



# Shoppingbot (Ecommerce Robot System)

Junyeong Choi, Davis Nasem, Pauyo Olmann  
 Advisor Dr. Ausif Mahmood  
 Department of Computer Science  
 University of Bridgeport, Bridgeport, CT

## Abstract

Since the outbreak of Covid-19, it has threatened our lives both healthily and economically. The middle-class economy collapsed, and the small medium enterprises were no longer able to make a living. The government implements social distancing regulations for public health. People are exposed to the covid germs at the working area. After the national emergency was declared on March 13, personal enterprise fall about 80%. We carry out this project to make up for their economic loss and build the opportunity for the market share, in a time where the industry is pushing forwards to new methods of effective and efficient e-commerce. With a constantly changing world becoming more and more dependent on technology, the commercial industry has shifted to more automated services. We aim to create a e-commerce shopping automated robot that operates as a system to improve the work efficiency of businesses, and take part in growing industry.

## Market Understanding

After national emergency declared March 13, Americans began limiting their movement in an effort to stop spreading viruses. For small and medium size businesses, pandemic was unexpected global shock. Typical small and medium businesses were not able to make sales by the lockdown and it resulted a massive total revenue disruption. Expected loss of total revenue was about 80 percent without cutting their expenses. According to Pew Research Center, 71% of people are currently working remotely. 54% of them are willing to continue to work from home after the coronavirus outbreak ends. People are adapted to the remote working environment and it is proven that many people are comfortable with the remote working space. Even people are now adapted to shop online. The global e-commerce market size was valued at USD 9 trillion in 2019. Demand for the e-commerce market keeps increasing. The growth rate of e-commerce sales is much higher than growth rate of non-e-commerce sales even though non-e-commerce sales is much higher now. The gap between e-commerce and non-e-commerce is shrinking. Since Covid-19, there is massive growth of online shopping. People get used to online shipment according to the lockdown and social distancing; therefore, customer experience for shipping become one of the most important services. In an ever expanding industry that embraces an era of technological advancements in how we operate businesses and how consumers receive their purchases, it is more important than ever to continue to innovate in areas where possible.



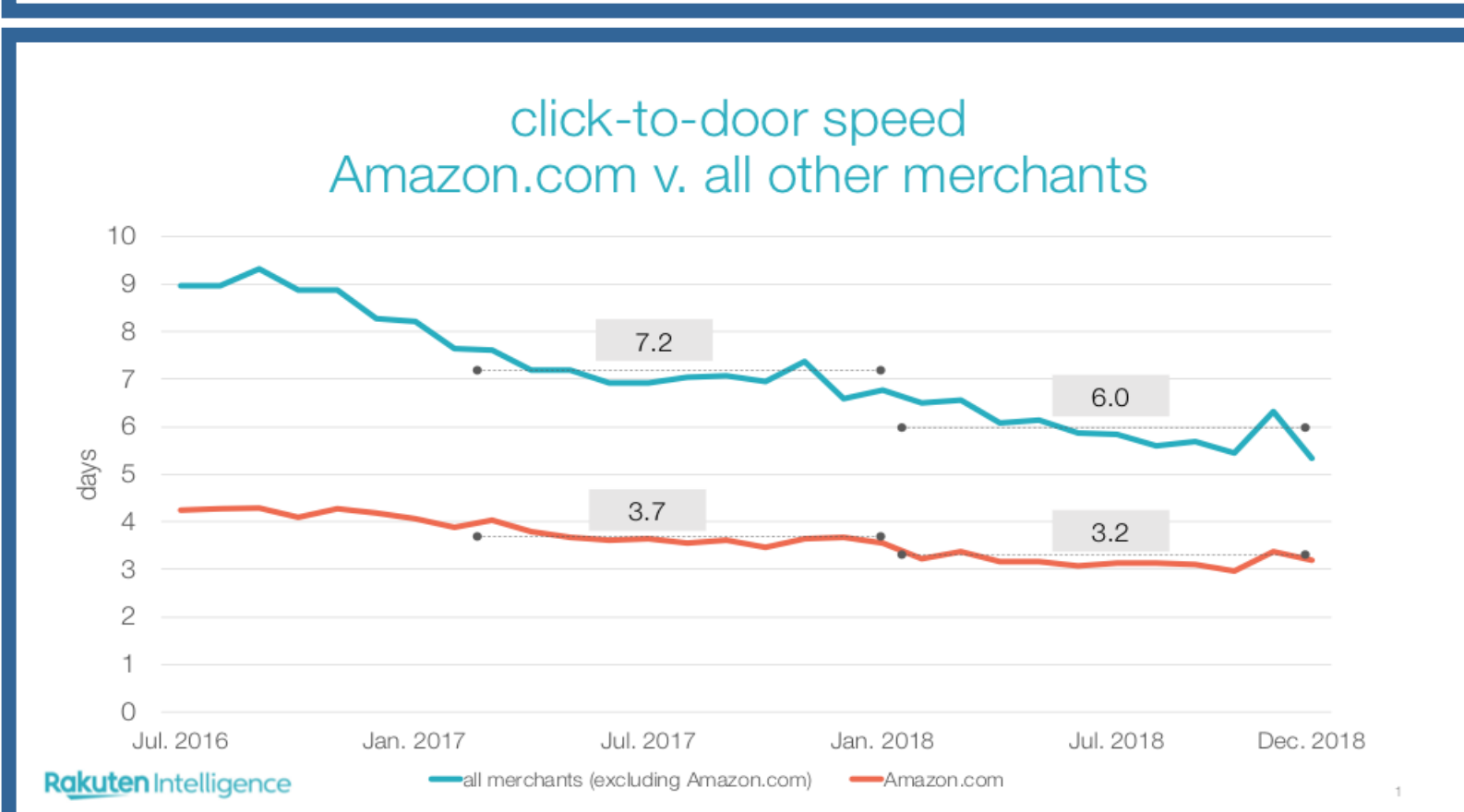
## Proposed Shoppingbot

We decided to build a web application and an automated robot system to help a working environment for small and medium businesses. Robot system is harmless to biological viruses; therefore, social distancing regulations are not needed. Also, it shows higher efficiency in simple tasks and have a lower rate of mistakes compared to people.

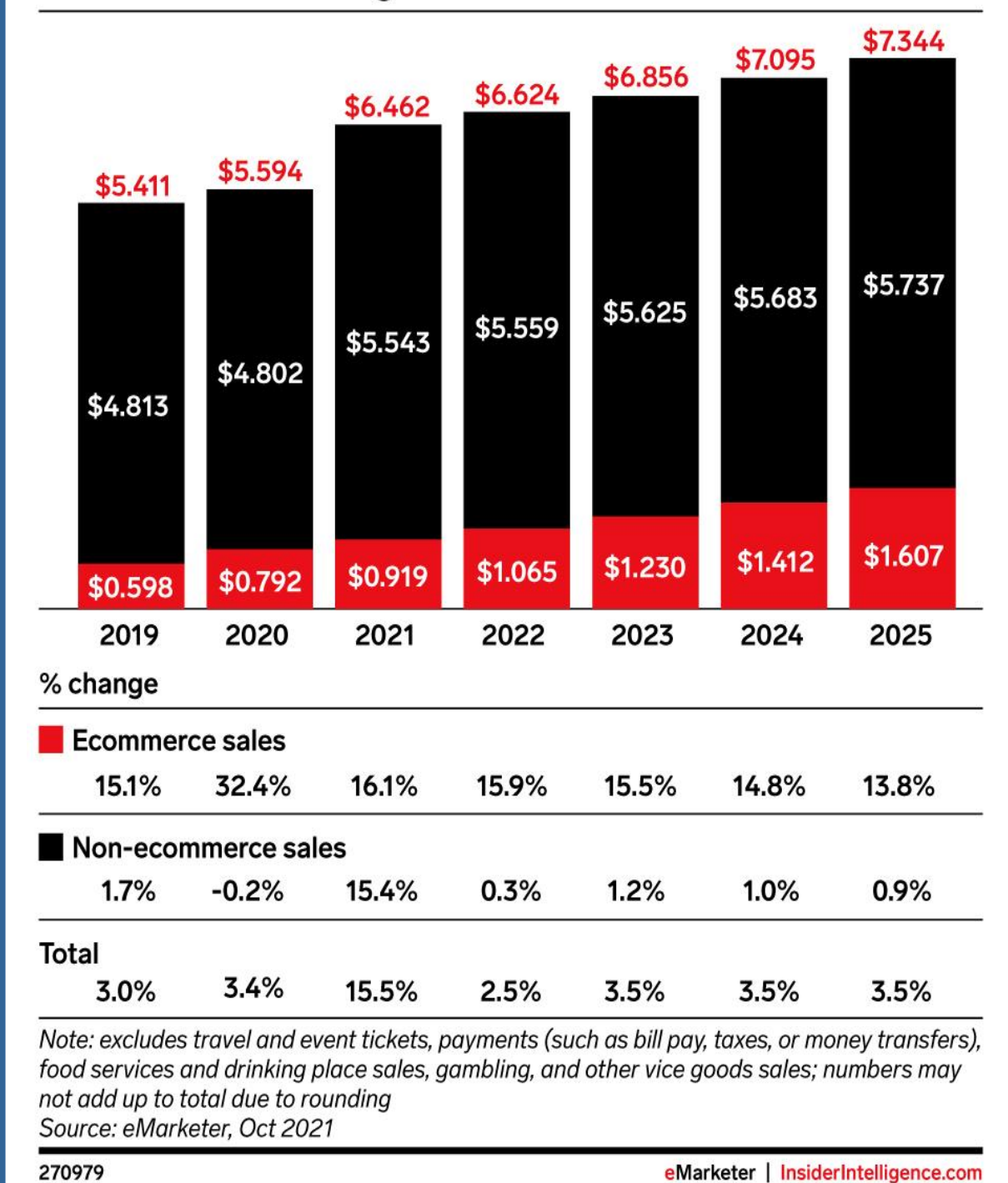
Our robot system will be made up of Arduino components, along with a 5 DOF robotic arm kit and a tracked mobility system. This would allow for a good amount of operational mobility as the robot should be able to navigate and collect items. It will receive the HTTP request from the web server and they need to recognize what products are ordered by the customer and put the items into the cart automatically. With this system, we expect less operation cost, faster shipping, and lower wrong item shipping rate.

We provide an individual website that has registration and management of products system. As soon as a customer purchases the products, then it sends the HTTP request to the web server. The automated robot system receive the HTTP request and collect the items in the physical cart. The user's password will be encrypted with SHA-256, which no one is able to find out for security reason. Also, Json Web token will be used to authenticate users. The project will be deployed as an open source; therefore, software will be provided to anyone who purchases our system and also is responsible for price of server individually.

We used Django as a backend and React.js as a frontend. The project will be deployed on AWS server and also anyone can download the software from github.



## US Total Retail Sales, by Channel, 2019-2025



## Reference

- [1](2021, November 09) Insider Intelligence, eMarketer Available: <https://www.emarketer.com/chart/252053/us-total-retail-sales-by-channel-2019-2025-trillions-change>
- [2](2020, June) JP Morgan Available: <https://www.jpmorganchase.com/institut e/research/small-business/small-business-financial-outcomes-during-the-onset-of-covid-19>
- [3](2020, December 9) Pew Research Center Available: <https://www.pewresearch.org/social-trends/2020/12/09/how-the-coronavirus-outbreak-has-and-hasnt-changed-the-way-americans-work/>
- [4](2020, December 18) Insider Intelligence, eMarketer Available: <https://www.emarketer.com/chart/221703/average-click-to-door-speed-us-digital-purchases-made-on-amazon-vs-other-retailers-dec-2015-march-2018>

## Many workers would like to telework after the pandemic is over; transition to working from home has been relatively easy for many

