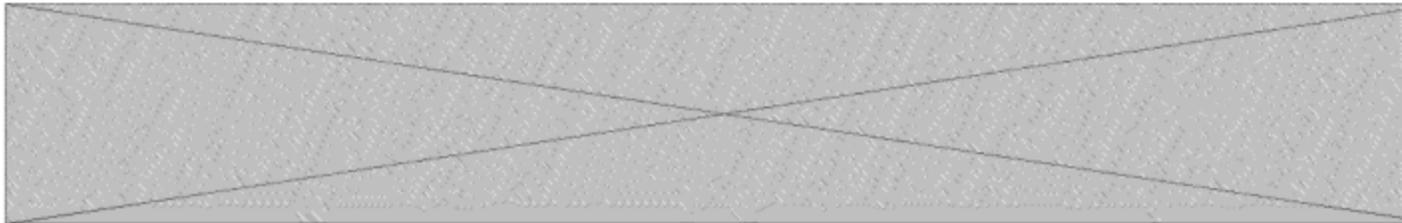**To:**   jeevacation@gmail.com[jeevacation@gmail.com]
From: AFHU
Sent: Tue 5/28/2013 5:49:25 PM
Subject: Amnon Shashua and the MobilEye in the New York Times

Title: AFHU EMAIL

Amnon Shashua, the Sachs Professor of Computer Science at The Hebrew University of Jerusalem, and invent
of the Mobileye, is the subject of an article in the New York Times, May 27th, 2013. You can see a video of
Professor Shashua demonstrating Mobileye to President Barack Obama here.
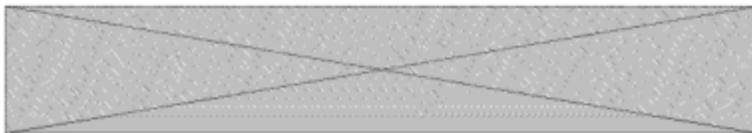
At High Speed, on the Road to a Driverless Future

By JOHN MARKOFF

JERUSALEM — Last month, on a freeway from Jerusalem to the Dead Sea, I sat in the driver's seat of an Au
A7 while software connected to a video camera on the windshield drove the car at speeds up to 65 miles an ho
— making a singular statement about the rapid progress in the development of self-driving cars.

While the widely publicized Google car and other autonomous vehicles are festooned with cameras, radar and
the laser range finders called lidars, this one is distinctive because of the simplicity and the relatively low cost o
its system — just a few hundred dollars' worth of materials. "The idea is to get the best out of camera-only
autonomous driving," said Gaby Hayon, senior vice president for research and development at Mobileye Visior
Technologies, the Israeli company that created the system in the Audi.

The Mobileye car does not offer the autonomy achieved by Google's engineers. The Google car, which has bee
tested for more than 300,000 miles in California traffic, will merge onto freeways, drive safely through
intersections, make left and right turns, and pass slower vehicles.

By contrast, the Mobileye vehicle is capable only of driving in a single lane at freeway speeds, as well as
identifying traffic lights and automatically slowing, stopping and then returning to highway speeds.

But by blending advanced computer vision techniques with low-cost video cameras, the company is
demonstrating how quickly autonomous driving can be commercialized. "You cannot have a car with $70,000

equipment," said Amnon Shashua, a computer scientist at Hebrew University and a founder of Mobileye, referring to Google's lidar system, "and imagine that it will go into mass production."

Elon Musk, the automobile and spaceship entrepreneur, recently made headlines by saying much the same thing. Mr. Musk said he was interested in designing self-driving versions of his Tesla automobiles, possibly in partnership with Google, but in an interview with Bloomberg Mr. Musk said lidars were too expensive to be used in production cars. Like Google, Mobileye is not an automobile company, but rather a technology firm that is intensely focused on developing the next generation of artificial intelligence software.

The company was founded in the 1990s, after developers persuaded General Motors to buy an inexpensive camera that could detect vehicles in adjacent lanes.

Since then it has grown into a major supplier of automotive safety technology, all based on designing advanced algorithms that add "intelligence" to inexpensive cameras.

Mobileye has recently begun offering the third generation of its technology, which companies like Volvo have promoted for its ability to detect pedestrians and cyclists. Nissan also recently gave a hint of things to come with a demonstration of a car that could automatically swerve to avoid a pedestrian who walked out from behind a parked car. The system was based on Mobileye technology.

As soon as this summer, the first limited systems offering a feature known as "traffic jam assist" will begin arriving from more than five major automobile makers. Those cars will drive safely in stop-and-go traffic, but will require that drivers keep their hands on the steering wheel.

But more advanced systems will be introduced as early as 2016, according to Mobileye, and it was that advanced capability I experienced last month, during my foray in freeway traffic.

With two Mobileye engineers, Dr. Hayon and Eyal Bagon, we drove several miles east of Jerusalem, where Mobileye is located, and then pulled off at a nondescript turnout where another Mobileye employee waited in a shiny white Audi A7.
On the way out of town, the two men were apologetic. This was a work in progress, they told me.

I was already feeling a little let down. In California in 2010, I had been the first reporter to drive in the Google car, a Toyota Prius fitted with sensors that created a remarkably detailed map of the world around the car. Moreover, it was connected wirelessly to the Internet, giving it access to a vast cloud-based set of data that could be matched to what the local sensors were seeing.

It was a tour de force. The car merged seamlessly with traffic on Highway 101 and then turned off the freeway to automatically drive through downtown Mountain View, Calif., where Google has its headquarters. It was taken out of automatic pilot just twice — while passing a cyclist and then again to back into a parking space. The Google engineers did not want to chance a mishap with a reporter on board.

There was no such caution last month with the Mobileye engineers.

"Why don't you drive?" Dr. Bagon suggested as he slid into the passenger seat behind a large display and keyboard. Dr. Hayon jumped into the back seat, and I had no choice but to get behind the wheel.

The Mobileye engineers proceeded to give me a rapid-fire lesson on how to drive their robot car: Turn on the automatic navigation by pressing the cruise-control button and then pulling a stick on the steering wheel towar you to activate the "lane-keeping," or steering, feature.

In a display projected onto the windshield, you can see the speed and an icon that lets you know the auto drivir feature has been switched on.
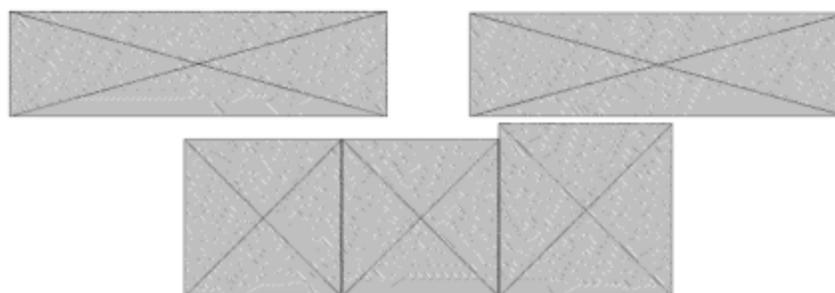
Following another engineer who had taken off in a car ahead of us, we pulled onto the highway. After a false start, I engaged the autopilot, and off we went; I put my hands in my lap and tried to relax as we snaked down desolate canyon road on our way to the Dead Sea. When the car ahead of us slowed for a stoplight, it took all my willpower to keep my foot off the brake and trust the car as it rolled smoothly to a stop behind it.
In the Google car, I had felt detached from the machine intelligence that guided it. As the car piloted itself through its first curve, there had been an eerie more-human-than-human sense.

But in the Mobileye car I was acutely aware of the autopilot's limitations. The car had a tendency to weave a b when it started to pull away from an intersection — behavior that did not inspire confidence. Once, as we were passing a parked car, the Audi pulled in the direction of the other vehicle. Not wanting to learn the car's intentions, I lifted my hands out of my lap and nudged it back to the center of the lane. The Mobileye engineers sat perfectly calm.

Later they told me that by the end of the month, the single camera would be supplemented with an array of five more: a wide-range camera and additional side-mounted and rear-facing cameras. The goal, they said, was to build a system with the same capability for autonomous driving as the Google car's.

After 20 minutes of freeway driving, I pulled the Audi off at an intersection, and then put it back on autopilot and headed toward Jerusalem. The demonstration was not as eye-popping as my Google ride, but it gave me a clearer understanding of what the automobile industry has in its sights.