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Liberty Robotics – Using Machine Vision AI with 3-D Volumetric Sensing to Enable Robots to Analyze Objects or Scenes and Effectively Guide Them to a Multitude of Tasks and Applications

Bob Berry
President and CEO

Liberty Robotics Inc.

Interview conducted by:
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CEOCFO Magazine

CEOCFO: ***Mr. Berry, what is the overall focus of Liberty Robotics Inc., and why are you now Liberty Robotics and not Liberty Reach?***
Mr. Berry: We are focused on 3-D volumetric sensing to guide industrial robots for many applications. We strategically chose to transition from Liberty Reach to Liberty Robotics as it more accurately represents the market and applications that we serve. Our focus lies in leveraging 3-D vision to effectively guide robots to a multitude of tasks and applications. This branding mirrors our evolving mission and underscores our dedication to innovation and excellence. That was the purpose of moving towards the name Liberty Robotics.

Machine Vision AI is our tagline. Before this, just with the name Liberty Reach, a lot of prospective customers would ask what we did, as the name didn't reflect our purpose. With Liberty Robotics and the tagline Machine Vision AI, I think it showcases our commitment to being in the forefront of technology and advancing automation.

CEOCFO: ***Would you explain the Machine Vision AI and how it relates to robotics?***
Mr. Berry: When programming industrial robots, their forte lies in executing repetitive tasks efficiently. However, they fall short when it comes to adapting to unforeseen part variations and shifts. By equipping robots with visual perception capabilities, we enhance their intelligence. Our technology enables robots to analyze objects or scenes using 3-D sensors, empowering them to perform diverse tasks with precision. This marks a significant departure. While conventional programming ensures a robot moves from point A to B consistently, it struggles to adapt when the environment changes. Our technology bridges this gap by enabling robots to recognize and respond to such alterations autonomously.

CEOCFO: ***Would you give us a few examples?***
Mr. Berry: A common application in automotive would-be picking parts out of racks for instance or picking parts out of bins. The problem is the racks get bent over time, they change and the parts are not always in the same spot. Our vision will look at the position of the rack, it will look at the position of the part and it will guide a robot to go in and accurately grab the part and then put it into a tool or a fixture or another assembly for manufacturing. It could be welding, gluing, or many other applications.

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CEOCFO: *How is information transmitted to the robot?*
Mr. Berry: Our cameras are different than typical machine vision cameras. When I say 3-D, there is a distinguishing difference between 2-D and 3-D. Most people are familiar with pixels, as it relates to 2-D cameras. We use voxels. A voxel is a volumetric pixel. The 3-D sensors that we offer will provide an X coordinate, a Y coordinate, and a depth coordinate. We take hundreds of thousands of these voxels, and we get full 3-D geometry of the scene or object. We immediately compare the digital model back to the reference model to determine where the robot needs to be guided. We guide the robot in full six degrees of freedom space to its new corrected location. All of this happens in a few hundred milliseconds.

CEOCFO: *Are your systems added to robots?*
Mr. Berry: Typically, yes if it is a new project. We have several different partners out there, but we work with all the different industrial robot companies. There is a plethora of companies that provide industrial robots. Our customer, the end customer, would buy the robot and they might have an integrator that would install and implement a full system.

In many cases, the integrator will be responsible for implementing a full assembly line, but we are just a portion of that line. We would provide our sensor technology; we provide the software and any ancillary equipment that goes with it and we would work with the integrator to install the system. That would be the case where it is a brand-new project and a new robot.

We also can retrofit systems where they already have an existing robot. Sometimes we replace competitors' vision systems because ours are more efficient and effective. Other times they may not have a vision system, but over time they start to run into issues with availability and they want to add vision, so we can come in and retrofit and integrate into an existing line as well.

"While many companies in our industry talk about utilizing AI in their software, what distinguishes us is that our AI capabilities are powered by our own proprietary algorithms." Bob Berry

CEOCFO: *What makes your 3-D vision systems better?*
Mr. Berry: With our method of using voxels, we have a complete 3-D holistic view of a scene, as opposed to 2-D vision, which relies on special lighting and contrast. Our sensor technology works with non-visible light so we can run in the dark without any light. We are not susceptible to any ambient light changes like other systems. We get a full 3-D image of the part so it makes it easier to interpolate in 6 degrees of freedom where both translations and rotations of where that part is compared to a 2-D system.

Another big differentiator of our system is our lighting fast calculation times for full 3-D. For example, we can look at an object that could be as large as the size of an entire vehicle, image it, figure out where it is in 6 degrees of freedom, and send information to the robot for guidance, all in about 250 milliseconds. We are taking vast amounts of information, and we are calculating what the robot needs to do and what tasks the robot needs to do and doing it all in the sub-millisecond timeframe.

CEOCFO: *Do potential end users as well as potential integrators understand the difference at Liberty Robotics or is it still about education?*
Mr. Berry: It is still about education for some companies, but many companies that we work with, especially in the large automotive OEM's, understand the advantages of our technology and have already adopted it. We are in pretty much every major automotive OEM in North America. There are still a few that are still using the antiquated 2-D vision technology because that is what they know, and they have used it for so long. I think once they see the advantages of our technology, and realize its effectiveness, it will become imperative for them to adopt it, otherwise they will be behind their competition.

We continually enhance our technology based on customer feedback. What we have done recently is combine some of the features that 2-D offers and integrate them with our 3-D features, giving our customers even further capabilities to do things. Now we can image the part, image 2-D and 3-D features, and provide better accuracy, robustness, and reliability.
Liberty Robotics Inc. interview continued on page 5.

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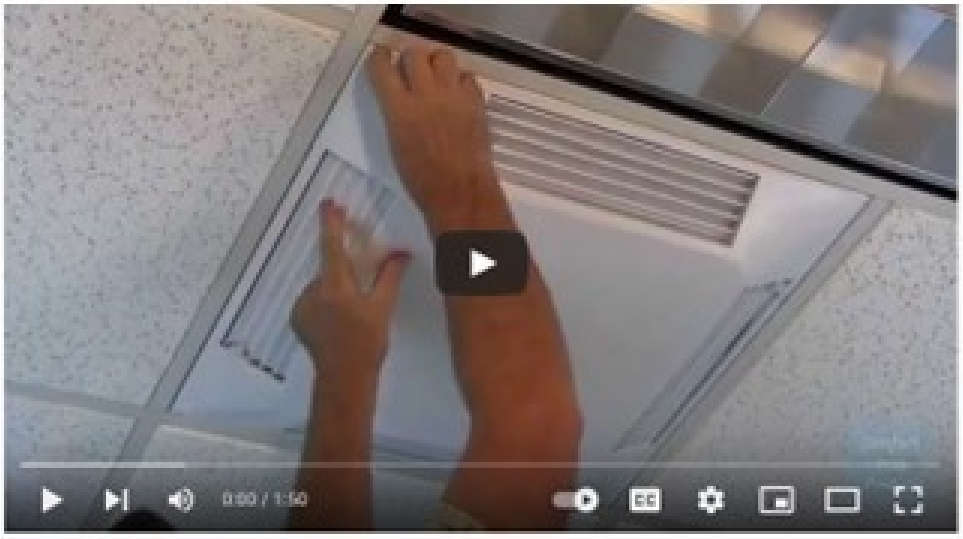

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CEOCFO: ***What is the business atmosphere today?***
Mr. Berry: I think the good news is that because we are in the automation space, companies are looking for ways to become more efficient and save money. The cost is continually trending higher for labor and benefits, and the price of industrial robots has come down. Our technology facilitates the replacement of repetitive tasks traditionally performed by plant and facility workers. Consequently, we stand to gain a significant advantage, with favorable market conditions offering numerous opportunities. Hence, we maintain an optimistic outlook regarding the economic landscape in the next three to five years.

One of our key areas for continued growth is the automotive industry. There is still a lot of runway left in automotive for us, including battery handling, battery sealing, body shop applications and more. We are also moving into the warehouse and logistics space which traditionally has utilized a lot of manual labor, and a lot of ergonomically challenging tasks that people do not want to do, which is a perfect opportunity to utilize our vision technology coupled with robotics to do those tasks. Those tasks include things like palletizing, so putting mixed case or mono case boxes onto a pallet, or depalletizing, where the system can remove boxes off pallets, and putting them onto conveyors.

We also get involved with a practice called decanting, where you remove an entire layer of a pallet and then you parse out all those boxes or products and pack them efficiently into plastic totes that would eventually go into an ASRS system. This is a storage and retrieval system that is used for sending various products out the door to multiple stores and venues.

CEOCFO: ***How do you stand out in conferences like MODEX where there are so many different companies with ideas? What have you learned about how to get your story out?***
Mr. Berry: There are a lot of players out there that are trying to get into this same space that have taken a lot of money from VC's or private equity. They are putting up large booths and doing a great deal of marketing but there is very little substance behind them. For us, we have a product that works in a production environment and most of the customers who are looking for this technology, I think are smart enough to see through what a demonstration system is and what is an actual saleable system.

A show like MODEX is so large and there are so many companies, vendors, and suppliers out there that it is hard to navigate through that. Therefore, we tend to focus specifically on users that we know can use our technology. It is a more targeted approach, versus just trying to hit the broad market and try to gain customers that way.

CEOCFO: ***You have several offerings, are there some that gain more attention than others?***
Mr. Berry: Our best-selling and our bread-and-butter products are what we call the V-Fix and V-Guide systems, which are used extensively in the automotive industry. We do a lot of business in the paint and sealer shops where they use our technology to find the vehicle and apply, for instance, interior seam sealing, under-body sealing and roof-ditch sealing. We also do high-accuracy closure hem sealing which is a functional and cosmetic seal around doors, tailgates, and hoods. Other applications include part handling, as well as pick and place applications.

The beautiful thing about our product is it can be utilized across all manufacturing goods. Now we are making some headway in the heavy equipment industry with our product. We are also making headway into recreational vehicles where they are using our technology for guiding robots for gluing and joining components, and that sort of thing. We have other companies that are large organizations worldwide using our technology to find, for example, a vehicle that requires inspection. They might be inspecting paint quality or looking at scratches or dings, and the technology that they have is required to get close to the vehicle to get an accurate reading. They even use us in some cases while the vehicle is moving down the line, to give them the accuracy that they need to do their inspections.

We are used with several different OEM vendors where we supply that technology to them. I would say that V-Guide and our V-Fix products are our most widely used products, however we see a tremendous opportunity and growth with picking and packing products for warehousing and logistics. These are our V-Pick and V-Pack products.

CEOCFO: ***How do you spend your time as CEO; what is your focus day to day?***
Mr. Berry: My main focus revolves around operations, and day-to-day activities, while collaborating closely with various teams within the company. One important team is our product development team, where we're deeply engrossed in

creating products for the market. Research and development are pivotal here, with nearly half of our staff dedicated to this endeavor. Managing and supporting this group in their tasks is one aspect of my role.

Another critical area of operations is project development or project engineering, which involves working alongside our teams to execute projects destined for our customers in the field. Customer-centricity is paramount for us. It's not just about having superior products; it's also about providing excellent service and support, building lasting relationships with our customers. I strive to foster a culture within our organization that prioritizes these values. At Liberty Robotics, two of our core values are "delight the customer" and "sweat the details," aiming to outperform our competition and exceed customer expectations.

Overall, my primary objective is to lead our teams and managers in both operations and product development. Alongside the typical CEO responsibilities like monitoring cash flow and analyzing financial statements, my engineering background drives me to ensure we consistently deliver outstanding products. Moreover, I aim to cultivate a collaborative culture within our team, focused on achieving success for our customers.

CEOCFO: ***Final thoughts, what should people remember about Liberty Robotics?***
Mr. Berry: As a small and agile company, we pride ourselves on our ability to adapt quickly to meet our customers' needs. What truly sets us apart from our competitors is our unwavering commitment to innovation. All the software and technology we've developed are completely proprietary to us. This encompasses not only the hardware and sensors but also the software itself.

While many companies in our industry talk about utilizing AI in their software, what distinguishes us is that our AI capabilities are powered by our own proprietary algorithms. We've invested significant time and resources into developing these algorithms in-house, ensuring that they're tailored specifically to our products and the needs of our customers. This unique approach allows us to offer cutting-edge solutions that are truly ahead of the curve.

Unlike many others in the market, we don't rely on popular open-source software packages such as YOLO or TensorFlow. While these are widely used by others, we've chosen to develop our own proprietary software. While the underlying mathematical principles may be similar, our approach is distinct.

One of the key differences lies in our methodology. Traditional AI systems often require extensive training with multiple images to achieve the desired results. However, with our technology, known as Pick On First Sight, we eliminate the need for exhaustive training datasets. This means we can start operating immediately, without the time-consuming process of running hundreds or thousands of samples through the system. Our approach allows for swift implementation and efficient performance right from the start.