



An analysis of sensor shopping technology used in e-commerce platform

Deepika¹, J Srinivasan², Anantha Padmanabhan R³, Arundhathi Menon⁴

^{1,2} Assistant Professor of Commerce Sri Krishna Arts and Science College, Coimbatore, Tamil Nadu, India

^{3,4} II B.Com (E-Commerce), Sri Krishna Arts and Science College, Coimbatore, Tamil Nadu, India

Abstract

A comparative study of radiation characteristics of a polarized switchable microstrip planar array of triangular patch antenna printed on synthesized LiTiMg ferrite substrate with a normal magnetic bias field has been done and reporting here. Radiation patterns and some important characteristics of proposed array antenna have been compared with the same geometry printed on RT duroid and silicon. 61% miniaturization and high quality factor are some advantages of using LiTiMg ferrite compare to RT duroid. With the biasing of external magnetic field perpendicular to the ferrite substrate arise some tunable behavior which has been elaborated by the generation quasi TEM, magnetostatic and spin waves. In this analysis spin wave exchange term (ω_r) which depends upon the static internal field (H_{ex}), has also included in the dispersion formula because the wavelength of microwave approach the inter-atomic distance of ferrite material which is the main cause of generation of spin waves in such types of layered structures.

Keywords: IT (information technology, amazon Go, machine vision, artificial intelligence, EPOS (electronic point-of-sale)

Introduction

We have shopped in many ways like going to a super market and purchasing things using a trolley or going to a grocery shop and purchase things by asking the shopkeeper. When it comes to technological development in India, in any department it has to been accepted that we aren't much developed when compared to other countries like Japan and US. So we are going to explain a very new method of shopping which are done by humans very easily with the help of sensors developed by 'AMAZON'. The store which is developed by AMAZON is named as 'AMAZON GO STORE' which is really an exciting way to shop grocery items.

In early 2017, Amazon plans on making their sans-checkout grocery store, Amazon Go, available to the public. The experience is designed for those who don't like to stand in a checkout line. Sophisticated technology will track their purchases, allow them to exit the store without a physical checkout, and automatically charge their account.

What is amazon go store?

AMAZON GO developed by amazon is a grocery retail shop where they sell grocery items, liquor and meal kits. The AMAZON GO STORE shop is now currently situated only at Washington. The size of the shop is 1,800 Square feet. The shop was opened for the company's employees on the 5th of December 2016 and to the public on the 22nd of January 2018.

Need for the study of amazon go store.

This is a brand new way of selling products to the public. Nobody would have expected such a technique to sell product to people, but such an expensive technique to sell Grocery

products to the public, will they be successful in it? How are sellers and buyers going to react, what will be the reaction of the retailers? Every problem has a solution which is briefed below.

Objective for the study of amazon go store

The real aim is to use its customer-centric Learning's from its online platform to improve physical shopping. Online shopping was first to disrupt the retail model as customers were given the option to purchase goods from the ease of their home. And Amazon Go may well be the next step in this experience. As to whether it's good for retail, it might shake up the already declining influence of bricks-and-mortar stores and prompt them into rethinking ways to innovate their store to suit the convenience of the customer. Conversely, this could spell further trouble for the big supermarkets.

Scope for amazon go store

A cashier less platform could help Microsoft expand its cloud presence and help retailers like Walmart, but it probably won't arrive anytime soon. Meanwhile, Amazon will likely retain its first mover's advantage in the space as it opens more Amazon Go stores across the country. So because of this online transactions are going to be very important so it will be very specific for banks to improve all their systems, A lot of computer techniques are needed to know to maintain the shop, lot of development will be expected. Computer engineers can get benefited by this and a lot of scientists can be benefitted with the development of new sensors in the upcoming days There will be a lot of problems for small and medium scale retailers and shop owners if a shop like AMAZON GO STORE gets launched in a country like India.

Technology used

Amazon Go uses what they call, “Just Walk out Technology”. This technology is responsible for keeping track of items taken from, and in some cases, returned to, the store’s shelves. It also keeps track of the individual’s virtual cart. For this to be possible, Amazon uses technology similar to that of self-driving cars. The system relies heavily on sensor fusion,

computer vision, and deep learning algorithms. While they haven’t revealed too much about their technological advancement, it appears that Amazon plans on making cameras central to their operational strategy. These cameras will track not only the products and their placement, but also the individuals who do the shopping.



Fig 1: A Poster of AMAZON GO and its MOTO.

Research

Amazon go Review

Public opinion

How did the public react when we questioned them about the shop?

So, when we asked the public about the shop many of them found it difficult to answer because the shop hasn't got a good ad and the shop is located only in one city so it hasn't got familiar yet with the public.

Would you like to do sensor shopping?

After explaining the public about the shop we questioned them whether they would prefer shopping like this in India. The public were very excited when they heard about this kind of shopping but their question was that will Amazon implement a shop in all countries like they did in US.

Industries with similar technologies

Amazon states that the technology behind their cashier-less operating model is the same technology prevalent in driverless cars. However, the automotive industry isn't the only place that this type of technology is being used. Vision technology is also extensively used in manufacturing industries to assure quality, and to inspect, test, and sort parts. Computer vision and machine learning have become so prevalent across industries that it can even be seen in the scientific study of animal behaviour. 3D Computer vision software has already been developed that scans the subject animal's behaviour in order to try and measure the quality of life of the animal. It is capable of learning and differentiating normal behaviour from abnormal behaviour. This allows for an objective analysis of how the animal is coping in its captive environment. In addition to the automotive, manufacturing, and scientific industries, the hospitality industry is no stranger to the type of sensor technology potentially used by Amazon Go. A similar concept is used at some hotels that have condiments and drinks on the counter or in the refrigerator, known as a mini

bar. These snack trays have motion sensors and electronic scales built in, that at times, may automatically charge the consumer if something is moved.

Shopping process

In order for consumers to shop at an Amazon Go store, the consumer must first create an Amazon account, have a smart phone, and download the Amazon Go app. Once these items are in place, the customer scans their Amazon Go app, located on their smartphone, upon entering the retail store. At this point, the customer is free to walk around the store, shop, and add and replace items to or from their virtual cart

In order for Amazon Go to accomplish this paradigmatic shift in the operational model of retail shopping, it relies heavily on technological innovation. The technology Amazon Go uses automatically senses when an item is picked up, put back on the shelf, and who committed the action. Once the customer is satisfied with the items they've chosen, they simply walk out the door - no lines, no checkouts, and no waiting. The purchased items are charged to the customer's Amazon account and a receipt is sent to the Amazon Go app.

Self-checkout process

The Amazon Go concept is an evolution from the self-checkout operational model that is used at Walmart and other grocery stores. However, self-service in the retail arena has been evolving for over a hundred years. In 1916, Piggly Wiggly made the innovative decision to allow customers to explore the aisles of products without the assistance of an employee. Then, in 1992, some of the first self-checkouts debuted. Since then, the self-checkout model has been widely accepted and immensely popular. According to a study conducted by computer and point-of-sale terminal company, NCR, those who use the self checkout indicated that they appreciate the convenience and ease of use that it provides. One interesting note of those surveyed, was that they indicated that they still liked knowing an attendant was nearby to

provide help if needed. While interviewing Paul Forsell, an Assistant Manager with a major retail and grocery store, he estimated that roughly 20 to 30 percent of customers prefer the self-checkout. Meanwhile, the rest give preference to the traditional cashier check-out method. He indicated that while self-checkouts are popular, some people prefer to not have to deal with the technology themselves.

Supply Chain

With all of this next generation innovation associated with Amazon Go, we must also look at any potential strides in supply chain sustainability that may also be occurring. It's no surprise that Amazon does have sustainability initiatives that span many of its different services and products. From Amazon Wind Farms in Texas, to its innovative approach to recycling energy of nearby data centre', it's clear to see that Amazon has been making great progress in its efforts to build upon the best energy and environmental practices. However, one initiative of particular relevance is the work being done with Amazon Fresh, Amazon's grocery delivery service for Prime Members. Amazon Fresh's initiative with Feed America, a non-profit organization tasked with feeding America's hungry through extensive national cooperation of food banks, has led Amazon Fresh to donate food to these food banks from its distribution centres. While it is unclear if Amazon Go will incorporate a similar model as Amazon Fresh, the partnership with food banks appears to already exist and could potentially be duplicated. In addition, Amazon has stated that the efforts it makes towards energy and environmental practices are intended to be implemented throughout Amazon

Managerial implications

The potential threats for retailers, grocers, and their employees, in the event of a widespread implementation of a technology similar to that of Amazon Go, are numerous. This technology threatens those working in cashier positions gives rise to theft and fraudulent activity concerns among retailers, and could potentially widen the competitive gap between small and large retailers with the potentially large investment. If Amazon were to expand their payment platform, this could create increased competition for companies like PayPal, Square, and Visa. In addition, if Amazon chooses to implement sustainability efforts into Amazon Go, like it has with its other business units, it could increase the sustainability standard among retailers. With potential threats, come potential opportunities. The advent of Amazon Go and the evolution of the self-checkout bring many benefits for both the consumers and retailers alike. For consumers, the decrease in waiting time, and the ease of use are very attractive benefits. For retailers, the ability to reduce lines, relocate personnel resources, and gain the customers trust to provide quick service could prove to be profitable.

Advantages of amazon go store

1. Rapid shopping saves time: Obviously, the biggest advantage is time efficiency. The whole idea behind Amazon Go is that you grab what you need, and leave. In today's fast paced society, it goes hand in hand with busy people. For those on a quick lunch break, or those running

to catch a bus or needing to be somewhere quick. Knowing that you can get lunch in thirty seconds is a great. I think we have all gone into a super market for something small, only to see the queue at the check outs and done a prompt U turn out of there. Amazon Go solves that problem.

2. Tricky technology: There has already been an lot of articles posted by people trying to trick Amazon into trying to steal from them, attempting to avoid items appearing on their receipt after leaving. In all cases, they have failed. The Just walk Out Technology automatically detects when an item is picked up, and replaced to the shelves. The cameras, location in store still unknown, will scan the barcode of the product, so it knows that you still have the item, and not mistaken you for someone else putting the same item back. These cameras can correctly detect a bar code even if it is mostly obscured, so quickly putting an item in your bag won't cut it.
3. Cheaper prices: AMAZON GO STORE could sell products actually at cheaper price when compared to other supermarkets because of less wage expense and their large supply chain around the world.
4. 4Less expense for amazon: The technology used by them might cost them a lot because the shop runs fully under the control of sensor and camera. But the point is to note that the company need not spend their wages for the cashiers.

Disadvantages of amazon go store

1. Unemployment: The project carried out by amazon is amazing but it is a proof of the extent to which technology is a threat to some professions, destined to disappear. There are still physical employees, such as storeroom workers and stock clerks, but the development in technology in the upcoming years will be large and humans will be surely replaced by robots.
2. Cost for implementing: The cost of implementing a single shop is very high because of the usage of modern Technology. There is only one shop which has been opened by amazon situated at seattle. Many people are still not aware of the shop, The main question is will amazon be able to implement more number of branches for the AMAZON GO STORE it is going to be really tough because amazon has invested a lot in the Technology, the cost of a single machine used in the technology costs around 12000 pounds which is 10, 84,593.09 rupees. This might be possible for amazon but if the sales doesn't go well it will bring a huge loss which will affect the company.

Public opinion

How did the public react when we questioned them about the shop?

So, when we asked the public about the shop many of them found it difficult to answer because the shop hasn't got a good ad and the shop is located only in one city so it hasn't got familiar yet with the public.

Would you like to do sensor shopping?

After explaining the public about the shop we questioned them whether they would prefer shopping like this in India. The public were very excited when they heard about this kind of shopping but their question was that will Amazon implement a

shop in all countries like they did in US.

Amazon go in India

We involved in a research on one question? Whether it is possible to start AMAZON GO SHOP in a country like India? We are not so sure. In India we have a problem of population and density. But it is possible because the maturity and innovation go hand in hand with AMAZON

Their products are extremely mature with more than 20 years of experience in US and other markets.

At the same time, they have been very agile in their approach towards Indian needs and challenges, be it handling of FDI rules, collaborative network with small sellers and dual fulfilment approach to handle both large suppliers as well as small business owners.

Amazon has enough cushion for experimentation as it has huge cash in its pockets. Their commitment / investment in India is long term, which can be seen from their recent investments.

Another big differentiator in going to be their capability for bringing international brands / products to Indian market.

Amazon in India

The company took its first steps into the Indian market in February 2012 when it launched Junglee.com, a site which allowed customers to compare prices online but not purchase items directly.

It will initially only sell books, films and TV shows but plans

to offer mobile phones and cameras within weeks.

India has over 50 million active internet users, about 40% of whom have previously made purchases online.

Third party retailers will sell their goods through Amazon's site using a "marketplace" model, a familiar retail concept in India

Sellers send their goods to Amazon's warehouse near Mumbai. When an order is placed, Amazon packs and sends the order to the customer.

"Our vision is to become a trusted and meaningful sales channel for retailers of all sizes across India," said Amazon's Amit Agarwal, country manager in India.

"We will do the heavy lifting for the sellers so that they can focus on core business functions like sourcing and pricing their products.

Amazon CEO Jeff Bezos says success in India is one of the reasons for its better-than-expected quarter.

It has announced 18 new Indian series, as well as added a Fire TV stick that understands English and Hindi commands.

Amazon posted \$35.7 billion in revenue on Thursday, beating the \$35.3 billion analyst estimate.

So this can make Amazon introduce a shop like AMAZON GO in India.

The statistics down in the picture says that Amazon is earning big bucks in India.

Both these picture shows that Amazon has dramatically improved in India. Amazon has raised it's market both in sales and shares.

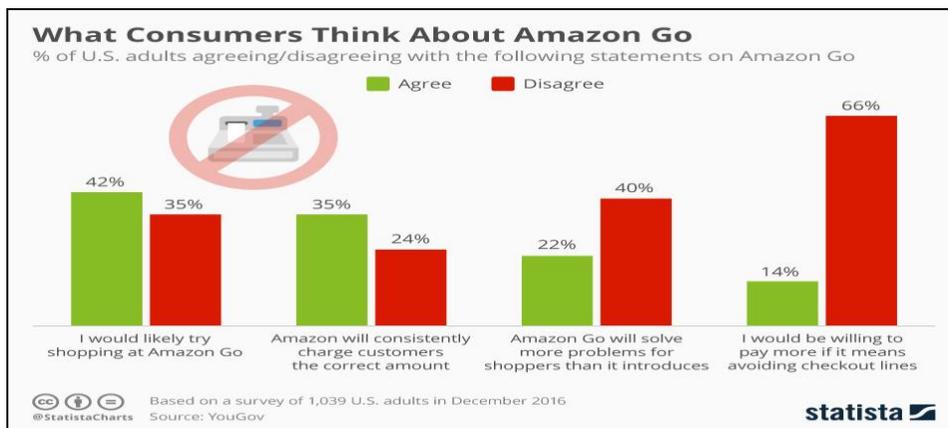


Fig 2: Customer's review on the shop

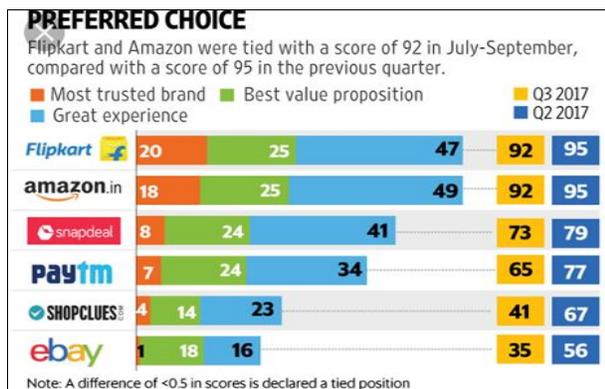


Fig 3

Both these picture shows that Amazon has dramatically improved in India. Amazon has raised it's market both in sales

and shares.

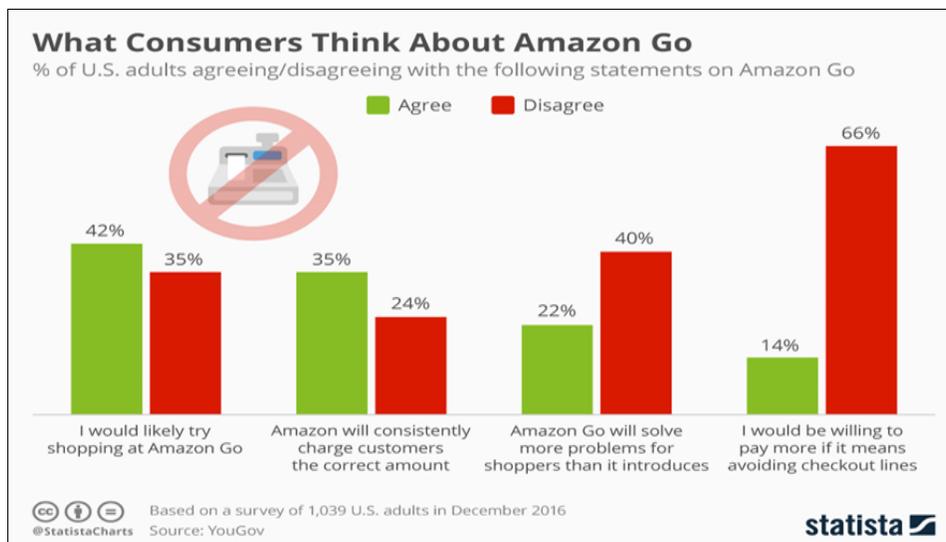


Fig 4: Amazon’s success in India

Research Questions

1. What would some of the pros and cons be in the adoption of this technology?
2. Do you think it could benefit your chain of stores and your particular store?
3. Do you believe that Amazon Go’s new technology will be adopted by other food chains?
4. Do you believe that this new technology is sustainable?
5. What are the greater effects that you think this technology will have on their respective communities if implemented into food chains?
6. Could this new concept make Amazon Go a major player in the grocery business in the future?

Conclusion

Amazon Go plans to introduce its checkout-free grocery shopping concept in early 2017. The strategy is an evolution from the self-checkout version that is used in many grocery chains today. Advanced technology and computer integrated inventory management systems enable the customer to take products off the shelves, put them in their carts, and leave the store without going through a checkout line. Besides the convenience to the customer, Amazon evidently plans to benefit through a reduction of checkout clerks. The cost of implementing, maintaining, and sustaining the system may offset or exceed cost-savings through reduction of checkout clerks. It is unclear as to whether the new concept will be embraced fully or partially by other grocery chains and similar industry applications.

References

1. Amazon Go Editorial Staff. Amazon Go, Retrieved from, 2017, <https://www.amazon.com/b?node=16008589011>.
2. Amazon Go Editorial Staff. Amazon Go, Retrieved from, 2017, <https://www.amazon.com/b?node=16008589011>.
3. Amazon Go Editorial Staff. Amazon Go, Retrieved from, 2017, <https://www.amazon.com/b?node=16008589011>.

4. Barnard S, Calderara S, Pistocchi S, Cucchiara R, Podaliri-Vulpiani M, Messori S. Amazon Go Editorial Staff Amazon Go, Retrieved Amazon [2] [2] from, 2017, <https://www.amazon.com/b?node=16008589011>.
5. Bureau of Labor Statistics. Labor Force Statistics from the Current Population Survey.[Online]. Available, 2017, https://www.bls.gov/oes/current/naics4_445100.htm.
6. Bureau of Labor Statistics. Retail salespersons and cashiers were occupations with highest employment in. [Online]. Available, 2015-2016, <https://www.bls.gov/opub/ted/2016/retail-salespersons-and-cashiers-wereoccupations-with-highest-employment-in-may-2015.htm>Amazon Go Editorial Staff. Amazon Go, Retrieved from <https://www.amazon.com/b?node=16008589011>.
7. Davis L. companies losing customers as consumers demand more human interaction, Accenture strategy study finds. Accenture, [Online], 2016-, Available: <https://newsroom.accenture.com/news/us-companies-losing-customers-asconsumers-demand-more-human-interaction-accenture-strategy-study-finds.htm>. [Accessed 25 February 2017]
8. Dipert B. Visual depth sensors: Multiple applications and options. Vision Systems Design,.[Online], 2017, Available, <http://www.visionsystems.com/articles/2017/01/visual-depth-sensors-multiple-applications-andoptions.html>. [Accessed].
9. Forsell P. Interviewee, Assistant Manager at St Cloud, MN Walmart.[Personal Interview], 2017.
10. Laasby G. Hotels use sensors to bill for uneaten snacks, hit guests with unexpected charges. Milwaukee Wisconsin Journal Sentinel, [Online], 2014, Available: <http://archive.jsonline.com/watchdog/pi/hotels-use-sensors-to-bill-foruneaten-snacks-hit-guests-with-unexpected-charges-b99347028z1-274623181.html>. [Accessed 25 February 2017]
11. Melville A. Amazon Go Is About Payments, Not Grocery. [Online]. Forbes. Available, 2017,

- <http://www.forbes.com/sites/groupthink/2017/01/20/amazon-go-is-about-paymentsnot-grocery>
12. Merholz P. The Future of Retail? Look To Its Past. [Online]. Available, 2011, <https://hbr.org/2011/12/the-future-of-retail-look-to-i>.
 13. NCR. Self-checkout: A global consumer perspective. NCR, 2014, [Online]. Available: https://www.ncr.com/sites/default/files/white_papers/RET_SCO_wp.pdf. [Accessed 25 February 2017].
 14. Pasquarelli A. What Amazon Go Means for the Future of Retail. [Online], 2016, Available: <http://adage.com/article/digital/amazon-means-future-retail/307020/>.
 15. Rash W. Amazon Go won't kill many jobs, but it may prove a boon to crooks. E Week, [Online], 2016, Available: <http://eds.a.ebscohost.com>. [Accessed 25 February 2017].
 16. Solomon W. What Retailers Must Remember About Customer Experience Amid The Amazon Go Hype 11, 2016, [Online]. Available: <http://www.forbes.com/sites/micahsolomon/2016/12/11/everyoneslearning-the-wrong-customer-experience-lesson-from-amazon-gos-cashierless-retailmodel/#6297d0f83f25>
 17. Swanson J. A First Look at Amazon Go. Benzinga, 2016.