Israel High-Tech Solutions Impact on Future Businesses & Investment

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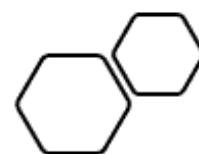**Private & Confidential
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Topics
- Smart City
- Urban Mobility

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Welcome to Woven City

Woven City is a fully connected ecosystem powered by hydrogen fuel cells to be built at the base of Mt. Fuji in Japan.

This "living laboratory" will include full time residents and researchers who will test and develop technologies such as autonomy, robotics, personal mobility and smart homes, in a real-world environment.

We welcome all those inspired to improve the way we live in the future, to take advantage of this unique research ecosystem and join us in our quest to create an ever-better way of life and mobility for all.

Acknowledgements

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Foreword

Israeli companies listed on Wall Street have reached a historic USD300 billion market cap and marks significant innovative achievement for the year


WalkMe at Nasdaq Wednesday. Photo: Courtesy

WalkMe, as a software-as-a-service (SaaS) company, its Digital Adoption Platform (DAP) was recognized in Everest Group's PEAK Matrix Assessment of DAP vendors as the leading DAP product. Its products can improve the efficiency of software organisations use.[1]

WalkMe was one of Insight Partner's first Israeli Investment and the Gemini fund has invested 28% and 9% equity respectively in the company a year ago.[2]

The IPO of WalkMe just became the 85th Israeli company to currently be traded on Nasdaq and NYSE.
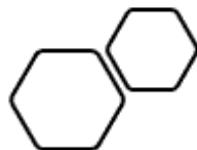
Investment perspective:

According to the data gathered by Oppenheimer Investments Bank that published on the CTECH News in 17/6/21[3] , there has been a USD100 billion surge year-to-date (YTD), whereby USD75 billion are in new companies that have either gone public or merged with SPAC companies, and the rest of the USD25 billion indicated a jump in value of pre-existing Israeli stock in the US markets.

Among the "Israeli" portfolio in New York, which includes 85 companies, an increase was recorded of more than 12% year-to-date (YTD) – which outperformed Nasdaq which only recorded a return of 9% in the same period. The appreciation of the market value of these Israeli companies accounts for 75% of Israeli GDP and is greater than the total value of the shares of the 507 companies traded in Tel Aviv (of which 52 are dual-listed firms), which stood at around USD 295 Billion mid-June.

Take another of Israel's IPO as an example - Monday.com[4], which went public in June 2021, traded at a value of USD 6.8 billion, but surged over 30% to USD 9.1 billion in mid-July 2021. The financial market is picking-up after the pandemic and everyone has been capitalising on the current low interest rates and excessive liquidity. This is the trend-following situation and people are hitting the iron while it is still hot. WalkMe, as mentioned earlier, joined the club, raising USD286 million at a value of USD2.5 billion.

Recall that in the first launch issue of our investment report in Feb this year, we mentioned the boom of the Israeli high tech solutions IPO and SPAC, and since then, new records keep breaking previous during this never-ending pandemic paradox.

Nevertheless, we believe the momentum is still very strong, especially that people are more aware of the utilisation of new technology to overcome the uncertainty of the post-pandemic future.

In this Israel Investment Report, we will cover the stories of some Israel high tech companies where their latest technologies are applied in smart cities and urban mobilities where they all have leading positions in the market. As Smart Cities and Urban Mobilities have involved most of the technologies that are becoming the necessities of our daily lives, we want to continue our efforts and carry forward our proptech coverage to the next level.

Smart City

Smart City and the technologies:
When we refer to a Smart City, we cannot ignore the ideas the Japanese global automobile manufacturers bring to us. Toyota is now endeavouring to create the Woven City[5] which is in-fact a **living laboratory in which to experiment** from scratch with the latest technologies in terms of urban planning, mobility, energy management, connectivity, robotics, and space optimisation. A similar project to the one already carried out is Toronto's Alphabet city by Google.[6]

Smart City is always regarded as a form of a techno-spatial model that relates to framing a new development paradigm for the 4th industrial age. The scale is going to be huge where the applications of building infrastructure and all technologies inclusive could be worth more than USD1.5 trillion by 2020, according to a study conducted by business consulting firm Frost & Sullivan.[7]

The IoT paradigm in an urban context is of particular interest enabling governments to adopt Information and Communication Technology (ICT) solutions in the management of public affairs, realizing the Smart City concept. The area of smart cities encompasses different technology-led or enabled advances, running from the installation of digital interfaces in traditional hard infrastructure to streamlining city operations.

What are the Benefits?
Smart cities concept is mostly deployed on mobility development, through either building sustainable transportation networks or improved telecommunication to ease physical mobility issues. It aims to make a better use of the public entity, increasing the quality of services while reducing the public administration and operational costs.
While the building of smarter transportation network improves the mobile system for logistics in favor of hyper-consumption in the city region, it can assist economic growth in deprived rural areas to improve overall poverty.
Improving efficiency by developing smart citizenship through a range of user-driven protocols are an important context where authorities utilize smart technology to create an open system for data gathering shares, allowing a faster decision-making process and favors economic growth.
Finally, the core of building a smart city is to attract specific investments to create new and extra economic benefits.

Smart cities enable the state to set up new techno-spatial models to transform the current operational paradigm, enabling the state to create more sustainable projects. There are more examples:

SmartForest City – Johor, Malaysia[8]
Masdar City – Abu Dhabi, United Arab Emirates[9]

Road to success is through COMMITMENT. That makes Israel lead the way in smart-city tech
A subsidiary of the Federation of Local Authorities in Israel – recently opened the **Municipal Innovation Center (MIC)[10]** – a central hub in Tel Aviv that will work with municipalities across the country who are seeking smart city solutions.

The centre will provide relevant data and information to facilitate the implementation of smart city technologies, focusing on sectors including emergency management, cyber infrastructure, and advanced communication systems. The hub will also work in the field of smart transportation – such as innovative urban traffic management, electric vehicle charging technologies, and environmental protection.
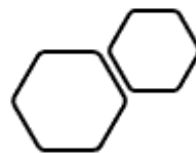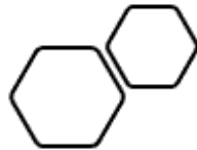
In the urban mobility arena

Israel has shown itself, once again, to be a world leader, according to an article published in July 5, 2021 by the Israel Economic and Commercial Mission to Hong Kong[11]. The performances have become so well established and can be demonstrated by Google's acquisition of Waze, and by Intel's acquisition in 2017 of Mobileye which developed technology for self-driving cars and advanced driver-assistance systems. More recently, in May of 2020, Intel also acquired Moovit, a "mobility-as-a-service" provider and journey planning app.

Reinventing the Car: New EV and Smart Car Technology.

Israeli technology is also changing the way vehicles are designed and built. Despite not being a traditional car manufacturing location, many companies, such as General Motors, Daimler, VW, and Ford, to name a few, have R&D centres in Israel to take advantage of Israeli cyber, AI, smart data and sensor technologies and integrate them into their vehicles.

Reinventing the Bicycle: e-Scooters, Bikes and e-Bikes

While one cannot resist writing about scooters, bikes, and e-bikes which have become so important in many cities as major transportation vehicles other than walking on foot, Israel too is innovating. As well as being one of the first countries to regulate, mainly for safety, scooter sharing services, such as Lime, Wind, and Bird, Israeli firms are updating the technology of the pedal bike which has remained largely unchanged since the eighteen hundreds.

Industry Innovation

From autonomous vehicles to evolving bikes and digital mobility platforms, innovation in the Israeli smart transportation sector is supported by **Ecomotion**, a joint venture initiative between the Ministry of Economy and Industry Innovation Ecosystems Systems Department, the Israel Innovation Institute, and the Smart Mobility Initiative. It brings together entrepreneurs, academics, government officials, local & global automotive industry representatives, investors, and others in order to provide a support platform for knowledge-sharing, networking, and collaboration.

Futurism?

Let's start our journey on the next page and take a look at some Israeli smart cities and urban mobilities technologies companies, and how they will transform and lead our communities and our lives into the future.
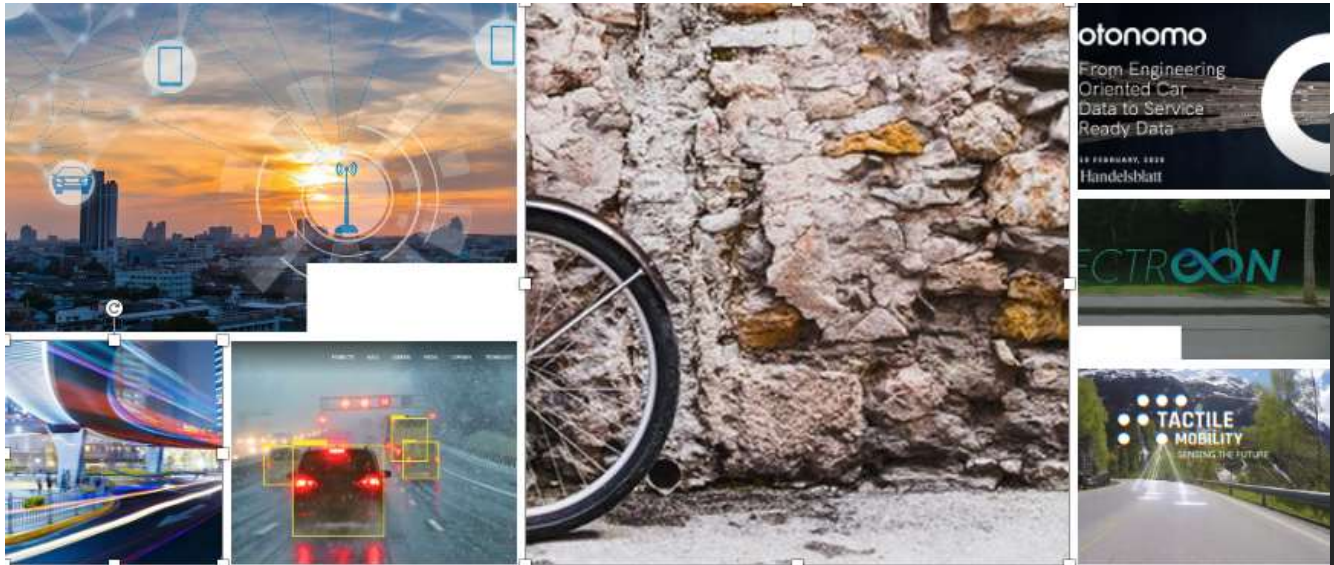
Smart Cities &
Urban Mobilities
Israel High-tech Solutions
Companies Profiles

otonomo

From Engineering Oriented Car Data to Service Ready Data

While preparing the writing of the article for this Aug Issue on Smart City, we decided to cover Otonomo because we have been following the company for a couple of years when we started in Japan. We see their technology and application comprehensive, and their scale of commercialization is considered one of the best.

We send our congratulations to them as they are performing beyond our expectations, and on Aug 12, they were listed on NASDAQ and their stock code is: OTMO. Let's try to learn more about their technology and see how they will affect our daily lives in Smart Cities of the future.

Why Otonomo?

Otonomo is a leading provider of a pioneering vehicle data platform and marketplace. This vehicle Automotive Data Services Platform fuels a network of 15+ multiple automotive manufacturers (OEMs) and more than 100 service providers, uses patented technology, and can safely ingest, reshape, cleanse, normalize, aggregate, and enrich car data from over 40 million globally-registered vehicles as they process 4.1 billion data points per day.

This advanced technology allows the company to accelerate time to market for new services that improve driving experiences from all perspectives. As Ben Volkow, Otonomo CEO[12] said: Our mission is to harness the immense potential of vehicle data and provide thousands of organizations across a broad range of markets the ability to seamlessly access, explore, analyze, and unlock the full power of vehicle data.

In addition, the whole concept of the design has put privacy at the core, which enables General Data Protection Regulation (GDPR) and other privacy regulation-compliant solutions using both personal and aggregate data. More elaboration on use cases will provide you with a better picture of how Smart City should deploy the technology that is interconnected to the urban mobility.

Otonomo maximizes use of connected data

The opportunities rise for developing drivers' services based on automotive data which can be a continuous process, ranging from smart cities and traffic management to insurance to electric vehicles to Safety and Emergency services.[13] Connected data includes specific location, engine status, door lock, speed reading, battery status, fuel level, etc., which are generated from the vehicle electronic control unit (ECUs), Controller Access Networks (CANs), and even infotainment systems.

According to Gartner, 255 million connected cars were running on the road in 2020[14]. The collected data is sent to the cloud, where the design for vehicle operations, including the apps and cloud services, is applied more effectively. The KPMG Global Automotive Executive Survey 2017[15] has also mentioned that 73% of consumer car purchasing / mobility services adopted decisions dependent on vehicle-independent products and services. As a results, a new ecosystem is developing around connected car data.

The Otonomo Automotive Data Services Platform makes connected car data much more valuable for mobility services and applications. They take further steps by adding car data to a unique layer of smart data and knowledge for decision makers and developers giving insight about what happens on the road and inside the car. This new data layers various devices such as ultrasonic car sensors, ADAS systems and EVs. Service providers can identify parking opportunities and dynamic road signs, assess charging location quality, and make the best in-car recommendations for drivers.

Automotive Data
40M Vehicles · 330B Miles Tracked · 4.1B Data Points/Day

Connected Car Data for Smart Cities

How Can Smart Cities fully utilize Connected Car Data?

Smart cities create an environment with a long-term vision for making urban areas less crowded and congested, thus reducing their environmental footprint, and improving quality of life. Connected cars produce data which will be able to serve this purpose transforming the smart city vision into reality. Otonomo's car data for smart cities is the solution enabling the smart city to create an even more accurate, optimized, data-driven place for better transportation, mobility, and safety.

Sources: https://otonomo.io/use-cases/smart-cities-car-data/

Smart Cities Can Use Connected Car Data for:

Traffic Management

Use connected car data, in combination with Internet of Things (IoT) sensor networks, to keep traffic flowing. Develop richer data inputs for real-time traffic flow optimization, efficient traffic light controls, parking space identification, public transport, and road congestion and condition notifications.

Parking Services

Drastically cut down on one of the most significant causes of pollution and congestion in urban areas: searching for parking. Use cameras and sensor data from connected cars and access roads for predictive parking or parking based on cost or availability. Eliminate hours of wasted driving time.

Accident Detection

Use car sensors to detect accidents in real time to save lives. Based on connected car data, accident detection systems can determine what course of action is required and send precise GPS coordinates, crash impact data, and other critical information to first responders.

Electric Vehicle Charging Infrastructure

Let drivers pay for their use of roadway infrastructure based on distance traveled. Car data solves the problem of declining fuel tax collections as EVs become widely adopted and allows for precise, convenient, and fair payment for road usage.

Road Usage Tax

Observe fuel states or remaining charge on electric vehicles. Alert drivers and guide them to the best fueling facility. Detect fuel theft.

Emissions Management

Systematically manage emissions, intelligently control idling areas, optimize parking, and analyze greenhouse gas emissions. Create data-driven simulations to drive short-term and long-term planning.

Otonomo Automotive Data Services Platform is comprehensive by offering data from the United States, Canada, Europe, and Asia, covering more than 18 million passenger and commercial vehicles. Connected vehicles generate data streams from infotainment units, fuel systems, advanced driver assistance systems (ADAS), and other systems that monitor vehicle operations. The data ranges from status attributes, such as doors state, battery voltage, or remaining fuel to driving data such as distance travelled, and fuel consumption to environmental data such as road signs or conditions.

Traffic Data
Understand movements across urban areas with trip data from select cities. See times spent in particular urban locations.

Road Sign Data
Gain deeper insights into the features of the road system with road sign data from the ADAS systems from more than 500,000 vehicles.

Parking Data
Help drivers find parking spots faster with access to real-time parking information.

Hazard Data
Reduce road accidents and increase driver safety with real-time road hazard data from connected vehicles across Europe and North America.

BMW CarData
Gain access to quality data from millions of BMW and MINI vehicles. Leverage dozens of attributes and types to deliver innovative personalized driver services.

Mercedes-Benz Data
Build new products for Mercedes-Benz customers. With drivers' consent, you can utilize pay-as-you-drive (PAYD) data, electric vehicle (EV) charging data, fueling data, vehicle security data, and more.

Sources: https://otonomo.io/data/

Avis Budget Group Data
Unlock new value from data generated by a connected fleet covering an estimated 4 million road miles this year and grew to 7 billion road miles in 2020.

Construction Data
Take advantage of near real-time and historical data that is regularly sent by connected construction equipment. The data is cleansed, normalized, and aggregated.

Commercial Fleet Data
Take advantage of historical vehicle data from commercial fleets worldwide to identify trends over time and gain valuable insights.

Otonomo's Networked architecture for simplicity and scale made drivers' consent less complex
Otonomo Consent Management is one of the features in the automotive data platform that enables driver-specific consent rather than per vehicle consent. It provides an efficient way for connected car drivers to take control over the sharing of their vehicle data. Vehicle identification number (VIN) / location is the personal data, and the hub provides both interfaces and APIs that OEMs and other data providers can utilize to incorporate consent management into their apps.[16]

This helped the company to eliminate the difficulties and to become the leading connected car data solutions in the industry which can be considered as sophisticated, comprehensive, and full of advanced development capacity.

MLB Commentary
Car data is an essential element in a smart city project for the autonomous driving. In addition, insurance, vehicle manufacturers, authorities and retailers can leverage the data to explore possible business opportunities. Otonomo can integrate all data into one platform for third party operation, thus disrupting the car data market.

Otonomo's Use Cases Summary

Use Cases	Advantages
Smart cities	1. Urban area less congested, reducing environmental footprint, 2. Create accurate, optimized, data driven solutions
Safety & Emergency	1. Detect accidents in near-real-time, improve response time 2. Quick response to location data. 3. Real-time/ historical data on accidents, to identify hazardous road
Fleet Management	1. Location monitoring, route optimization, demand prediction 2. Health of fleet monitoring, potential hazard prevention 3. Parking / fuel system management 4. Maintenance prediction
Mapping	1. Capture dynamic traffic information, temporary road change 2. Location analysis, navigation, autonomous vehicle development
Concierge	1. Vehicle as a wallet, for parking, gas, tolls, EV charge 2. On demand for washing service, car checkup, EV charge
EV	1. Perform efficient charging station recommendation and planning 2. Optimizing charge load for money saving
Insurance	1. Offer usage-based insurance products, pay as you drive & pay how you drive 2. Driver behavior and monitoring, mileage verification 3. Improve accident reconstruction modeling for claims.
Diagnosis	1. Vehicle health indicators alert, with early insight
Construction	1. Theft prevention and recovery 2. Prevent future accident by reconstruction building events 3. Competitive insurance premium obtain 4. Fleet management 5. Predict regional economic activity and in favor to deployment
Traffic management	1. Improve real-time traffic flows, adjust traffic signals, metering lights, toll systems 2. Detection of traffic accidents, road conditions, weather etc 3. Accident prevention
Parking solution	parking space detection in urban area, payment calculation
Maintenance	capture vehicle health data and predict the maintenance schedule
Media	personalized advertisement based on habit and locations

Sources: https://otonomo.io/

ELECTREON

Transforming Roads into Charging Assets

The next Smart City Israeli startup is ElectReon.

Like the experience of Formula E in the Real Racing game, ElectReon[17] Wireless has developed an electric road technology that charges the batteries of electric vehicles as you drive using the electrical battery section. The concept uses magnetic coils that are placed under the traffic lanes and charge the vehicles' chargers wirelessly, using magnetic induction. This helps to reduce the weight of electric vehicles, and only a relatively small battery is needed. The system includes a management unit located on the sides of the traffic lanes of the electric road, and a receiver unit located in the vehicle's undercarriage.

Smart mobility and smart cities are intrinsically linked – each benefits the other
More than 14 countries and over 20 cities around the world have proposed banning the sale of passenger vehicles (primarily cars and buses) powered by fossil fuels such as petrol, liquefied petroleum gas and diesel at some time in the future to achieve the Zero-emission target[18].

Motor Company Chairman Bill Ford[19] once said in a Ted Talk event that the solution is 'smart'; but building smart cars is not enough, we also need smart roads, smart parking, and smart transportation systems in a future of zero emissions, and with the freedom to move around that we have today.

ElectReon wireless induction technology can be one of the solutions
This Israeli start-up sees the Electricity Paving Road as the future[20]. Conductive coils are used that can wirelessly charge battery-powered cars, buses, and trucks, offering a fix for the biggest hurdle in the emerging EV industry: range anxiety. ElectReon Wireless Ltd., the company Ezer co-founded in 2013, has lined 6 kilometers of roads in Israel and Sweden to prove the viability of the idea, and it's working on similar projects in Germany and Italy.

ElectReon Technology composed of 4 major units
1. Under-Road Units
Infrastructure built of copper coils under road surface transfer power to vehicle receiver.
2. Vehicle Unit
There is a receiver installed in every vehicle to transmit energy from the under-road copper coil directly to engine and battery while driving.
3. Management Unit
Installed under or at the roadside. Safely transfers energy from the electric grid to the road infrastructure.
4. Central Control Unit (CCU)
Provide fleet orchestration & smart data on all registered vehicles.

What are the advantages:
- Battery size can be reduced, made cheaper, lighter, more efficient, and allows more space for passengers and cargo
- Better utilization and minimizing idle time due to charging
- Range anxiety reduction because the dependency on battery performance is resolved
- Reduces deployment investment as this is a shared platform for all EVs
- No space occupied for charging stations saving land resources and visual hazards
- No need for new grid infrastructure and transformation stations as the solution may benefit and leverage on existing infrastructure
- Due to electrification, the solution can help minimize pollution and carbon emissions
- Distributed renewable energy systems will get supports by connecting to multiple renewable energy stations along the routes

Projects to confirm the technology
ElectReon began its project in Sweden, and will progress further to Israel, Germany, and Italy. All projects are collaborating with local communities and universities for sustainable development. Let's look at their projects one by one and see how their solution can help build a better smart city in the future.

Project Tel Aviv Israel – Starting September 2020
in partnership with the local municipality and the Dan Bus Company, the project is in deployment status which includes a 2km route with 600m wireless charging path between Tel Aviv University Railway Station and Klatzkin Terminal in Ramat Aviv.

This project makes use of an e-bus with a super capacitor battery and the solution has been applied for the purpose of urban public transportation.

Sources: https://www.electreon.com/projects-tel-aviv

Project Gotland Island, Sweden – Starting in 2018
This is the world's first wireless electric inter-city road system, using an Electric Bus and an Electric Heavy-Duty Truck as pilot vehicles to test the system for intercity long haulage.

The project is in deployment status and includes a 1.6km long electric road, part of a 4.1km route between the airport and the town center of Visby on Gotland Island, Sweden

Sources: https://www.electreon.com/projects-gotland

Project Karlsruhe, Germany starting December 2020
This project is cooperating with an energy utility in Germany, using an E-bus shuttle with a Li-ion battery, charged by the first wireless electric road system in the country. The project is operated by Karlsruhe Transport Company, VBK

The project is in pre-deployment status and applied for urban public transportation purposes. The wireless electric road system will power a bus line that will connect the new EnBW training center in Karlsruhe's Rhine harbour to the local public transport system.

Sources: https://www.electreon.com/projects-germany

Project A35 Toll Road in Lombardy, Italy
Heavy-duty vehicle, charged by the first wireless electric road system in Italy.

The wireless electric road system will power a one-kilometre section of road, adjacent to the A35 toll road, operated by BreBeMi.

Sources: https://www.electreon.com/a35-italy

TECHNOLOGY
ELECTREON - WIRELESS DYNAMIC CHARGING

Management unit on the side of the road transfers the energy from the electric grid to the road infrastructure

Receivers are installed on the floor of every vehicle to transmits the energy directly to the engine and the battery. Driver habits are not affected

Infrastructure of copper coils covered by rubber

https://www.electreon.com/

We need to understand that the electric vehicle is very good, but the battery is not very green. The more we consume EVs, the more we consume electricity which is powered by pollution-causing materials and with limited resources such as lithium and cobalt.

ElectReon is offering a solution to crack the code using internal combustion while reducing the carbon footprint. This is an important factor that a smart city will need to take into consideration so people living in the city may move with ease and freedom.

Strategic Partners

https://www.electreon.com/

Technology Roadmap

https://www.electreon.com/

Sources: Company

Static and semi-dynamic charging at taxi queue

Sources: Company

Static charging at depot and terminals and dynamic charging along the rout

Sources: Company

Static charging at loading docks of distribution facilities and semi-dynamic charging at entry/exit queue

MLB Commentary

It is believed that adaptation to the electric vehicle will be the global trend over the next decade, however, the size of battery, the peripheral facilities including power supply is inadequate and inconvenient currently. Disruptive game changers in power supply will enjoy enormous business opportunities. Wireless charging during driving may be one of the solution providers. With the ElectReon technology advantage of reducing battery size of up to 90%, and proper EV fleet management and monitoring allowing greater efficiency and accuracy, we believe stakeholders can also enjoy the benefits. Below is a summary of the benefits.

Advantages of wireless dynamic charge
- Lower capita / maintenance cost
- No lost real estate changes. Visual changes
- No unnecessary stops
- Saving in energy consumption
- Reduction of battery size

13

GIVING VEHICLES THE SENSE OF TACTILITY

The first company profile that opens the page of our Urban Mobility section is Tactile Mobility[21]

Founded in 2012, Tactile Mobility aims to provide smart and autonomous vehicles (AVs) with the missing tactile sensing and data that make vehicles smarter, roads safer, and enhanced mobility-ecosystems. Its tactility-sensing innovation empowers multiple data solutions that maximize safety, user-experience, and driving efficiency in the mobility industry. The technology can provide safer, more efficient, and enjoyable driving.

Their proprietary big data engineering grasps consumer behavior and habits plus user spending patterns in order to achieve the sense of tactility. Smartphones and Apps are used as supplementary tools to collect users' information that could be further integrated and analyzed. Their vehicle sensors will collect ambient driving conditions / environmental data as well as the behaviors and needs of the drivers and passengers. All the information will be shared with the stakeholders including regulators, authorities, car manufacturers, insurance companies, and tire manufacturers for tackling problems and improving the ecosystem.

Normal sensor limitation
Autonomous vehicles equipped with lidar can normally play the role of the human eye, which can calculate the speed of the vehicles and determine braking on time. However, drivers' feelings were not taken into consideration when coming across potholes, like grip level, and feel when impacting a bumper and more.

How Tactility works?
Tactile mobility provide autonomous vehicles with a sense to be able to "feel" the road. Their solution is to provide the autonomous vehicle with a sense just as the driver feels.

The "feeling" includes on and off ramp maneuvering, being thrown about, the feeling of driving too fast, or hitting a bump or pothole. This leverages on sensor usage to feel the road and improve safety and comfort.

Tactile mobility offers a software solution embedded in the vehicle with computers onboard the ECU's while the company will make use of the data collected from multiple non-visual existing sensors, such as wheel speed, wheel angle, wheel rpm., etc., and act like a probe to feel the road, mapping data such as the road bump and cracks, oil spills, etc.

The advantages of Tactile Mobility are to ingest all the data to fuse, clean any noise, and then use AI technology application to allow them to derive insights and valuable information that will be reflected to the vehicle's computer which will then improve the context to make better informed driving decisions. Tactility brings safety to the drivers' attention, such as braking on time which is essential for the further development of autonomous driving. For example, vehicles' visual sensors allow the calculation of its own speed and keep a safe distance from the vehicles ahead. However, a grip level must be developed in future, in order to know how sharply a brake must be applied before they start to slip.

Advantages of tactile mobility
Tactile mobility's software-only, ECU embedded, low-footprint technology ingests, fuses and analyzes data from dozens of existing onboard vehicle chassis sensors.

- Eliminate driving risk
By utilizing a pipeline of signal processing, machine learning, physical modeling, proprietary algorithms and sophisticated qualifiers, Tactile Mobility delivers a wide range of insights about vehicle health, road quality and driver behavior.

ABOUT

We are here to catapult the mobility industry into far-reaching frontiers, by unleashing the power of tactile data.

Tactile Mobility's multidisciplinary team of innovators has been passionately honing the missing sense for superior driving, since 2012. With presence in the U.S., Germany, and Israel, we apply our vast experience in signal processing, AI, big data analysis, embedded computing, and more, to transform the mobility industry.

This data is also uploaded to the Tactile Cloud in real-time, producing crowdsourced insights that can alert others of road risks.

- From Individual to Network
Tactile mobility has already been in collaboration with car makers including, BMW, Porsche, Ford, Toyota, and car parts manufacturers Nexteer, and more. There are hundreds of thousands of vehicles sharing information through the Tactile Mobility platform which turns vehicle into real-time mobile road probes.

- DNA model
By uploading virtual sensor data from multiple vehicles to the cloud and analyzing it, VehicleDNA™ and SurfaceDNA™ are the models which cater to real time auto responses and reliable mapping information.

VehicleDNA™
This model represents the unique attributes of each vehicle's engine efficiency, braking efficiency, tire health, weight, fuel consumption, and more. Data is downloaded back to each relevant vehicle, ensuring that the embedded software has the most updated and accurate context available, for improved ongoing calculations and performance. It is also commercialized with customers such as Fleet Managers and Operators.

SurfaceDNA™
Model road features, such as grades, banking, curvature, normalized grip levels, and location of hazards such as bumps, cracks, and potholes are recorded. Data is downloaded to vehicles roaming the specific area, enabling them to prime the embedded software with insight on the road ahead, improving safety and user experience reaction time. This model is also specifically invaluable for third-parties such as mapping companies, road authorities, municipalities, fleet managers and owners, OEMs, and insurers.

https://tactilemobility.com/

Applications:
Tactile Mobility uniquely offers real-time grip estimation plus grip and hazard map based on actual reading which improve the safety of autonomous vehicles.

Grip level governs the behavior of a vehicle on a road surface – how hard it can brake, how sharply it can turn, and how quickly it can accelerate without losing grip.

Real-time data
This offers safer driving based on improved grip level, smarter braking, adaptive cruise control, more effective drivetrain management, adaptive suspension systems, and more. Hundreds of Toyota vehicles across Israel are being tested.

Vehicle data
Tactile mobility's vehicle data feed offers enhanced after-market maintenance recommendations, based on actual trends and anomaly indications like variations in power performance, tire health, fuel consumption, brake functions, and more.

Surface data
Tactile Mobility enhances safety by enabling smart and autonomous vehicles to "feel ahead" based on tactile pavement rating and pothole allocation maps, created from crowdsourced vehicle data.

https://tactilemobility.com/

GIVING TIRES A SENSE OF TOUCH

Our software-only AI-based solution ingests, fuses and analyzes vehicle-level and fleet-level data to deliver both in-vehicle indications and cloud-based analytics insights

GIVING CAR INSURANCE A SENSE OF TOUCH

Our software-only AI-based solution continuously and automatically monitors a wide range of vehicle, environmental, and driver behavior parameters

TECHNOLOGY

High-resolution tactile sensing and data analytics platform, fueling the future of autonomous vehicles and smart cities

Our data services are based on Tactile Mobility's technology platform comprising two advanced software modules, an in-vehicle embedded software and a cloud module, which can be provided as standalone solutions or combined together to reinforce each other

How the disruptive solution benefit stakeholders?

Road Authorities – Maintenance ahead of accidents

Imagine if the road authorities track the road conditions in real time at a lower cost, they can stay ahead of the curve and make necessary repairs before they have to sink exorbitant sums into the maintenance and repair works. The US spends USD6 billion per year for road repairing, paying for the costs associated to but not limited to weather, car accidents, flat tires, rim bending, and more.

Auto Insurer – new insurance landscape

Auto insurers need better technology to evaluate the situation and improve risk measurement. Tactile Mobility's can provide a richer and more accurate picture of risk on vehicle, driver behavior and road characteristics, which is in favor to create personalized risk profiling and detailed accident reporting. 64% of the insurance premiums calculated are tied to behavior. In the status quo, insurers do not account physical and functional road conditions, vehicle dynamics and health and how driving styles differ according to conditions. This implies that a new insurance landscape will be developed.

Fleet Manager – directly related to cost control

Since tread depth is crucial in vehicle safety - increasing the vehicles' ability to grip the road, brake efficiently on slippery surfaces, avoid aquaplaning and ensuring driver and passenger safety are essential. Replacing tires is one of the largest expenses for fleet managers; therefore, the ability to monitor tread depth in real-time greatly reduces their vehicles' downtime due to excessive tire wear and ultimately cuts costs.

Car / car parts manufacturers

Beyond the performance aspect of the road connection, the feedback can play an important role in giving the driver a sense of hazardous road conditions either on ice, gravel, or rutted surfaces. Nexteer, a global OEM for steering and driveline businesses, already works extensively on software-tuning for steering feel. It expects to get even better with real-time data collection on vehicle environment by using Tactile Mobility's software. The collaboration will equip BMW Group's vehicles including Mini and Rolls Royce with the ability to analyze the road surface to enhance performance.

MLB Commentary

Seeing road safety is one of the the most crucial parts in smart city planning and deployment. Drivers also expect better experience and comfort as they rely on driverless technology. In future urban mobility, Tactile Mobility uniquely offers real-time grip estimation and mapping based on actual readings which will largely improve the safety of autonomous vehicles as well as the associated industries and ecosystem.

Their collaborations with BMW, Porsche, and others are representing the tactile solution of the startup serving the automotive industry, municipalities, road authorities, fleet managers, and insurers that make a better driving tomorrow. We believe this not only disrupts the vehicle design but also the car insurance landscape and driving ambient conditions thereby improving the driving experience.

https://tactilemobility.com/

Brodmann
The next generation of perception software for automated driving.
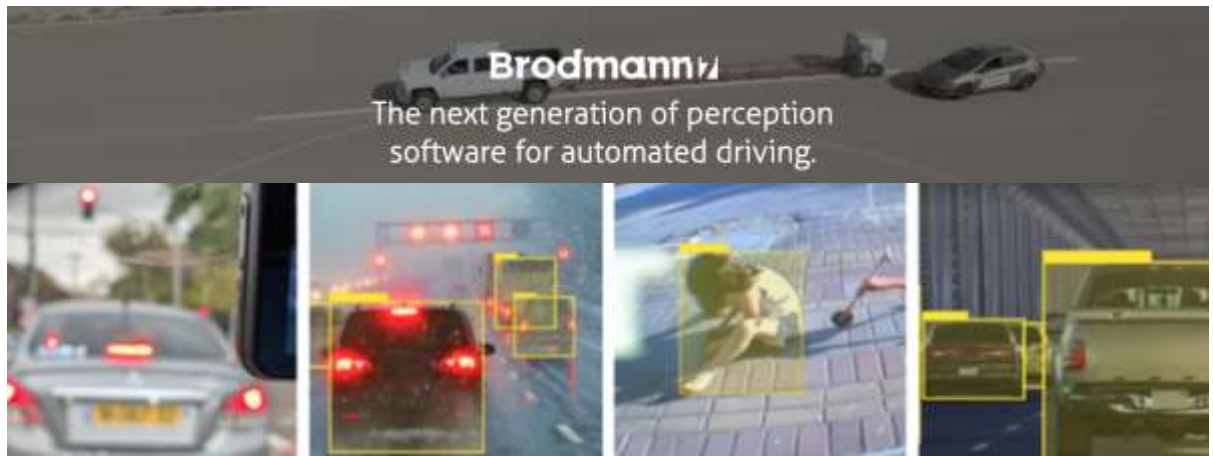
Another urban mobility company we are going to cover is Brodmann17[22]. Brodmann17 is the leading provider of software-only perception-patented technology for automated driving. With just a fraction of compute power and with highest accuracy, they enable the transition of AI capabilities from premium to mass-market.

Its technology opens the doors for low computation implementation of AI – significantly lowering cost, complexity, and price, and can be used over many sectors and industries. Brodmann17 enables 95% cost reduction and a massive reduction in the calculations needed to produce accurate computer vision capabilities. This disruptive technology is the deep-learning perception technology offers performance improvement on any hardware, including low-powered processors, such as ARM cores (No need for GPU or other AI accelerators). It allows artificial intelligence and deep-learning programs to run on cheaper standard computer processors, like those in mobile phones and laptops, rather than on expensive specialized processors usually required for data-heavy applications.

As the CEO – Adi Pinhas once stated, the platform can reduce the price of features like dashboard cameras and monitor driving by as much as 50%, making them more affordable to consumers.

Our mission is to bring our life-changing technology to the mainstream

The future of transportation will be greatly enhanced by AI technology. Our mission is to accelerate the development and adoption of this important technology by creating affordable AI solutions which maintain the highest accuracy. This will bring AI found in premium vehicles to the mass market, enabling smarter cars and safer roads.

Brodmann17 was founded in 2016 when a team of deep-learning world-class talents came together to accelerate the adoption of AI in our everyday lives. the technology was already implemented and installed in a commercially available field proven NCAP certified product.

Driving technology

It is believed that Autonomous driving will be big business, while Advanced Driver-Assistance systems (ADAS), one of the crucial elements, is projected to reach over USD92 billion by 2025. Thus, highly reliable AI-based vision technology is in great demand. AI and Machine learning powering features like automatic emergency braking, keeping cars in their lanes, and self-parking are expected to grow significantly.

Vision based

Broadmann17 Ltd., a mobility software company providing vision-based AI solutions, brings automated driving to the mainstream on any hardware in the automotive industry. It engages in the development of automated deep learning training platform, specifically designed for automotive-grade ADAS/AD solutions. The platform protects against human error and lowers associated risks.

Technology Applications
Fleet Management ADAS

This solution is based on patented deep learning neural networks, built from the ground up especially for the automotive offering top accuracy.

A set of fundamental building blocks developed with top automotive companies and designed for the industry's toughest standards. These modules require just a fraction of computing power compared to any other solution available today.

Aftermarket ADAS

It was created for emerging aftermarket devices that offer ADAS functionality on top of basic dash-camera functionalities, ideal for fleet management and driver scoring. The system was designed to use available resources in existing dash cams and provide long distance object detection.

Deploying State of the Art Deep Learning on Edge Devices in Several Minutes with Brodmann 17
Dr. Amir Alush

Front camera Active Safety Software

Brodmann17's front active safety software is purely based on deep learning and groundbreaking AI, providing object detection & tracking, TTC estimation and full-fledged ADAS functionalities. A set of Euro NCAP-compliant functions rely on ADAS building blocks was full-fledged, including:

- Forward Collision Warning
- Lane Departure Warning
- Pedestrian Collision warning
- Adaptive cruise control
- Autonomous emergency braking
- Lane Keep assist
- Traffic Jam Assist & Highway pilot

Rear/ Surround Camera ADAS

Brodmann17 offers surround view ADAS software that use AI to provide life-saving alerts with 360 degrees coverage. It can overcome extremely challenging weather conditions tailor made for specific applications. This solution provides the following warnings including 1.) Rear Collision warning pedestrian / vehicle collision warning and 2.) Identifying objects in blind spot areas to ensure safe land changes.

https://tactilemobility.com/

*Surround View Perception Building Blocks*
A set of fundamental building blocks designed for the industry's toughest standards. These modules are based on deep learning vision technology that accurately detects vehicles, pedestrians, and other objects at just a fraction of computing power.

Services	Detail of services	Results
Time to Collision (TTC)	Determine potential danger	Warn driver ahead of time
Cost reduction	System classify the reason for a sudden break was a dangerous lack of focus or a safe response	Address driver behavior, reduce insurance cost
True edge solution	Collision avoidance system at the edge	Fleet managers get real-time road insights

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Novel neural-network inference

Brodmann17 engineered the core deep learning algorithms and patented a new neural-network (NN) technology. The result is a NN with identical accuracy, however, with a much smaller number of calculations, enabling faster and lower power-compute networks compared to the standard NN approach. This allow the company to have the advantage on the improvement of runtime and power plus the accuracy even on the low power processors.

https://tactilemobility.com/
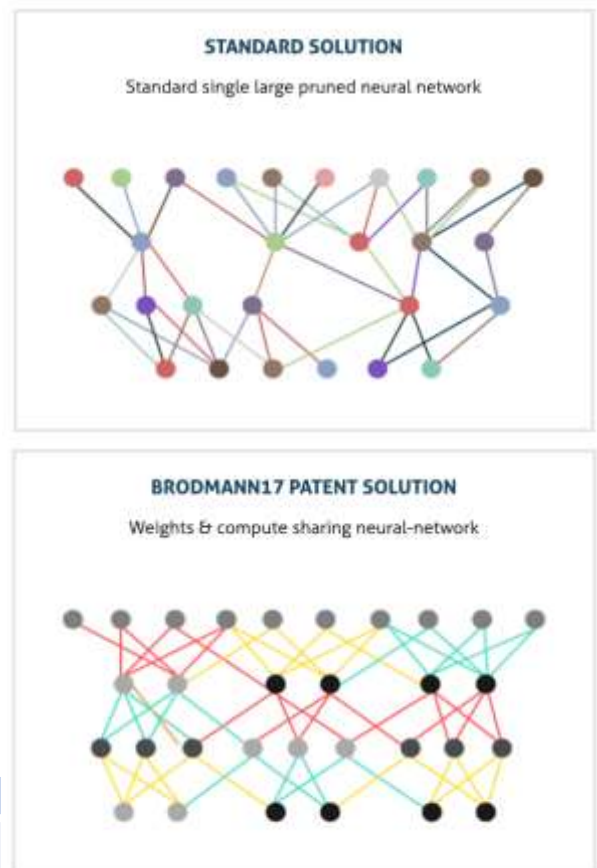
Brodmann17's automated training platform - automotive grade

Brodmann17 has developed a unique platform in order to swiftly bring automated driving to the mass market.

We bring artificial intelligence found in
premium vehicles to the mass market

This comprehensive platform ensures the best neural-network for any given challenge and processing power by optimizing the entire neural-network training process based on their IP: the data selection, parameter tuning, neural network architecture search (NAS) and deployment to target embedded processors for runtime benchmark.

Scale Brodmann17's Operations and improve complex process
The training platform was developed as a neural network production line to scale Brodmann17's operations and improve the highly complex process of training and NN deployment that cannot be done at scale manually.

Performs Methodological searches over thousands of servers simultaneously
The training platform performs methodological searches and continuously re-iterates over thousands of servers simultaneously. As the platform is cloud-based, it is infinitely scalable, and the training process can be completed as quickly as it is required.

Reduce Time to market and costs efficient
The automation of the training platform removes most humans' mistakes and lowers associated risks, while reducing time to market and justified the costs.

Cloud based. No privacy issue
The cloud-based training platform and Brodmann17's partners are given to the authorities to access the data and monitor their training process which can also avoid privacy issues.

Brodmann17's partners

https://tactilemobility.com/

Conclusion
Built from the ground up patented deep learning technology specially designed for automotive industries and vision for mass market applications…

Brodmann17 provides the world's most sophisticated and efficient ADAS solution. The technology offers top accuracy for commodity processors, used by leading tier-1 automotive suppliers and fleet management companies for both integrated and aftermarket solutions.

This advanced ADAS technology significantly improves automated driving systems by optimally balancing performance, accuracy, hardware constraints, and price, creating a golden path towards smarter mobility that is accessible to almost everyone.

You may wonder how the name was given? The company was named after the 19th-century researcher, Prof. Brodmann, who identified area number 17 of the human brain as the one responsible for processing visual information.

Fund raising
Brodmann17 has raised USD11 million in a Series A round of funding led by OurCrowd, with participation also from Maniv Mobility, AI Alliance, UL Ventures, Samsung NEXT, and the Sony Innovation Fund. The company competes with Intel's Mobileye, services being developed by other OEMs like Bosch, and BMW. The investor can provide not only capital but also collaboration opportunities for the company.

MLB Commentary
Autonomous driving involves expensive R&D and hardware installations. However, Brodmann17 lowers the expenditure in core equipment which facilitates R&D and installation costs and applies to the mass market. Autonomous driving first commercial efforts will come in the form of advanced driver assistance systems (ADAS). Thus, be the early bird investor in this startup which will bear great fruit.

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Israel High Tech Solutions @ Events

Event	Date
CES 2021 IS All-Digital	2021 Jan 11 - 14
Asian Financial Forum AFF	2021 Jan 18 - 19
MedinIsrael 2021 (Virtual)	2021 Apr 20 - 21
CommunicAsia Singapore	2021 June 9 - 11
MWC Barcelona	2021 June 28 – 2 July
Israel's AgriFood Week 2021	2021 Oct 24 -28
FinTech Week HK	2021 Nov 1 -5
MEDICA Germany	2021 Nov 15 - 18

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