



The Augmented Kitchen

How Augmented Reality Will Build the Kitchen of the Future

KitchenPlan

“The camera is not just answering questions, but putting the answers right where the questions are.”

– Aparna Chennapragada, Google Vice President of AR & Google Lens

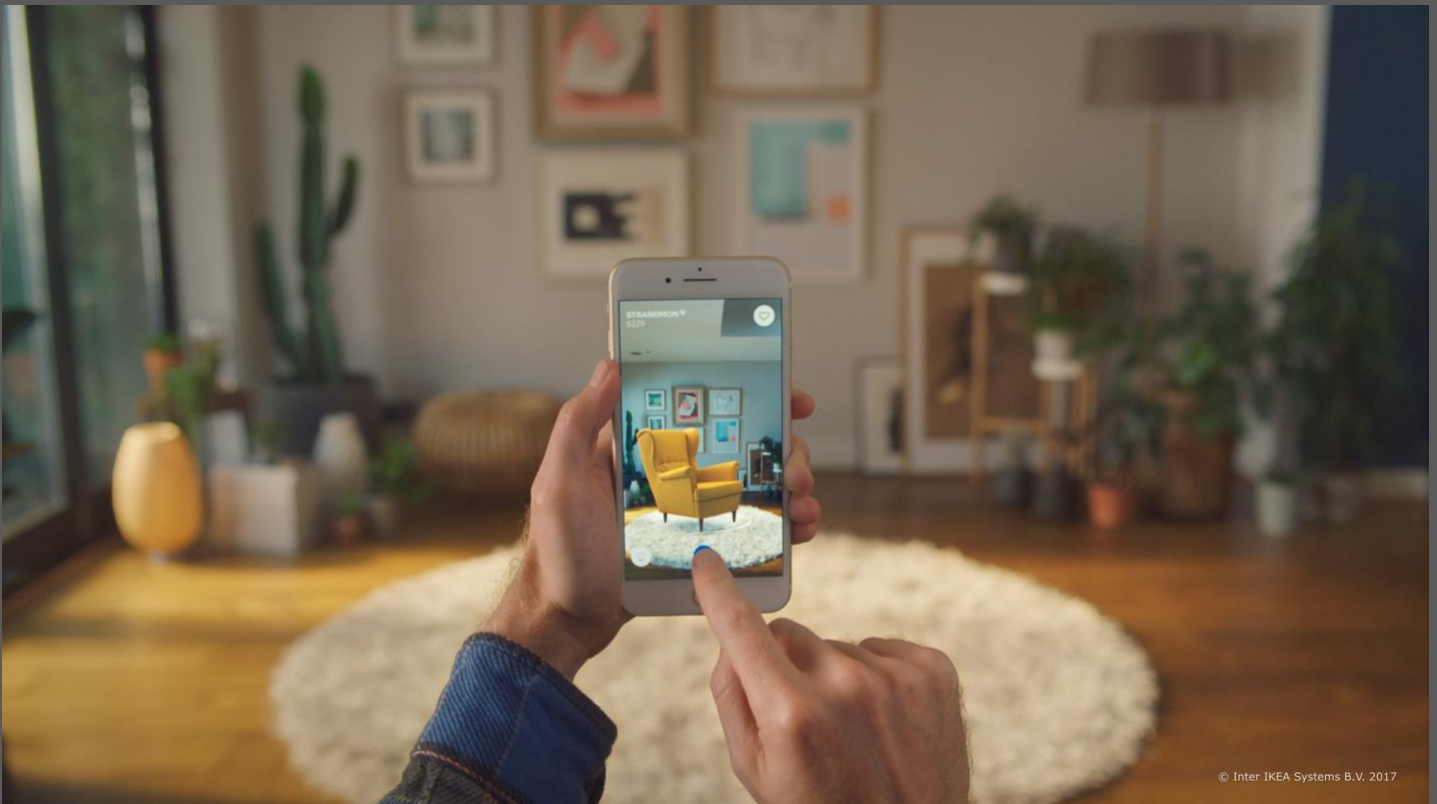
A Visual Future

Our future will be visual. There's unanimous agreement among tech analysts that we'll move from text-based information to immersive visual content that's all around us. This includes technologies that let us visualize digital information that's spatially anchored to relevant points in the real world.

We currently search for information through text queries on our devices, then look up to translate that info to the world around us – everything from navigation to products we want to buy. But our visual future will make those interactions more intuitive by pinning information directly to the physical world.

Otherwise known as Augmented Reality (AR), this involves digital overlays that inform us of our surroundings, and this technology is available on the smartphones we already carry.

In fact, the AR opportunity lies in its widescale availability. One billion global smartphones are currently AR-compatible according to ARtillery Intelligence, growing to 3.5 billion devices by 2022¹. This is advanced even further by AR that's accessed right in your mobile browser... you don't even have to download an app.



Not Just Fun & Games

You may have already heard of or even used AR. Some of its early forms have reached mainstream use through Pokémon Go and Snapchat selfie lenses. If you've ever put virtual dog ears on yourself through Snapchat, you know what we're talking about.

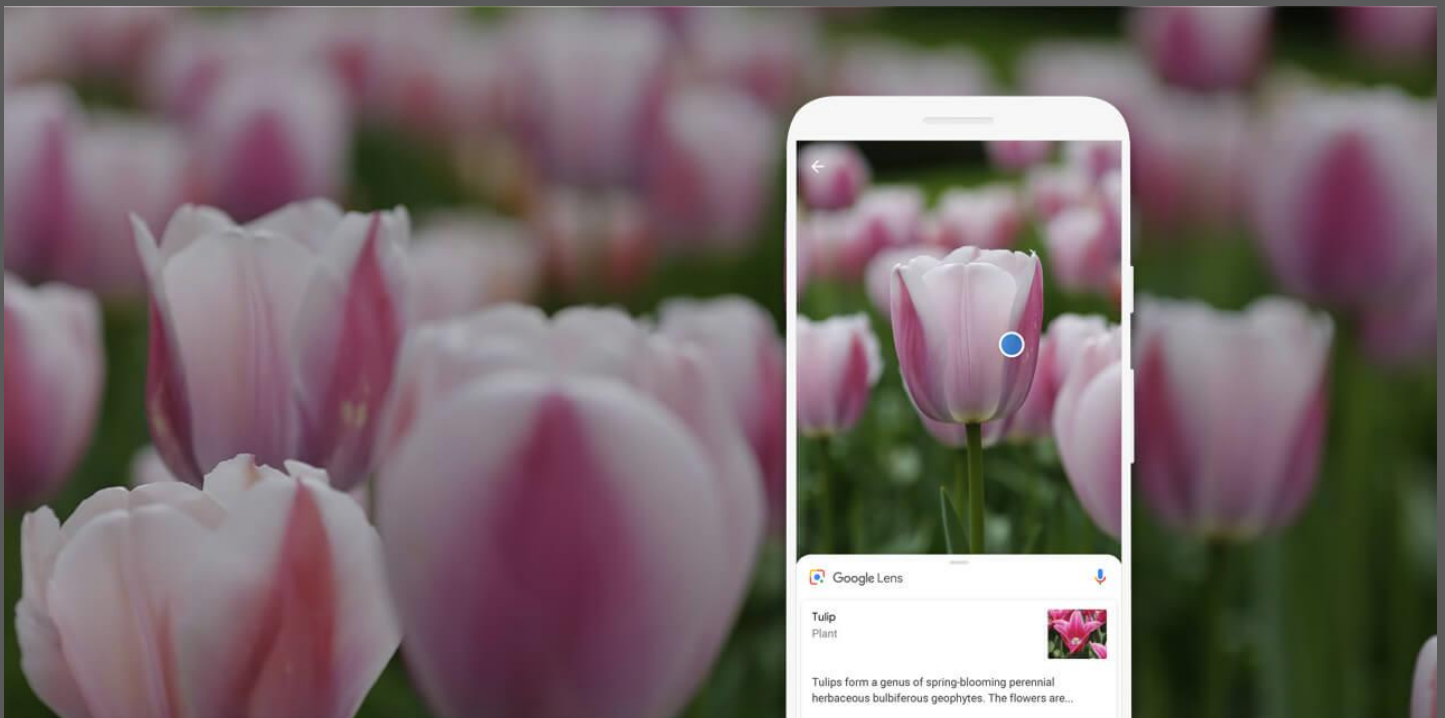
But these applications are the tip of the iceberg for AR's true potential. Like many technologies, AR has incubated through games and social apps. But as history tells us, it will grow into several other ways to improve our lives and work. That includes everything from workplace productivity to consumer commerce.

One way that AR is already colliding with commerce is through product visualization. Retailers like IKEA and car manufacturers like BMW let shoppers superimpose products in their homes and driveways to contextualize them. As you can imagine, this works best with big expensive items because it helps to see them virtually before ordering or buying.

And it's already working. Furniture goods and home services company Houzz reports that consumers are 11x more likely to purchase goods when given this AR home-visualization optionⁱⁱ. And they spend 3-times as much.

This new visual paradigm also applies to the way we've gathered information for the past 15 years: search. Extending from Google's mission to "organize the world's" information, the camera will be the new search box. Point your phone at objects to identify them. For example, Google Lens accomplishes this with computer vision and artificial intelligence – key ingredients for our AR future that we'll explore later in this report.

Just like mobile search, this will all be a free utility. But the real business case will be the smaller share of commercial-intent searches. This will be the launch point for the way we buy products and facilitate services with local professionals.



The Gathering Point

One of AR's opportune areas, as indicated by early usage trends, is home services. And a key subset of that is remodeling, where homeowners can get highly visual and immersive mockups of their spaces. This "spatial planning" provides more dimension and context than traditional methods which required a pencil, paper and tape measure to gather the needed data before one could enter room dimensions into CAD software and generate a 3D rendering.

Drilling down yet another level, a top area of home renovations is the kitchen – a gathering point for families and the source of our sustenance (important stuff!). In the U.S. alone, there are a reported 10 million kitchen renovations per yearⁱⁱⁱ, totaling more than \$50 billion in consumer spending.

But the process is mired in decades-old technologies and processes. Today, 8-10 person-hours^{iv} per project are wasted gathering measurements of the existing kitchen (a.k.a. "as-is" plan) during the idea and planning

phases. This information is required in order to get to the construction phase.

This is where AR's transformation intersects with the kitchen. In fact, kitchen construction and renovation are even more primed for AR than the furniture and car examples above.

Compared to those fairly standardized products, kitchen renovations involve bespoke assembly and coordination of several suppliers and installers. And there are several stages including planning and construction. The combination of AR and AI can create a digital visual thread that ties them all together.

If done right, AR can serve all stakeholders involved. Homeowners have the ability to "try ideas on", allowing them to make more informed stylistic decisions and to have a much better idea of what they are looking for, prior to meeting with a trade professional. This in turn saves time, money and errors, ensuring an overall better customer experience.



Capture, Create & Collaborate

How can technology solve these problems?

It's about the three C's: **Capture, Create & Collaborate**. Home owners and trade professionals can capture reliable measurements and kitchen components with the simple use of their smartphones. This is made possible by advances in image recognition (computer vision) and artificial intelligence, similar to Google Lens.

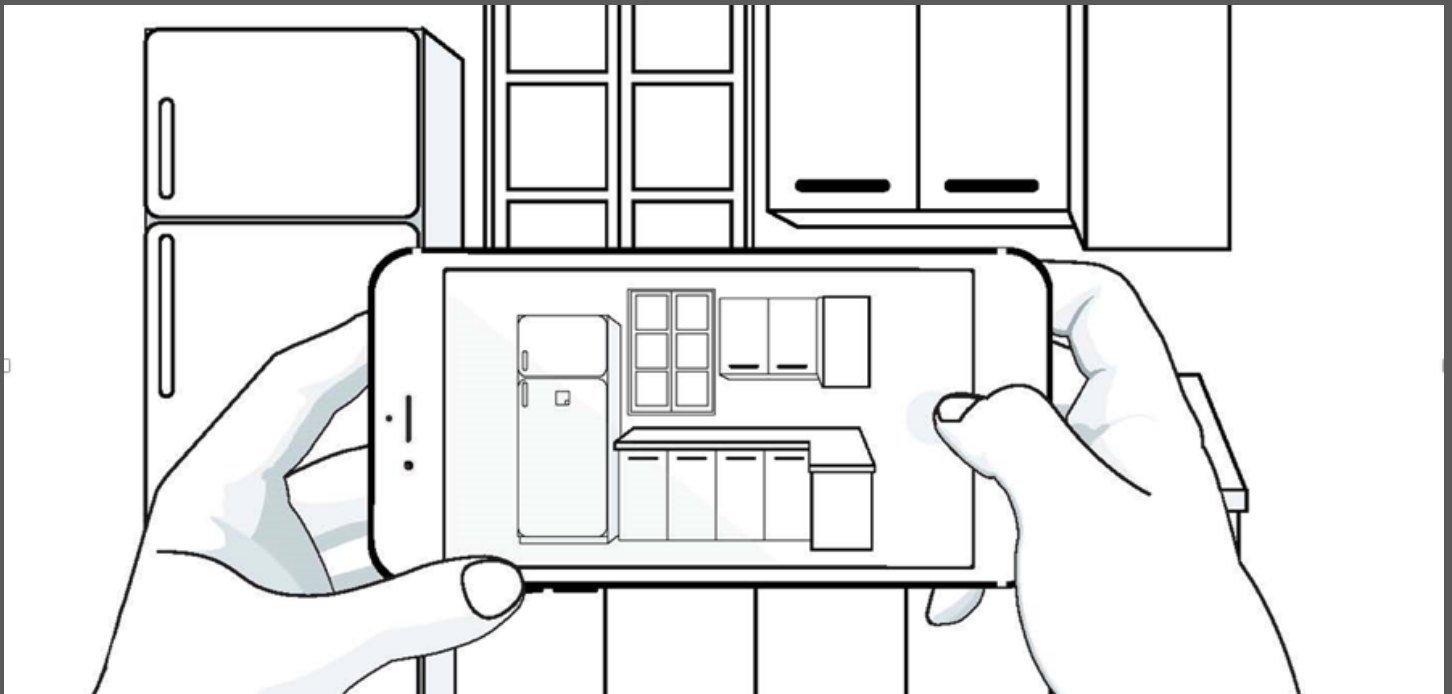
These technologies have trained the camera to take measurements using the phone's gyroscope and accelerometer to calibrate X, Y & Z world coordinates and to recognize objects like cabinets, appliances and countertops. They do this by matching detected objects with a database of 3000+ 3D kitchen artifacts.

Moreover, this capability is being unlocked through the mobile browser, as referenced

earlier, in a mode known as "web AR." This makes it more accessible to average homeowners, as it only requires a phone and a mobile browser such as Safari or Chrome.

Using these technologies, the existing scene is reconstructed, and a digital blueprint is created which can be shared electronically with kitchen pros, significantly improving communication and collaboration. This, in turn, cuts several hours from the traditional process of home visits to take measurements, thus boosting pros' efficiencies and reducing their costs, which can be passed along to the homeowner.

Last but not least, when the process is automated through AR, there's a database of measurements that can be saved by the consumer – a valuable asset that they can utilize during the project, as well as revisit throughout the life of their home.



Enter KitchenPlan...

KitchenPlan is an Augmented Reality-based company that has stepped up to address the above opportunities. With roots in the kitchen renovation industry, it knows the dynamics and pain points of this massive sector, and has streamlined the process of kitchen renovations for all stakeholder involved. Those include homeowners, trade professionals (architects, designers, contractors, property appraisers) and Non-Profits (Habitat for Humanity).

It does this by harnessing the power of AR to measure kitchen components, digitally share data with kitchen pros, maintain a database of measurements for the life of the home, and facilitate the philanthropic re-use of pre-owned materials. Altogether it reduces time, cost and waste.

KitchenPlan's unique intellectual property accomplishes this through Web AR, an emerging form of augmented reality that tech analysts agree is the next generation technology that's more accessible and user friendly than downloaded apps. This is especially true as 5G becomes available for the majority of homeowners, opening up capability that was once reserved for professionals with access to expensive 3D cameras and CAD software programs.

But the real story of KitchenPlan is told through its founder, Jim Gurule. Having worked in the industry for decades, Jim has seen, first-hand, the industry challenges and outdated methods outlined earlier. He knew there had to be a better way... so he invented it.



From Building Code to Programming “Code”

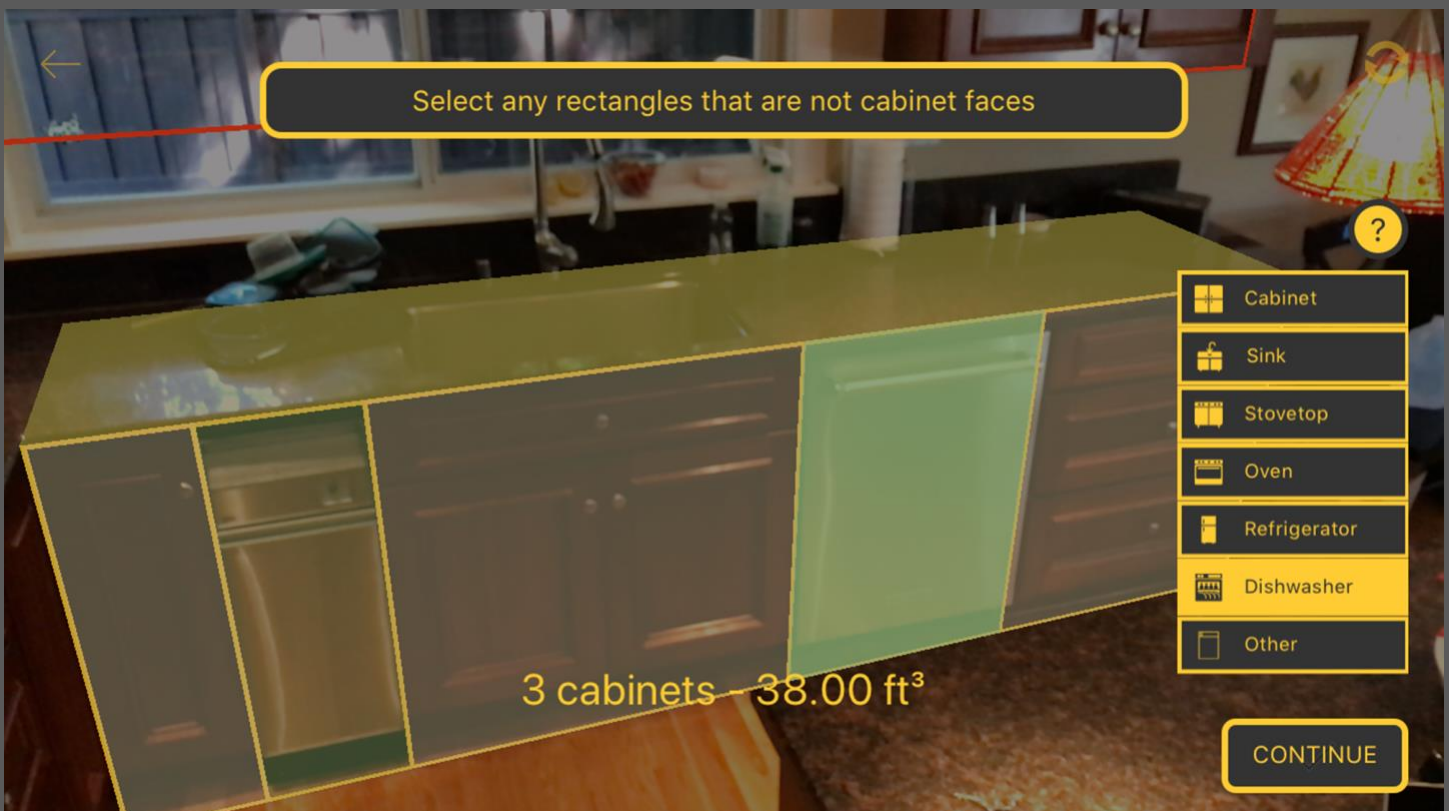
Before founding KitchenPlan, Jim Gurule was granted four patents related to kitchen renovation, such as a 3-way clamp that holds cabinets together so that they're aligned before fastening them with screws. This is a process that normally involves cabinets falling out of place as you frantically hold them together while trying to fasten them at the same time – a longstanding pain point. Millions of linear feet of cabinets have been installed using Gurule's patents.

This got Jim thinking in terms of three dimensions with X, Y and Z coordinates. Kitchen cabinets are essentially cubes, and that geometry is the same way that 3-D spatial computing – otherwise known as AR – operates. This realization kicked off Gurule's journey to digitize kitchen renovation.

As further background, just as your 2D computer screen or TV has “pixels,” 3D computing like AR has “voxels,” which is short for “volumetric pixel.”

Bringing that concept back to kitchen renovation, “installing boxes” (industry slang for cabinets) can be simulated digitally by “installing voxels.” And that's the same way the camera “thinks” in AR. It's the manifestation of yesterday's craft in tomorrow's technology.

So kitchen cabinets can be translated one-to-one into AR objects. And in a broader sense, the universal building code can be translated to programming “code.” These are the technological underpinnings and founding principles of the intellectual property developed by Gurule and KitchenPlan.ai.



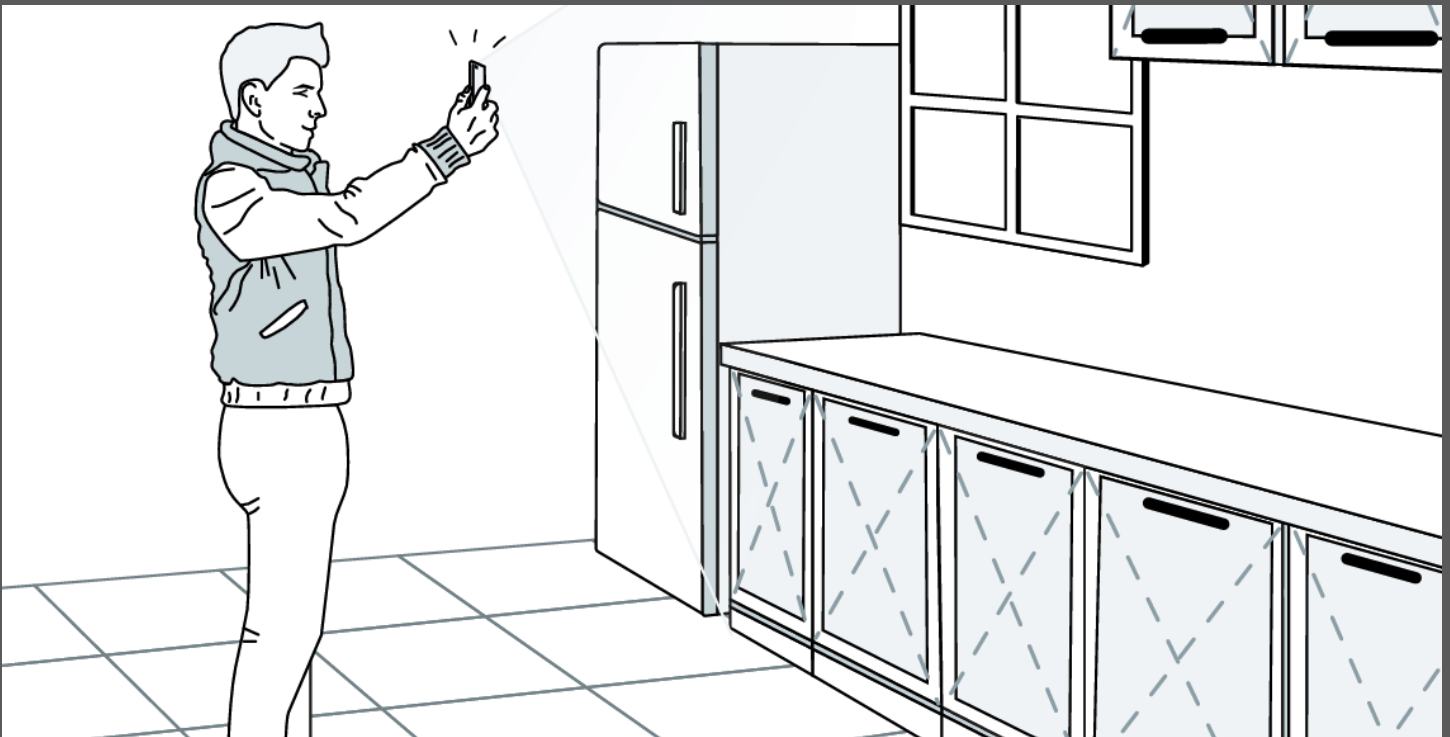
From Principle to Product

So how do these technological underpinnings translate to product? KitchenPlan's technology lets homeowners hold up their phones to see their existing kitchen through the camera. They can then overlay 3D images of cabinets and snap them into place with the touch screen.

The interface is simple and intuitive, but behind the scenes there's lots of computational math. Thanks to advances in AI, Google's machine learning engine (TensorFlow) does the heavy lifting in mapping the space and making sure cabinets snap into place correctly... Just like Gurule's first invention, the 3D clamp.

But the best part is that the system gets better over time. As machine learning is designed to do, it "learns" spaces and cabinet dimensions. That information is shared to the cloud so every home renovation project benefits from the refined algorithms from previous projects.

And to get the ball rolling, KitchenPlan already has a database of over 3000 3D kitchen objects and artifacts, which was developed during an earlier product-line project for Home Depot. This comprehensive database will only grow stronger through machine learning and the "network effect" of several projects – past, present and future.



Head Start

From a business perspective, Jim Gurule and KitchenPlan bring key advantages. From cabinet-making to technology innovator, Jim has the “domain expertise” to harness current advances in technology to transform the kitchen renovation industry. His mission is to transform the kitchen renovation experience for all stakeholders, and to divert a million linear feet of cabinet from landfills (see next section).

And Kitchen Plan has a head start on the competition. Its ability to capture, create and collaborate through the intellectual property it has developed can't be easily replicated. That includes reconstructing existing scenes based

on a standardized database of 3D artifacts. Gurule's ability to marry his domain experience with the power of today's technology represents a rare combination of assets.

This makes KitchenPlan's IP likewise rare and valuable. In addition to being innovative, knowledgeable, and addressing a large opportune market, it holds another key attribute: defensibility. It would be very difficult for anyone else to come along and replicate KitchenPlan's unique mix of assets. Based on these factors, KitchenPlan could be the right partner, technology provider or investment for you. It is open for business.



Do Well by Doing Good

“It’s not just about how much wood you’re using or your electricity bill, it’s about contributing to the positive future for the planet.”

– Avi Rajagopal, Editor in Chief, *Metropolis Magazine* (quoted in *KBB Monthly*^v)

Along with outdated renovation methods, another problem compels KitchenPlan’s tech: Waste. 534 million tons^{vi} of construction materials are deposited into landfills each year.

Through the same “capture, create, and collaborate” process described earlier, deconstruction pros can be looped in to the workflow to repurpose/upcycle old kitchen materials. Better yet, it’s an opportunity to donate those materials to families in need.

This is accomplished by connecting deconstruction pros, appraisers, government agencies (those that offer tax incentives & grants to reduce waste) and nonprofits who put materials to good use. And this isn’t just wishful thinking...it’s already happening.

Enter Habitat for Humanity. It recently put these ideas in play by working with global

technology company, EPAM, and KitchenPlan to streamline kitchen materials reuse.

Its new program has six parts **1.** Homeowners “capture” measurements and kitchen components using their mobile phone camera and the magic of AR. **2.** Kitchen pros receive measurements quickly and reliably. **3.** Deconstruction companies are looped in to salvage pre-owned materials. **4.** Government agencies provide economic incentive. **5.** Habitat for Humanity facilitates the deployment of materials to **(6)** those in need.

This makes it a six-sided win.

We’ll be back to report the project’s outcome. Meanwhile, the future is bright for AR to improve our lives and work. Kitchen renovation is one of those areas, ripe to cultivate success in business metrics and humanitarian ones.

<epam>

KitchenPlan



Habitat
for Humanity

ReStore

Fulfilling our commitment to the
environment: EPAM + KitchenPlan +
Habitat for Humanity

About the Author

Jim Gurule is an innovator, industry insider and technologist who is currently researching and developing an industry platform using Augmented Reality and Artificial Intelligence to improve the kitchen renovation experience for homeowners and trade professionals. His innovation and insight come directly from his experiences as a cabinet maker early in his career, then as a licensed contractor and kitchen designer in the San Francisco Bay Area, and later as an owner of a manufacturer's representative agency. There, he gained experience in all facets of the business – sales and marketing; the development of product brands, patents and B2B marketing strategies; the design of professional development programs; and, finally, consulting for kitchen dealership owners.

Called by analysts in the tech sector a “triple threat,” Jim has the technical knowledge, executive sales acumen, and domain expertise in the kitchen renovation space. Today Jim provides business owner consultation, due diligence, and industry insight as a council member of GLG. In addition, Jim is often asked to speak about his ideas and perspective, as he did earlier this year at the Kitchen and Bath Industry Show during Design and Construction Week at the Las Vegas Convention Center, and the AEC 6.1 Hackathon in Silicon Valley. Jim's next speaking engagement will be as a panelist at the upcoming PCBC conference at the Moscone Center in San Francisco on May 30 – 31, 2019. Panel Topic: Virtually Changing How Buyers Shop for (and Builders Create) New Homes.



Video Companion

(Click video to Watch)



Contact

Questions and can be submitted at: [Kitchenplan.ai](https://kitchenplan.ai)



References

ⁱ Source: ARtillery Intelligence: Global XR Revenue Forecast Fall Edition, 2019

ⁱⁱ Source: Houzz, company disclosures

ⁱⁱⁱ Source: http://www.remodeling.hw.net/benchmarks/economic-outlook-rri/homeowners-hired-pros-to-remodel-66-of-kitchens-58-of-baths-nkba-survey-finds_o

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^v Source: <http://www.nxtbook.com/nxtbooks/kbb/20190506/index.php#/38>

^{vi} Source: <https://www.irs.gov/pub/irs-pdf/p526.pdf>