Spring Biomed Vision – Revolutionary News for Early Diagnosis of Systemic Diseases

Revolutionary news for early diagnosis of systemic diseases, from Alzheimer's to heart diseases, arrives from HaNevi'im (The prophets) St. in Haifa, where the high-tech company, Spring Vision operates in the field of ophthalmological multispectral imaging.

Spring Vision developed a medical device, using an innovative technology, originated in Sheba Medical Center, enabling detection of systemic diseases based on analysis of an image of the retina. The image acquisition lasts only a tenth of a second, in a non-invasive process that uses different wave-lengths of light, emitted from an array of light emission diodes (LEDs). The revolutionary artificial intelligence (AI) -based retinal imager, ***iCapture45***, was selected to participate in an upcoming experiment at the international space station (ISS). This has been a joint initiative by the Ramon foundation and Sheba Medical center. The experiment is expected to measure the damage caused to space-tourists' vision during a short-duration spaceflight, due to the lack of gravity forces at the station. A previous device, developed by Spring Vision's CEO and Spring Vision's leading R&D team, is being used by NASA since 2012 at the ISS.

"The potential in using our technology is tremendous. Our vision ", said company's CEO, Noam Allon, and BOD Chairman, Ravi Shapira, "Is to provide cost-effective, easy-to-use and efficient diagnostic devices for retinal diseases detection, and to make Spring Vision an international leading company in the field of multispectral imaging, by finalizing the development of a groundbreaking autonomous, non-invasive, immediate capturing diagnostic technology of both retinal and systemic diseases. This technology can be available and affordable to every ophthalmology clinic, because of its low cost, compared to the current expensive retinal cameras found in hospitals. The image taking process comprises minimal inconvenience to the patient. Interpretation of the captured images is done automatically, using unique methods and algorithms, developed especially for this innovative device."

The basic idea of the technology was originated at the Advanced Technology Center in Sheba Medical Center, and was conceived by Prof. Arie Orenstein, an international expert in medical laser technologies, and his team, and Prof. Michael Belkin, one of the most renowned ophthalmology experts in Israel. The scientific and technical development was done at Spring Vision, where both scientists act as investors and shareholders as well.

The company has six registered patents in the field of medical imaging (two of them were licensed from Sheba Medical Center), such as mapping small blood vessels in the retina, tissue oxygenation, retinal images capturing automation and 3D capturing of the optic nerve head.

"The huge advantage in mapping small blood vessels", said Prof. Eyal Margalit, head of clinical research at Spring Vision, who is an ophthalmology expert and retina specialist, eye surgeon at Poriyah, Assuta and Ma'ayan hospitals, "Is that most common and severe diseases are manifested initially in bodily blood vessels, and that most systemic diseases have specific features reflected in retinal blood vessels. Spring Vision's revolutionary device enables us to detect changes in small retinal blood vessels, as warning signs for systemic diseases such as heart diseases, diabetes, kidney diseases, and even neurological diseases such as Alzheimer's. Thus, high resolution imagery of retinal blood vessels provides physicians with substantial information about other pathologies in the patient's body at the same non-invasive capturing method."

Prof. Margalit adds: "An educated use of our medical device allows, among other possibilities, and after analysis of the captured images, early detection of Alzheimer's disease. One of the most significant features of Alzheimer's disease is protein (amyloid beta) accumulation in the patient's brain. This protein accumulates in the retina, which is in fact part of the brain, as well. Detection of this protein in the retina during the multispectral imaging will give an early warning sign, without the need for invasive exams such as sampling of brain tissue. This is an important breakthrough, as the only FDA approved medication for Alzheimer's disease nowadays is effective for the very early-stage patients".

The second innovative aspect of the new device is its ability to determine the oxygen levels in retinal tissues (and not only in the retinal blood vessels), as a measure of its proper activity. It's accepted that the health of body tissues is measured by their oxygenation level. Spring Vision's technology allows such oxygenation measurements, simultaneously with imaging of blood vessels, and the combination of both these aspects is a true breakthrough in modern medicine, after a proper clinical proofing.

The Israeli Innovation Authority's (part of Israeli Economics Office) has funded Spring Vision with five grants, all dedicated to research and development of the iCapture series. The company has just recently gotten the required approvals for human experiments, aimed to map small blood vessels, at Carmel Hospital and Sheba Medical Center for 300 subjects, as well as 10,000 subjects in six hospitals in India, and two leading medical centers in the USA. In addition, the company is progressing rapidly towards filing for an iCapture45 FDA approval.

To summarize, the advantages of the revolutionary device, the ***iCapture45*** has the ability to image the retina in a very short time, overcoming the rapid eye movement (about 250 times in a second). Current devices in the market acquire images in a much longer period of time, making it harder to compose and interpret the retina's image. Other advantages are high resolution of the images, a large field of view of the retina, AI-based data analysis, testing and decoding of the image in three seconds, cost-effectiveness (less than a quarter of the price of other diagnostic devices in hospitals), no need for pupil dilation prior to capturing the retina, no need in using invasive procedures or intravenous injection of pharmacological agents such as fluorescein, a substance with potential mild to fatal side-effects, and the ease-of use, allowing the device to be installed on any commonly-used ophthalmic slit-lamp.

"The information available to ophthalmologists from standard retina examination, using currently available equipment, is only a quarter of the information received using the revolutionary iCapture45, and it's applicable to a variety of customers. For example, our device is clearly an amazing solution to any insurance company, struggling with assessing the general health state of each client. The data received from our examination will provide an effective platform that will enable lowering premium costs for healthy individuals with a younger biological age (as opposed to chronological age)", said Noam Allon.

Noam Allon, the CEO of Spring Vision, has been working in the field of medical imaging for over 36 years, since he graduated his studies at the Technion, Israeli Institution of Technology. Prior to his current position, Noam was the head of R&D at Shamir Optical Industry. In 1994 he established MediVision Ltd., a publicly traded medical imaging company, which was later a\sold to an American company, which was bought by IBM several years ago. One of MediVision products is used, as mentioned above, by NASA to examine the damage caused to astronauts' eyes while staying in low or zero-gravity conditions for long periods of time.

Noam Allon joined Spring Vison in late 2018 as CEO and investor, driven by the potential he saw in the field of mapping retinal blood vessels and detecting the oxygenation level of tissues. "Throughout the many years I have been working in this field, the need for automatic tools to gather and analyze data received from retinal imaging, without surgical intervention, is growing. At Spring Vision, I discovered the ability to make this dream come true."

Spring Vision's BOD Chairman is Ravi Shapira, a CPA who is a serial entrepreneur with three successful exits in his record. He served as head of counseling division at Deloitte, and the head of financial committee at Bezeq Telecom for many years.

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