



RADAR and AMD Transform Retail Inventory and In-Person Shopping Experiences

AMD Solution Helps RADAR Deploy Real-Time RFID & AI Inventory and Add Features with Hardware Over-the-Air Updates at Major Retailers

PARTNER

RADAR

INDUSTRY

Retail

CHALLENGES

Finding products in a store or warehouse can be challenging. Most systems can only show that a product is in the store, but not where it is located. What's more, brick-and-mortar stores have trouble competing with online retailers which can easily retarget customers to close sales.

SOLUTION

Using AMD Zynq™ adaptive SoCs, RADAR has created several retail solutions that help brick-and-mortar stores find products in seconds and use in-store behaviors to retarget loyal customers.

RESULTS

AMD is helping RADAR deliver real-time data to its customers, and the flexibility to add new features over the air, minimizing the need to replace physical hardware in the future.

AMD TECHNOLOGY AT A GLANCE

Zynq™ UltraScale+™ SoC

RADAR is a Software-as-a Service (SaaS) platform that combines RFID and computer vision to automate and augment retail store processes.

RADAR's technology offers exceptional speed and location accuracy, allowing brick-and-mortar stores to manage inventory efficiently through automated inventory counts. It also will measure customer-product interactions, giving physical stores similar insight into consumer behavior as online stores. RADAR is also building tools to help eliminate checkout lines with its autonomous checkout tool.

RADAR's model involves installing hardware once, then adding features over time using over-the-air updates. AMD uniquely offers RADAR the ability to expand the capabilities of its hardware via OTA updates, so as RADAR's customers evolve from basic service plans to premium services, the feature set of their hardware can be expanded without sending out a technician to make hardware upgrades.

CHALLENGE

RADAR was started in 2016 to help reduce checkout lines at stores and improve the retail experience for in-person shoppers. Since then, RADAR has raised more than \$70M dollars in funding to grow its business.

Today, the company is looking at three key areas: inventory tracking, cashierless shopping, and customer analytics.

RADAR CEO, Spencer Hewett, said the company is building inventory tracking systems for stores and eventually warehouses and distribution centers.

"Most stores have sales associates carrying a device that can tell them if a particular product is in the store, but not where it is," Hewett said. "If a product is moved by an associate or customer, the product could get lost, and the store could lose the sale."

RADAR puts sensors on the ceilings of stores or warehouses. These sensors use RF technology to identify RFID tags on products and create a live map of inventory in the building.

"With this technology we can identify 99% of the items in the store within a few feet of where it is located," Hewett added. "We are indexing the store much like a search engine indexes the web."

RADAR's second application will be cashierless checkout. It can tell retailers what people are buying and not buying. When a customer chooses to use the retailer's app for this purpose, they will be able to just walk out of the store and get charged for the products in hand without waiting in a checkout line.

Using this information, the retailer can then leverage RADAR's third application to retarget "opted-in" customers who visited the store with email, Instagram, or Facebook ads for products they may have been looking at but did not purchase. They could also send customers a promotional coupon at checkout.

SOLUTION

"Inventory analytics is a massive value-add to businesses today," Hewett said. "Most retailers have 65% to 80% inventory accuracy. With RADAR, every day you can shore up your store and have the products you need and find the products you want for customers much faster. It's a game changer."

RADAR holds a patent for combining computer vision cameras and RFID technology together in a sensor. This unique technology allows retailers to track products with great precision. Competing solutions can tell that a product is somewhere in the store, but with RADAR's technology, the product can be located in near real-time, saving significant time and labor costs. Artificial Intelligence (AI) is at the core of RADAR's technology. Machine learning and signal processing use deep learning AI models to improve accuracy, and all that processing is enabled by AMD technology.

RADAR recently announced that it is outfitting more than 500 locations at a major retailer with RADAR technology to ease inventory management, curbside pickup and in-store shopping experiences. The company primarily works with Fortune 500 retailers with more than 500 stores and at least \$2B in revenue.

AMD Zynq™ UltraScale+™ systems-on-chip (SoCs) are used in RADAR's sensor fusion retail system. Adaptive computing provided by these SoCs enable the real-time overlay of vision data with RFID tracking to not only track product inventory but also how customers are engaging with those products to gather more insights, not just generate data.

"Using AMD adaptive SoCs has been a game-changer," Hewett said. "What we're doing is at the cutting edge of emerging retail technology. It requires extremely custom parts that are able to meet what our algorithms are doing. From a compute and automation perspective, AMD is the only vendor offering a component with the customization and flexibility we need for our sensors."

Flexible Deployment Model

But if cutting-edge technology weren't enough, AMD has also created a revolutionary way to deliver its technology to RADAR. "AMD has pioneered a unique approach to serving customers that allows them to realize their vision in a more flexible and affordable way," said Chetan Khona, senior director of product marketing in the Industrial, Vision, Healthcare & Sciences

business unit at AMD. "RADAR is our first customer to leverage this new business model."

AMD took a Zynq UltraScale+ adaptive SoC and deactivated some of its functions. RADAR is then able to turn on certain hardware features down the road as the company or their customers' needs change, using secure codes assigned to each individual part. The company uses authentication and encryption technologies to help protect RADAR's "secret sauce." When they are ready to unlock new features, AMD enables RADAR to activate additional hardware capabilities over-the-air on an individual unit-by-unit basis, without sending a technician into the store.

"This brings another dimension in adaptability to the customer," Khona said. "We are able to expand RADAR's hardware on the fly by activating only certain numbers of products on an as-needed basis."

"We run a hardware business which can be low margin, but because of SaaS, we have built something that is sticky and can be used for long term. Eventually we can push more features over the air. This would not be possible without AMD. We would have to reinstall hardware every time we wanted to do something with more power, speed, or processing. With AMD we build once and then can grow our business by adding features -- similar to what you would see in a SaaS business model," Hewett said.

RESULT

Hewett said RADAR evaluated several options for compute in its sensors and chose AMD because it could handle multiple sensor inputs and wireless processing on the device in real time. Beyond that, the company was drawn towards its ability to unlock additional compute capabilities over time.

"AMD allows us to do business in a unique way," Hewett said. "It's a game changer for any hardware business—especially for a platform-to-service model like ours, where we can unlock additional features over time. It means we don't have to install new sensors at the customer site because we have the capabilities already built in."

WANT TO LEARN MORE?

About [AMD Zynq UltraScale+ MPSoC](#)

About [RADAR](#)

About RADAR

RADAR is a fully integrated hardware and software solution powered by RFID and enhanced by computer vision. Its heightened speed ensures immediate and accurate performance, even in the busiest of retail environments. The company is based in San Francisco, San Diego, and New York. More information is available at <https://www.goRADAR.com>.

About AMD

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