

Oculi adds the human eye to Artificial Intelligence

■ Staff

Oculi, an artificial vision startup, is hard at work creating technology that is transforming computer/machine vision for edge applications, such as smart and interactive devices at home, office, and in vehicles, including those used in gaming and the Artificial Reality (AR)/Virtual Reality (VR) market.

The company's Real-Time Vision Intelligence (VI) technology was developed by founder and CEO Dr. Charbel Rizk at Johns Hopkins University. It led to the creation of Oculi's flagship product, OCULI SPU (Sensing and Processing Unit), the world's first smart programmable vision sensor. The

chip combines the efficiency of biology, more specifically the human eye, and the speed of machines to

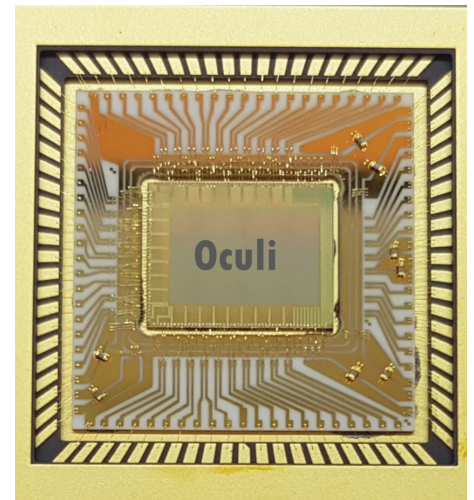
make computer vision faster and more efficient.

We caught up with Rizk to better understand Oculi's vision technology, the problem it solves and the progress the company is making to transform smart and AR/VR devices.

SOLVING THE CHALLENGES OF MACHINE VISION TO ENABLE NEW POSSIBILITIES

The way traditional cameras reconstruct images for human consumption works well for electronic and printed media, but it's inefficient and limiting in computer/machine vision. Imaging sensors continuously transmit data, much of it irrelevant, which creates a data deluge that often leads to latency (the pesky time lags that make gaming far less enjoyable), energy waste, blurring, and inaccurate signal information.

Traditional imaging sensors are also inefficient, requiring a large processor, electricity



Oculi SPU. (Image provided)

(i.e. wired), and time to process. These requirements add significant expense to manufacturing costs and have prevented mass production of game-changing features and devices, such as gesture control for displays and TVs, people detection for appliances, and effective in-cabin monitoring. As these markets evolve, machine vision needs to be revolutionized to enable products for mass production.

“Machine vision to date involves a conventional architecture, including a dumb



Dr. Charbel Rizk

image sensor and a processing platform,” said Rizk. “The current state of the market—including the need for face, eye, and hand tracking; low latency; and reduced power consumption requirements—is too complex and expensive for this old model.”

OCULI PROVIDES REAL-TIME, MORE EFFICIENT MACHINE IMAGING

In 2019, with nearly 20 years of research and development under his belt — preceded by stints as a Senior Systems Engineer for Boeing Douglas and Boeing North America/Rockwell Aerospace — Rizk spun Oculi out from Johns Hopkins and launched its revolutionary product.

Oculi solves the fundamental problems of traditional computer/machine vision by offering an integrated sensing and processing module, transforming the dumb imaging sensor to a smart programmable vision sensor. Its main product offering is a sensing and processing unit (SPU) that is capable of performing tasks at the pixel level and at the edge. Useless data doesn’t need to be sent back to a cen-

tral processor or the cloud to be processed. The OCULI SPU knows what data is needed from a scene and ignores the rest, so there’s less data to be analyzed or stored. This reduces power requirements and latency so action can be taken in real time and at the edge.

“By emulating the human eye, Oculi offers a first of its kind vision sensor that enables a natural and immersive user experience under any lighting conditions—indoors and outdoors,” said Rizk. “It does this 30 times faster and at one-tenth the power drain, while also protecting privacy and providing security, and it does it at a fraction of the cost. Our technology is ideal for edge applications, such as always-on gesture/face/people tracking and low-latency eye tracking.”

LOOKING AHEAD: THE FUTURE OF OCULI

Rizk estimates that Oculi will achieve significant revenue in the next five years. As an early-stage company, its initial focus is on Original Equipment Manufacturers (OEMs) and Tier One manufacturers that are looking to solve fundamen-

tal vision challenges and deliver new smart and interactive products to various markets. It’s currently piloting OCULI SPU with several manufacturers.

To speed the commercialization of its technology and advance its business, Oculi is one of 10 startups from around the world working at the Luminate NY accelerator at NextCorps in downtown Rochester. With support from Luminate and introductions to its network of potential partners and investors, Oculi hopes to secure additional funding and partnerships to scale operations for mass production, expand sales, and develop advanced versions of its SPU products.

“Oculi is working hard to transform artificial vision by improving its quality and efficiency,” said Dr. Sujatha Ramanujan, managing director of Luminate. “We’re confident that the team’s dedication and expertise will help to create products that propel numerous industries into a new era of optics and machine vision.”

For more information, visit www.oculi.ai. To get updates on Luminate and the emerging technologies being developed in Rochester, go to www.luminate.org.