where they are needed. This is the crux of the business opportunity we hope to address. Our goal is to provide a 5 minute target time to service. This implies that from the time a customer orders for an autonomous car, it will get to that customer within 5 minutes. It also implies that the car needs to be parked within 5 minutes of where the customer needs it.

Today when we drive ourselves to a shopping mall, we park in the lot provided by the shopping mall. In the future the autonomous car will drop off a customer in the shopping mall, and drive off to serve the next customer or park someplace waiting for the next customer. We expect that the parking lots around shopping malls, office buildings, and several public places will cease to exist as we know of today. They will all be converted into parking for autonomous vehicles, and all of this parking closer to the customer will ensure that we are able to address the 5 minute target time to service.

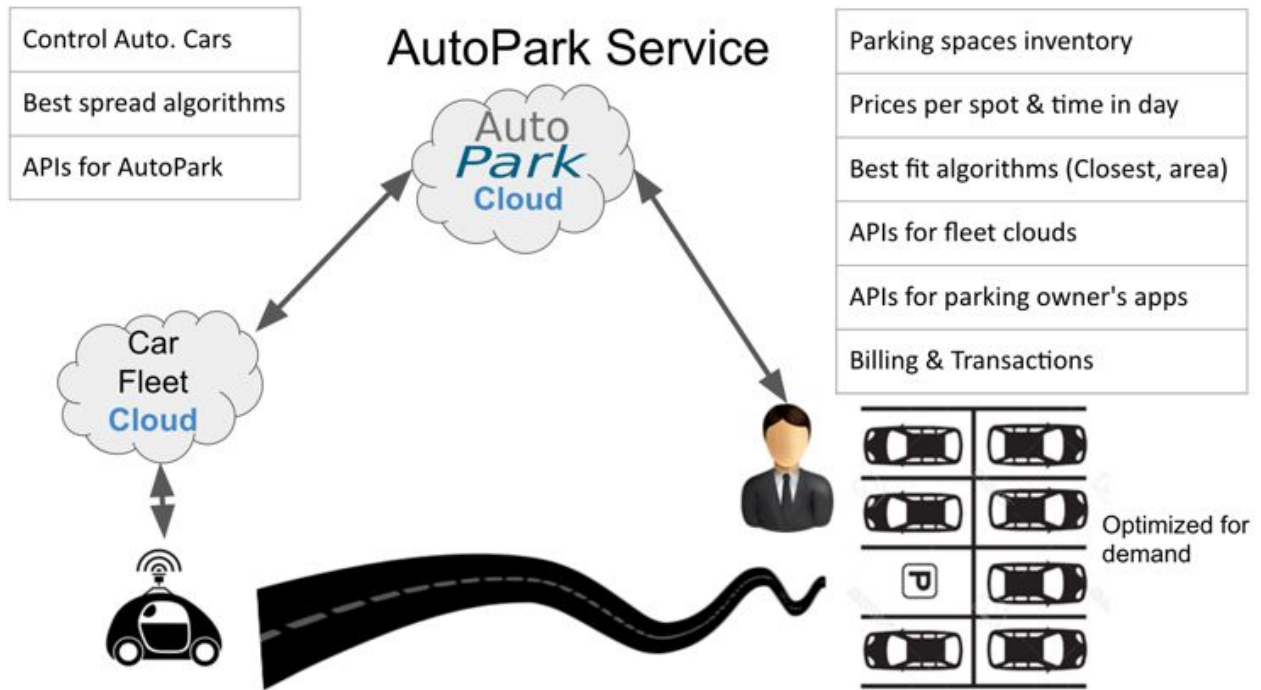


**Figure 2.** 5min Target time to service

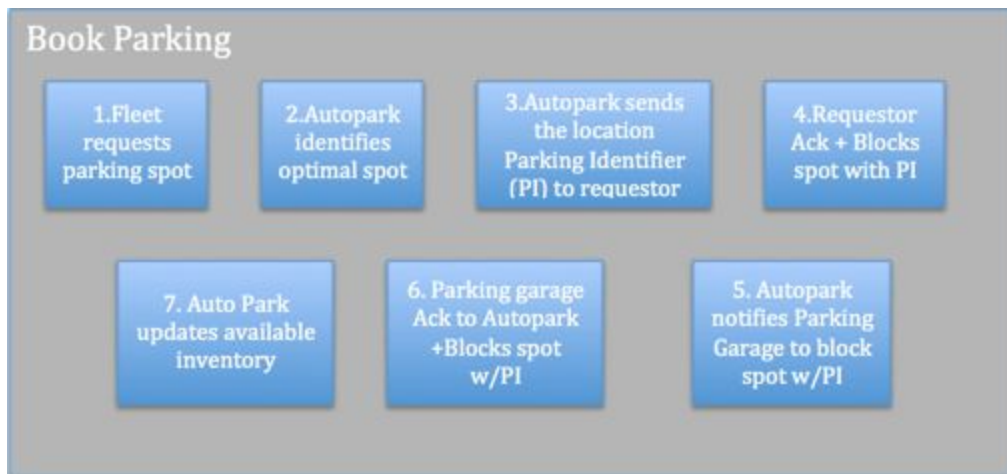
## Our Unique AutoPark Solution

AutoPark is an intelligent engine that simultaneously identifies optimal parking spots for fleet owners as well as enables the accelerated adaptation of parking garages to the autonomous car phenomenon. AutoPark is a service that provides the optimal location for a fleet owner to park their car(s), based on demand patterns. The AutoPark machine learning algorithms consume several on-line signals such as location, cost, time to service, as well as off-line signals such as

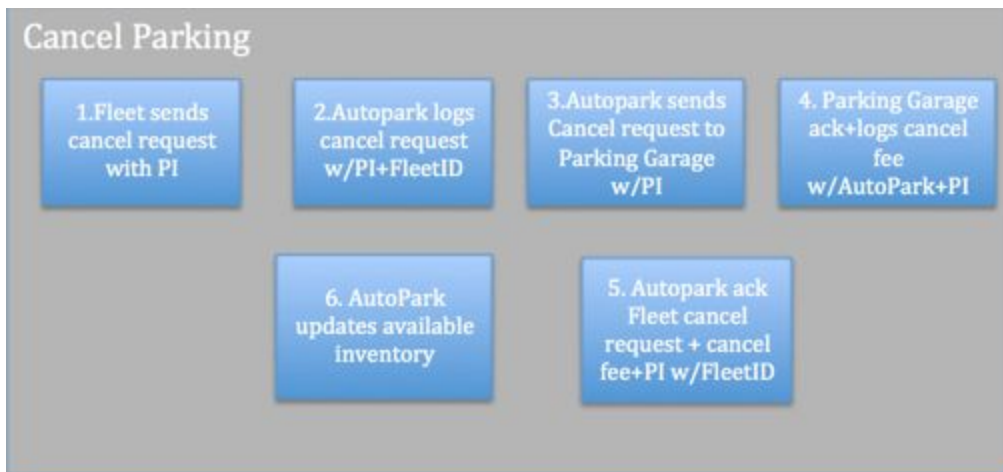
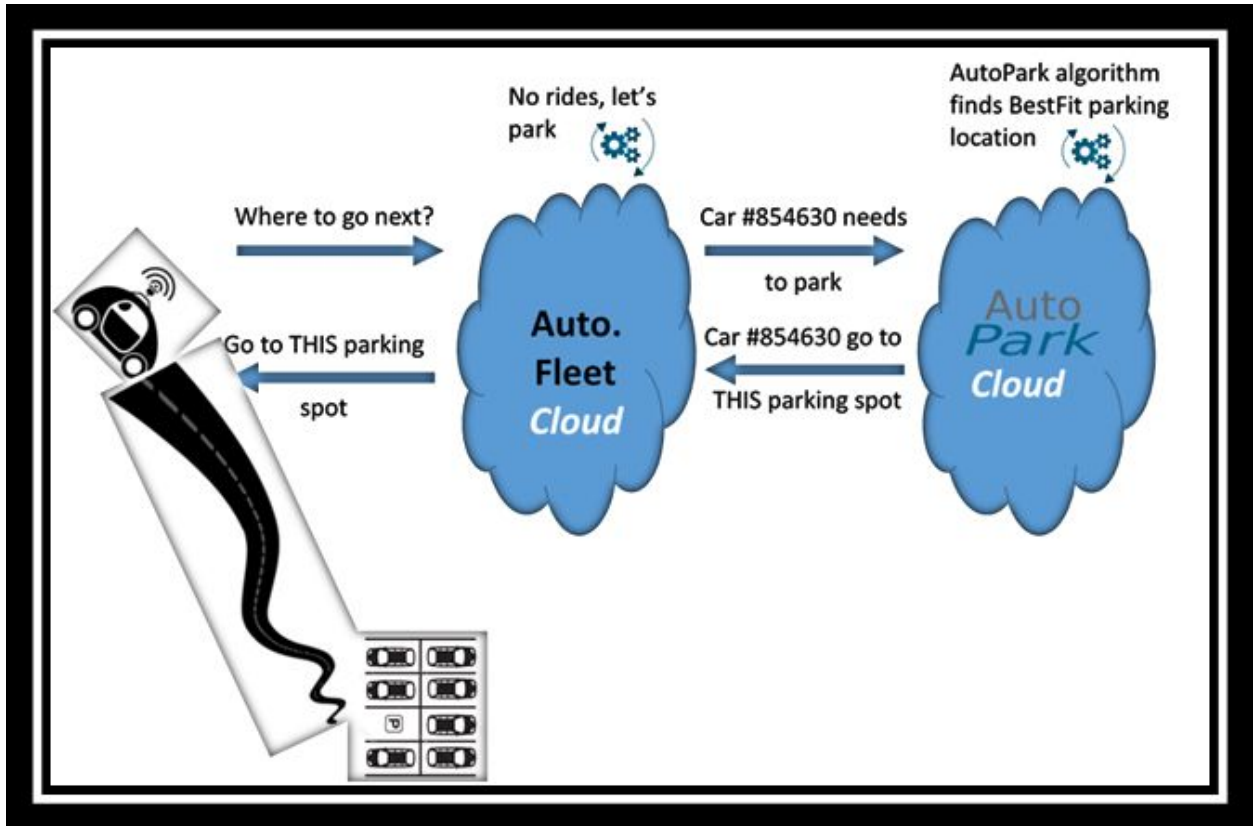
demand patterns, and predict the optimal location to parking spot requestors.

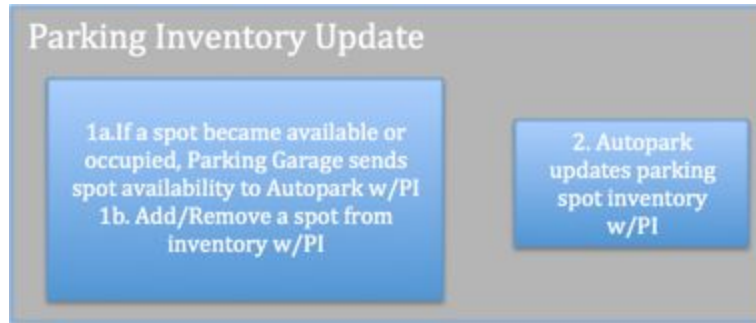


There are three major AutoPark workflows that connect the Fleet owners and Parking Garages (parking spot owners): **1. Book Parking, 2. Cancel Parking, 3. Update Inventory.**



Here is an example for booking a parking:





**Note:** The initial AutoPark service is predicated on a standard rate card structure based on individual agreements with Parking Spot owners. We expect to evolve this service towards a real-time dynamic marketplace, with dynamic pricing models driven by demand patterns, seasonality and other factors.

## Market dynamics

Apart from AutoPark, there are three potential types of players in the area of parking for autonomous vehicles: 1. The autonomous cars fleet companies, 2. Garage companies, 3. Parking Apps.

While the autonomous fleet companies can create their own garage and parking solutions, it will be more beneficial for them to partner with our company AutoPark. If each fleet company tried to create their own parking solution, there will be massive inefficiency in the parking part of the autonomous car ecosystem. This will lead to higher cost to all of the fleet owners. They will be better off if AutoPark solves the problem and partner will all of the fleet companies. Being its core business, the AutoPark is going to form relations with several thousands of garage and park owners. However, such an effort will be distracting effort for most fleet companies and they will not be able to achieve the same comprehensive and global parking solution as AutoPark.

Current day garages can adapt and evolve to service autonomous cars. However, the main disadvantage for the garage companies is that they are catering only a local high demand area such a neighborhood in San Francisco downtown. Because of the localized nature and also the garage companies being numerous in numbers, it will be a difficult logistical challenge for the garages to provide a comprehensive and global solution. We do recognize that the garages can play an important part of the parking ecosystem; however they are not equipped to contribute to the autonomous car parking ecosystem. AutoPark is also going to play a role of partner with these garages and providing them partnership with us so that after on-boarding our system, the garages will seamlessly and efficiently rent out their parking space to an array fleet companies. Also by partnering with several garages, we will be creating a comprehensive parking solution so that the autonomous car can park closer to the demand and we are solving the key problem of the autonomous car parking ecosystem.

There are numerous parking apps and these companies are truly our competitors. The parking apps are solving current day problem of manual car parking. The parking apps range from parking spot reservation such as airport parking reservation, or open parking spot discovery, or social parking where you can rent your spare parking or rent it from others. The parking apps overall have had mixed success: though numerous, many parking apps have had to close their start-ups [2] and many apps don't appear to be professional enough for mass use. As autonomous cars hit the roads, we will see these parking apps trying to develop solution for the autonomous car problem. However, we believe that the first mover advantage is going to play a huge role in the success of the autonomous parking company. We, being focused on the futuristic problem of autonomous cars will work on the solution and will be ready with it when the autonomous cars hit the road. We will also establish partnership with fleet companies and parking lots which is going to cement the success of our company.

## Business Model

Autopark is essentially a service company using which a parking spot owner can rent their spots to Autonomous cars fleet owners. Therefore, Autopark's strategy is structured around the two key constituents: the Providers (parking spot providers) and the Consumers (Autonomous Car Owners). Our main role would be to enable Consumers to get parking spots from Providers at a price. AutoPark will facilitate the transaction and take a percentage of the transaction as facilitation fees. This is going to be our main source of revenue. By linking our revenue with the transaction, the growth of AutoPark is linked with the growth of the autonomous market which is expected to grow exponentially in the coming future. Additionally, AutoPark can also monetize its core data in the future by providing autonomous cars improved and smarter service using the incoming-outgoing flux in the parking data.

## Target Market

Car companies will cease to do business as we know of today. We will no longer have to visit a car dealership to buy from our favorite salesman. The auto industry will move towards a service oriented industry where they will stop selling cars to individual customers and will start serving customers with a fleet of cars that will be available for their use. We see a trend where the current crop of car companies like GM, Ford, Audi will cease to sell cars and will operate cars for the use of the customers.

Similarly new players will emerge to serve the end user. The ridesharing services of today vis a vis the likes of Uber and Lyft will want to own the fleet of autonomous cars to serve their customers. The technology companies like Google, Apple, and Baidu will also enter the fray. All



of these fleet operators will want to use Autopark for the use of the parking lots to serve their customers.

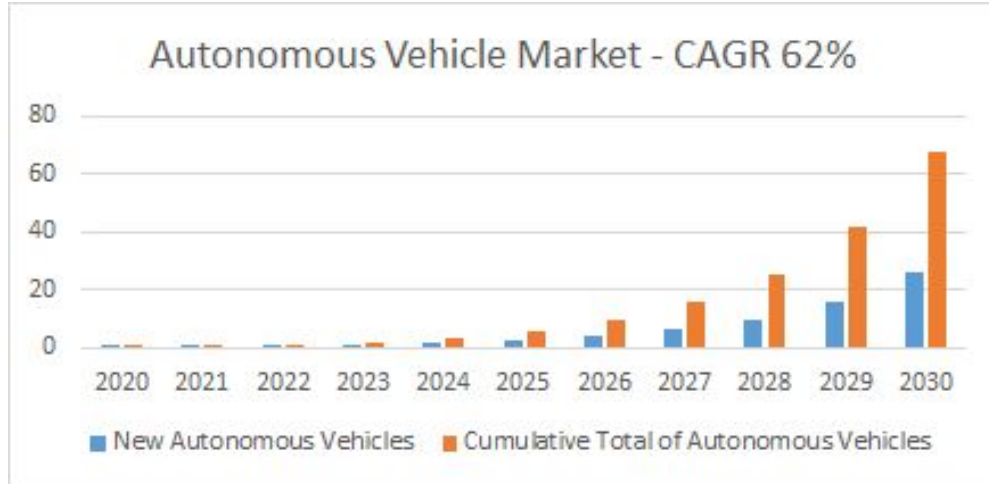


**Figure 3.** Potential list of customers for AutoPark

## The Market Size

The total number of new autonomous cars is expected to grow from 0.2 million units in 2020 to over 24 million units in 2030. The total number of autonomous cars on the roads is expected to reach a peak of 71 million by the end of 2030. The market for autonomous cars is expected to grow at a compound annual growth rate (CAGR) of 62% [3].



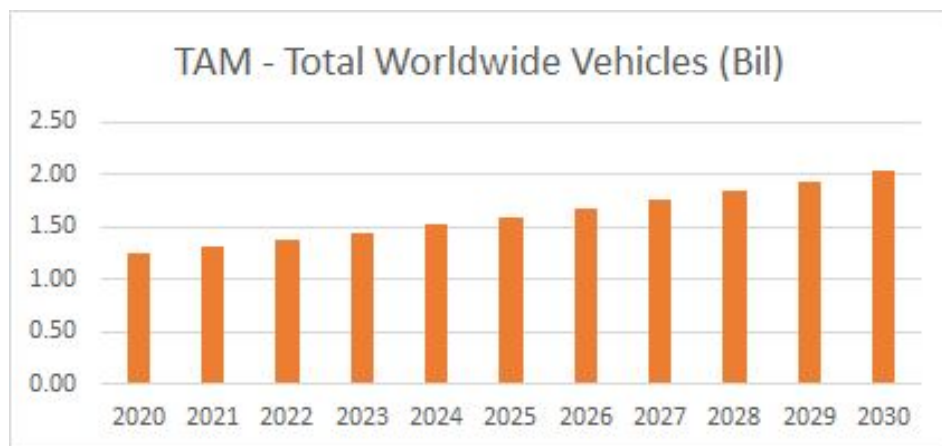


**Figure 4:** CAGR for Autonomous cars

The Total Available Market (TAM) is the total number of vehicles on the road worldwide and this is expected to hit 2.04 billion by the year 2030 from 1.25 billion in 2020. The United States is expected to have 60% of the worldwide autonomous vehicles.

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
TAM - Total Worldwide Vehicles (Bil)	1.25	1.31	1.38	1.45	1.52	1.60	1.68	1.76	1.85	1.94	2.04
US - New Autonomous Vehicles	0.12	0.20	0.32	0.53	0.86	1.39	2.26	3.66	5.93	9.62	15.58

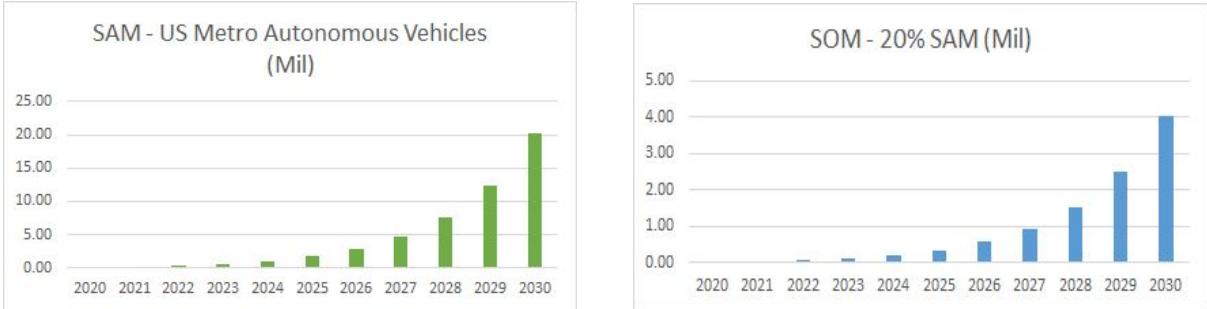
**Table 1:** TAM and size of US Autonomous vehicle market



**Figure 5:** TAM for AutoPark

Of the total available market for vehicles, AutoPark hopes to service the Autonomous cars in the US metro areas. As shown in Table 1, the total number of autonomous vehicles in the US is expected to grow from 0.12 billion in 2020 to about 15.56 billion in 2030. Of these, the number of autonomous vehicles in the US metro areas is expected to be 50% of the total autonomous vehicles in the US.

The size of this SAM for AutoPark is expected to grow from 60,000 cars in 2020 to over 20.24 billion in 2030. AutoPark is expected to capture only 20% of this SAM, and the SOM for AutoPark is expected to grow from 10,000 vehicles in 2020 to over 4.05 million in 2030.



**Figure 6:** SAM and SOM for AutoPark

The following table summarizes the TAM, SAM and SOM for AutoPark by year 5 of our operation (2025)

<b>By 2025...</b>	
TAM (Worldwide Vehicles)	<b>1.6B</b>
SAM (AutoN Cars in US Metro)	<b>1.71M</b>
SOM (20% of SAM)	<b>340K</b>

**Table 2:** Summary of TAM, SAM and SOM for AutoPark by Year 5 of operation

## Go to Market

To pursue the “first to market” strategy, AutoPark will start early establishing relationships with the current potential autonomous cars fleets owners – Uber, Google, Lyft and Tesla. Current predictions are that 2018 will be the first year where we will start see autonomous cars running in our roads, and 2020 is the year where we will see significant amount of autonomous cars in the roads and the year we will see the change in the trend from private car ownership to rideshare fleet ownership. Given this observation above, AutoPark will start developing its cloud

software at the beginning of 2017 which will allow us to build a prototype and start partnering with the fleets owners early on. AutoPark will also start securing parking spaces in strategic locations in order to be appealing to its partners.

Moving forward AutoPark target market is to have approximately 26,000 parking spots rented through its service by year 5 in business. AutoPark strategy is to incrementally expand both location of service and fleet car owners into our ecosystem. We want to start with one city and for the first few years add 1-2 cities per year. At end of year 5, we expect to operate in 5+ cities. This will be achieved by starting in 2018 partnering with 1 of the potential autonomous cars fleet owners and in a specific city (San Francisco). The expectation is to have by year 1, 1000 parking spots growing over year after year, partnering with more fleets and working in more cities where the goal is to have about 26,000 parking spots by year 5.

## Financial Plan

### Key Assumptions

- Sales Assumptions

The project parking spots will increase as follows in the first 5 years:

	Year 1	Year 2	Year 3	Year 4	Year 5
Projected Parking Spots	1,000	1,500	3,300	8,910	26,730

Sales assumptions are based on the SOM numbers projected in the target market analysis.

- Financial Assumptions

We project that our revenue will track the increase in the parking spots.

Year-by-year profit and loss assumptions					
	Year 1	Year 2	Year 3	Year 4	Year 5
Annual cumulative price (revenue) increase	-	50.00%	120.00%	170.00%	200.00%
Annual cumulative inflation (expense) increase	-	25.00%	35.00%	40.00%	50.00%
Interest rate on ending cash balance	0.50%	0.50%	0.50%	0.50%	0.50%
Cogs Increase		95%	93%	90%	85%

- Pricing Assumptions Per Transaction

Each transaction is evaluated at \$3 an hour paid by the Car for the service. \$3 number is based on the current parking rates where in a big city a user pays 20-30 \$ per 8-10 hour window. Part

of the \$3 is passed down to the parking lot owners and the residual cents/Dollars is the net revenue. Each Parking lot is assumed to be occupied for 14 hours a day and hence could potentially be rented out for 14\*\$3 per Day.

The above assumptions are used by the financial model in the following sections to calculate the P&L, Balance sheet and Cash Flow analysis.

## 5 Year Profit and Loss Projection

5 year P&L indicates an operating expense of approximately \$2.5M for the first year increasing to approx 4.5M by year 3. Operating income is negative for the first 3 years and turning positive in year 4.

Total revenue is projected to be approximately \$60M by year 5. By year 5, the corporation will achieve a gross margin of 15%. Business plan needs external cash influx for the first 3 years of operations.

	Year 1	Year 2	Year 3	Year 4	Year 5
<b>Revenue</b>					
Gross margin	\$383,250	\$1,149,750	\$3,541,230	\$13,659,030	\$61,465,635
Total revenue	\$383,250	\$1,149,750	\$3,541,230	\$13,659,030	\$61,465,635
<b>Operating expenses</b>					
Total operating expenses	\$2,577,000	\$3,221,250	\$4,348,688	\$6,088,163	\$9,132,244
<b>Operating income</b>	(\$2,193,750)	(\$2,071,500)	(\$807,458)	\$7,570,868	\$52,333,391
<b>Operating income before other items</b>	(\$2,193,750)	(\$2,071,500)	(\$807,458)	\$7,570,868	\$52,333,391
<b>Earnings before taxes</b>	(\$2,193,750)	(\$2,071,500)	(\$807,458)	\$7,570,868	\$52,333,391
Taxes on income	30%	0	0	2,271,260	15,700,017
<b>Net income (loss)</b>	(\$2,193,750)	(\$2,071,500)	(\$807,458)	\$5,299,607	\$36,633,374

## Projected Cash Flow

Autopark will require approx \$2M investments every year for the first 3 years to stay cash flow positive and pay for operating expenses.

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
<b>Operating activities</b>						
Net income	(\$2,193,750)	(\$2,071,500)	(\$807,458)	\$5,299,607	\$36,633,374	\$36,860,274
Depreciation	0	0	0	0	0	0
Accounts receivable	0	0	0	0	0	0
Inventories	0	0	0	0	0	0
Accounts payable	0	0	0	0	0	0
Amortization	0	0	0	0	0	0
Other liabilities	0	0	0	0	0	0
Other operating cash flow items	0	0	0	0	0	0
<b>Total operating activities</b>	(\$2,193,750)	(\$2,071,500)	(\$807,458)	\$5,299,607	\$36,633,374	\$36,860,274
<b>Investing activities</b>						
Capital expenditures	\$0	\$0	\$0	\$0	\$0	\$0
Acquisition of business	0	0	0	0	0	0
Sale of fixed assets	\$0	\$0	\$0	\$0	\$0	0
Other investing cash flow items	0	0	0	0	0	0
<b>Total investing activities</b>	\$0	\$0	\$0	\$0	\$0	\$0
<b>Financing activities</b>						
Long-term debt/financing	\$0	\$0	\$0	\$0	\$0	\$0
Preferred stock	0	0	0	0	0	0
Total cash dividends paid	0	0	0	0	0	0
Common stock	0	0	0	0	0	0
Other financing cash flow items	2,200,000	2,100,000	1,100,000	0	0	5,400,000
<b>Total financing activities</b>	\$2,200,000	\$2,100,000	\$1,100,000	\$0	\$0	\$5,400,000
<b>Cumulative cash flow</b>	\$6,250	\$28,500	\$292,543	\$5,299,607	\$36,633,374	\$42,260,274
<b>Beginning cash balance</b>	\$0	\$6,250	\$34,750	\$327,293	\$5,626,900	
<b>Ending cash balance</b>	\$6,250	\$34,750	\$327,293	\$5,626,900	\$42,260,274	

## Opening Day Balance Sheet

Autopark is a services company so the key assets are connections with the fleet owners as well the parking lots. Balance sheet projections indicate a negative equity for the first 3 years with break even achieved in year 4.

<b>Assets</b>	Initial balance	Year 1	Year 2	Year 3	Year 4	Year 5
Total current assets	\$0	\$6,250	\$34,750	\$327,293	\$5,626,900	\$42,260,274
Net property/equipment	\$0	\$0	\$0	\$0	\$0	\$0
<b>Total assets</b>	\$0	\$6,250	\$34,750	\$327,293	\$5,626,900	\$42,260,274
<b>Liabilities</b>	Initial balance	Year 1	Year 2	Year 3	Year 4	Year 5
Total current liabilities	\$0	\$0	\$0	\$0	\$0	\$0
Total debt	\$0	\$0	\$0	\$0	\$0	\$0
<b>Total liabilities</b>	\$0	\$0	\$0	\$0	\$0	\$0
<b>Equity</b>	Initial balance	Year 1	Year 2	Year 3	Year 4	Year 5
Total equity	\$0	(\$2,193,750)	(\$4,265,250)	(\$5,072,708)	\$226,900	\$36,860,274
<b>Total liabilities and equity</b>	\$0	(\$2,193,750)	(\$4,265,250)	(\$5,072,708)	\$226,900	\$36,860,274

## Break-Even Analysis

Break even point will be achieved at the end of Year 4 in operations. Expected parking spots under rent at point will be approximately 3300 resulting in a net revenue of \$13.5 M offsetting the operating expenses of approx \$6M.

## Team and Experience

We have a strong engineering and science focused team. Our CEO Nidhi Rao is an accomplished leader who has been in leadership roles in several major tech companies such as Yahoo, Sun Microsystems and CSC. Her soft spoken friendly nature and the ability to communicate effectively with our customers as well employees is an asset for the company. Our CTO Chakravarthy Kosaraju has more than 10 patents on his name and has been a tech champion and visionary in his earlier roles as Director of Engineering in Qualcomm and Intel. He has been instrumental in bringing major and successful technological transitions that brought long-term value to his companies. Mayan, an accomplished technical leader from VMware is going to be Head of Engineer. Raamesh, a doctorate in our team, will be Head of Data Solutions and will work on delivering AutoPark’s intelligence features and seamless user experience. Raanan, Director of Operations in VMware, will join AutoPark as COO. Baldev, a Director at Silicon Valley Bank, will be our CFO.



Nidhi Rao - CEO

Chakravarthy Kosaraju - CTO



Mayan Weiss - Head of Engineering

Raamesh Deshpande - Head of Data Solutions



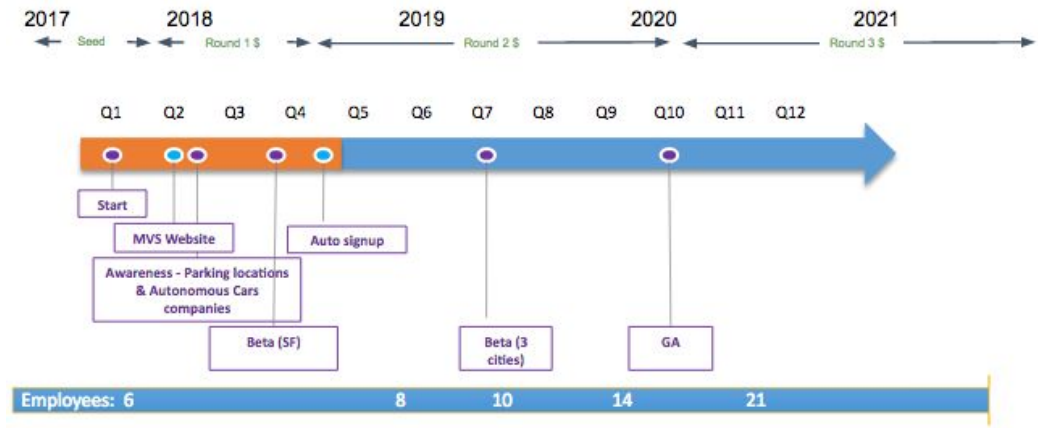
Raanan Kesar - SaaS Operations

Baldev Ghuman - Finance





## Timeline and Traction



“First to market” is critical for the success of our company. So we will be starting early in establishing relationships with the parking vendors and fleet managers. The timeline figure shows how we plan our milestones, in conjunction with resources, both from an employee perspective and funding.

We are starting with a small team of 6 and seed money to build the Minimum Viable Service/Solution (MVS). The MVS will include the basic inventory system required to start registering, managing parking spots and an initial set of APIs to be used by the autonomous cars fleet management allowing the consumption of these parking spots. As mentioned in the Go To Market plan, we plan to start with San Francisco and following a successful MVS, we plan to expand to three other locations, focusing more on the scaling attributes required. Eventually we expect to reach general availability within 10 quarters and have 21 Full time employees(FTE) to manage across the points of presence.



## Our Ask

Autopark seeks both financial investments as well as advice and strategic thought leadership in its quest to be the premier service provider in the autonomous parking space.

### Financial Ask.

- Investment of \$10M to support the company through the first 5 years from inception.
  - \$4M will be required during the pre launch 2 year period for development and R&D.
  - \$2M per year for 3 years will support the company from a cashflow perspective till the break even point is achieved and the revenues can sustain the company.

### Relationships and Strategy

- We seek advice from the investors on how to approach the fleet owners and also make introductions. The key for our business is to place us as a partner to the fleet companies and not as direct competition.
- Help with hiring key players on the technology, sales and business development from the pool of your networks.
- Advice on key positions of the board for strategic advice.

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[1]

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