

Robotics in Retailing: Bossa Nova's Robots

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ABSTRACT

The word Bossa Nova means new trend or new wave. The deployment of Bossa Nova technology is possible in a busy and crowded retail environment and is used for operations like collecting and analyzing on-shelves inventory data and to improve the shopping experience. Study describes that the use of robotics in multiple retail stores will change the environment and will bring more efficiency in retail. Retail 4.0 is going to transform retail sector and the new growth trend will emerge with innovative business models of data driven approach. The increasing use of Robotics is one of the major factors which can be analyzed as Intelligent, Emerging and Humanizing retail marketing.

Keywords: Bossa Nova, Retail 4.0, Robotics, Efficiency

INTRODUCTION

'Bossa-Nova' word borrowed from the music, as it is style of Brazilian music in 1950s, which is now very popular and well-known. The new wave of fusion in music is extended to the technology used in retail. Bossa Nova is the leading provider of real-time, on-shelf product data for the global retail industry. Its technology collects terabytes of data that enables the retail ecosystem to optimize the omnichannel shopping experience. With a multidisciplinary team of robotics, computer vision, artificial intelligence, and big data scientists, Bossa Nova has solved the challenges to deploy fully autonomous service robots in busy and crowded environments.

Bossa Nova was founded in 2005, with its headquarters at San Francisco, CA and was recently featured as one of the most promising AI company by Forbes. Its Specialties include: Human Robot Interaction, Robot Cloud Computing, Computer Vision, Machine Learning, Deep Learning, Autonomy, Self-driving, Perception, Human Robot Interaction, Retail Robot, Hybrid Cloud, Category Management, Data Analytics, Start-up, Optical Sensing, Mechatronics, and Omnichannel retail.

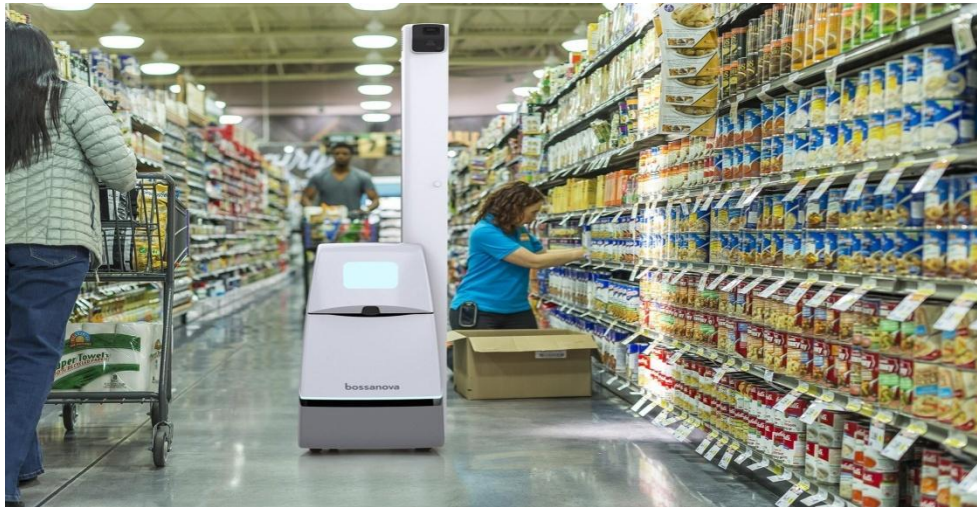
Bossa Nova's robots are currently deployed in more than 50 stores across the United States and in Europe, making it the largest deployment of this kind of technology in any retailer. Bossa Nova creates service robots for the global retail industry. Robots' mission is to make large-scale stores run efficiently by automating the collection and analysis of on-shelf inventory data by collecting terabytes of data that retailers use to increase on-shelf availability and improve the shopping experience. Robots drive autonomously through aisles, navigating safely among customers and store associates.

This is moving towards Retail 4.0 which has evolved as under

- Retail 1.0 : Brick and Mortar and other formats like catalogs and infomercials focusing on customers immediate gratification
- Retail 2.0 : E-Commerce's evolution
- Retail 3.0 : Connecting to customers through multiple channels (Omnichannel experience)
- Retail 4.0 : Embracing IoT and mapping technologies, Robotics and data analytics and Predictive AI technologies leading to high level of personalization and customization for customers

Bossa Nova Robotics

Retail robots are best at repetitive tasks, like scanning labels to detect out-of-stock and mispriced items. Robots have the capacity to free employees up to handle tasks best left to humans, like problem-solving with customers. By using robotics and the data they gather, retailers can improve the efficiency of their inventory and fulfillment systems to satisfy the needs of their omnichannel customers.



Source: Bossa Nova

Bossa Nova's advanced data and robotic technologies automate the collection of on-shelf product data, extracts actionable information in real-time, and delivers prioritized tasks to team members. Retailers can also leverage this data to inform the supply chain, build mobile experiences like Walmart's Smart Assistant, and more.

LITERATURE REVIEW

Soomaya Madakam et. al. (2019) in their research titled *The Future Digital Work Force: Robotic Process Automation (RPA)* observes that The Robotic Process Automation (RPA) is a new wave of the future technologies. Robotic Process Automation is one of the most advanced technologies in the area of computers science, electronic and communications, mechanical engineering and information technology. It is a combination of hardware and software, networking and automation for doing things in a simple manner. In this light, the research manuscript investigated the secondary data - which is available on Google, academic and research databases. The Robotic Process Automation has abundant applications including healthcare and pharmaceuticals, financial services, outsourcing, retail, telecom, energy and utilities, real estate and FMCG and many more sectors. This research concludes with Robots and Robotic Process Automation technologies are becoming compulsory as a part to do business operations in the organization. They will recruit the employees, screen as well as select people, give induction and training to the newly recruited and even look for the employee welfare schemes of the organization along with doing traditional repetitive tasks. In some firms, the robots will be replacing completely the manpower. The best part is that they will do repetitive tasks and even involve in the risky process of human life.

Thomas Davenport et al. (2019) in their research paper titled "How artificial intelligence will change the future of marketing" observe that in the future, artificial intelligence (AI) is likely to substantially change both marketing strategies and customer behaviors. Building from not only extant research but also extensive interactions with practice, a multidimensional framework for understanding the impact of AI involving intelligence levels, task types, and whether AI is embedded in a robot. This paper outlines a framework to understand how AI will impact the future of marketing, specifically to outline how AI may influence marketing strategies and customer behaviour. AI will be more effective if it augments human managers.

Tamros Mondol (2017) in the article *Robots in retail: driving innovation one aisle at a time* has observed that from logistics and supply chains to back-office operations, store operations, merchandizing, sales and marketing to customer-facing experiences, robotics can drive innovation, and help boost top and bottom-line outcomes. Study concludes that Robots may have limitations in the manipulation and demonstration of complex thinking and reactions that require a high degree of intuitive or creative skills. However, these are innovations for the future with improvements in AI and deep learning technology. For now, however, robotics in retail has moved to facial and voice recognition features, enhanced responses, interpretations and

reactions. While robots in retail are still a novelty, their rising adoption and evolving sophistication will make them ubiquitous in the future. For customers, the increasing presence of helpful robots in stores will translate into hassle-free, personalized shopping experiences. Retailers can capitalize on the rise of the robots to realize improved productivity, cut costs, enhance customer experiences and boost profits. Robotics, when combined with digital technologies such as analytics, AI and machine-learning, has the potential to drive transformation across the retail value chain. And that transformation will materialize sooner than one thinks.

Woong Yeol Joe and So Youg Song (2019) in their research paper Applying Human-Robot Interaction Technology in Retail Industries review human-robot interaction technology (HRI) suggests how retailers can enhance customer service and improve their operations through the use of service robots. The review of HRI technologies presents actionable information that can help retailers stay relevant with consumers during their technological development of the service system. Although extensive research has investigated the psychological, neurological, and engineering issues of HRI, few studies have established how robot technology can elevate customer service and transform the retail industry. This study explains the technological innovations that enable autonomous robots to offer unique consumer experiences that have noteworthy potential for assisting elderly and physically challenged consumers. This study covers primary HRI applications that can transform retail, entertainment, travel, and service business today.

ANALYSIS

The use of Robotics will lead to an increase in efficiency and bring a change in the environment. Efficiency can be understood in its literal meaning. But, store environment can be understood at the elementary level such as noise, colour, odor and furnishing, at a more aggregated level these elements includes ambient, design and social factor (Baker, 1986). Study includes the design and social factor, design factor includes stimuli that exist at the forefront of our awareness such as architecture, colour and material; and the social factor refers to social conditions represented by the number, type and behavior of customers and employees.

Robotics Functions	Impact on Efficiency	Impact on Environment
Scanning Shelves: Robots moving through the aisles scan inventory at the real time	Economical: Exact Inventory levels can be maintained as robots scan the items moving fast on the shelves which help retailers in appropriate forecasting of goods. This reduces the human efforts and reduces the cost.	Information Search: Robots through their scanning also help to understand the consumers' need which help consumers in their search process.
Assessing Inventory Levels: Robots through their scanning process collect and analyze data regarding inventory levels	Optimization: This helps retailers to maintain the appropriate inventory levels in all their categories and ultimate reduces the issues of over and under stocking.	Convenience: This creates the environment where consumers observe what they need all around creating the environment for ease and convenience.
Identifying Missing Price Tags : Robots identify the stocks with missing tags	Speed : The stocks with missing tags can be identified and immediately tagged without delay.	Trust: Merchandise without tags create ambiguity and lack of trust amongst the consumers. Each and every merchandise with proper tags speaks volumes about it.
Identifying Incorrect Prices: Differences in prices and incorrect prices are identified and data is immediately collected and analyzed. Resulting in immediate	Profitability: Proper prices help retailers to maintain the levels of profits by reducing errors.	Evaluation: Consumers evaluate goods also on the basis of prices too. Correct prices helps consumers to immediate evaluate, creating the

correct action		environment conducive in their buying process.
Misplaced Products: Robots through their movements in aisles also identify misplaced products	Timely Access: Identifying misplaced products immediately results in timely replenishment and placing orders at the right place.	Search: Consumer expects the store environment in terms of merchandise to be there where it is expected resulting in quick search.
Accuracy : Robots analyze data for each and every merchandise in all categories	Precision: Exact precision is possible in terms of both level and movements of inventory which increases efficiency in terms of Forecasting and Replenishment.	Decision Making: Due to proper forecasting and replenishment it creates the environment which leads to consumers reaching the stage of decision making quickly.

Source: Prepared

Study focuses on Robotics of Bossa Nova but there various technologies used by different retailers or developed by techno based companies viz. Target Wallet App, Store Assistant, Warby Parker Online Try-on, Alphabot, 7 Fresh's Carts etc. Each of it has impact on efficiency and store environment

CONCLUSION

Data is the core to different strategies to build an omnichannel experience. Multiple technologies from Robotics to Augmented Reality will lead to customer encountering multiple or any of the channel even remotely through mobile devices. Hence, it is essential that retailers will create technological based environment.

Retail 4.0 will change or revolutionize retail businesses resulting in increasing efficiency and customer satisfaction.

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