

Gardening Business System Using CNN – With Plant Recognition Feature

¹Leif Jay B. De Sagun; ² Jay Mar C. Vilvestre; ³ Randel Mangubat ;
⁴ Jomar A. Ybañez; ⁵ Ramilino Furog; ⁶ Mary Rose Leyson; ⁷ Keth A. Villanueva
 Asian College of Technology- International Educational Foundation

Abstract:- Technological advancement has shaped our modern society's technological success. With the rapid evolution of computers and software, the enhancement of business undertakings and transactions has achieved numerous technological advancements geared towards economic growth and business accomplishments. This paper tested and surveyed a specific number of respondents from six chartered cities in Cebu Province. The result showed that the respondents agreed with this proposed system's usability and convenience. It was concluded that there is a need to create and develop a gardening business system where transactions and communication between users are simplified. The application would help the users achieve greater heights and overcome business boundaries while ensuring a user-friendly environment within the program.

Keywords:- Garde Business System, Technological Advancement, CNN.

I. INTRODUCTION

Gardening is an act or activity of planning and cultivating gardens as a stress reliever (Merriam-Webster). Wiseman et al. (2015) affirmed that Gardening helps people from around the globe to momentarily forget their troubles while providing a good source of fresh vegetables or beautiful flowers. Midmore et al. (1991) stated that small-scale household gardening businesses as a food production strategy are very effective against poverty and hunger, particularly among unemployed individuals around the globe. Although at least 55% of the population living in the urban areas of Cebu City recognizes urban agriculture businesses (Marj, 2020), research and application still need to be developed for Gardening Businesses in Cebu. This study aims to provide an application for gardeners and florists alike within Cebu to perform business transactions with ease and accuracy.

Alyssa Gregory (2019) stated that Gardening has become an influential and fast-growing business idea for amateur entrepreneurs. In addition, many studies have reported that there has been a considerable increase in the gardening business since the COVID-19 lockdowns in the Philippines (DIY International, 2020). Many people diverted their

attention to urban Gardening to destress from this global health pandemic (Johanna, 2020). However, while planting and cultivating, this hobby eventually became profitable, especially when the economy is experiencing a downfall. Department of Agriculture (2020) reported that Cebu City dwellers are increasingly adopting urban farming to prevent food shortages and sustain food security during the COVID-19 pandemic. However, many need a convenient business medium to seek buyers and sellers. An online business platform can help one break geographic barriers (KPShopy, 2019) and, thus, can provide limitless opportunities to grow business in terms of market.

Although several existing applications cater to gardening-related businesses, there have yet to be developed applications that provide a platform for green lovers from Cebu to perform transactions such as trade, buy or sell with another user. In addition, Karl R. Ocampo (2020) reported that 78% of Filipinos who have turned to Gardening are between 22 and 38. However, most existing gardening business applications provide an interface that makes it difficult for most users to navigate. Some existing websites that offer a business platform also cater to several business types, making it too extensive and with minimal features to allow user-to-user transactions.

This study aims to develop an application where users within Cebu City can interact and communicate with another user within a virtual business medium. This will provide a reliable business platform wherein businesses involving Gardening take place. Thus, we will consider the user's navigation capability in developing the application's interface for ease and convenience.

II. METHODOLOGY

This study utilizes a type of developmental method, the V-Model Approach. The developmental method refers to the systematic work that refers on existing knowledge gained from research and practical experience that produces new materials, products, or devices (Portillo et al., 2015). This study uses the developmental method because its primary goal is to develop and create a business platform system designed to provide a business medium for all gardeners and Florists

from Cebu. The entire process of the system development, starting from the Planning Stage, went through a series of logical steps derived and adapted from the System Development Life Cycle (SDLC) model, particularly the V-Model Approach. SLDC is a conceptual model usually used in developing projects since it comprehensively describes the proposed system's usefulness, functions, and monitoring method.

According to Tutorials Point, V-Model is waterfall model's extension that is based on the association of a testing phase for every corresponding development stage. This is a highly disciplined model; the next phase starts only after completing the previous phase. The planning and feasibility study was conducted to determine the project's potential and need to be developed. This stage includes the software's overall structure definition and logical system description. Next would be the implementation stage, where the system designs are translated into code. The appropriate and proper programming language was chosen with respect to the application type. This stage includes most coding works and operations.

The system is tested to ensure that the interfaces between different parts of the system work. Testing evaluates if the system works on the intended platform and with the expected output or data. Furthermore, a dry run is performed to test whether the system does what the user requires (beta testing). Software Applications will undergo and require improvements and change once delivered to the clients. In this stage, various maintenance is done. Maintenance could happen because of some unexpected system's errors. In line with this, the system's changes could directly affect the overall software operations. Thus, the software must be developed to accommodate changes that could happen during the post-implementation period. The V-Model contributes significantly to providing a strategic verification and validation model that incorporates testing phases in every development stage, allowing researchers to adjust and reevaluate previous development operations flexibly. In V-Model, testing is demonstrated in a hierarchical perspective. As each development phase is completed, the expected system becomes more and more refined and detailed.

In the process of data gathering completion, this study utilizes probability sampling. In this sampling technique, a few criteria are selected while randomly choosing members of a specific population. This is needed to arrive at a result or conclusion about how vital the creation and development of the proposed system are and how significant the impact would be when completed. This study will further utilize Cluster Sampling as their strategic Data-Gathering method to allow the researchers to divide the population of Cebu into clusters. According to the PSA Central Visayas, as of 2020, there are currently around 6,000,000 inhabitants all over Cebu City. In addition, the same source reported that there are currently six

chartered cities in Cebu Province. With these data, we used the Sample Size Calculator and arrived at a sample size of 267, using a Confidence Level of 95% (margin of error) and Confidence Interval of 6.

The researchers gathered data from six different cities in Cebu, with 45 participants each using an online survey from Google Forms. This research will adapt and modify previous researcher-made questionnaires strategically developed through a series of evaluations relevant to the current needs and problems that require solutions in relation to the gardening business, online transactions, and the business medium itself. The data that will be produced from the data-gathering instrument are objective in type.

III. RESULT AND DISCUSSION FEATURES

This chapter presents a well-arranged discussion and presentation of the data analysis and the survey results. The findings are presented under the following headings: Age and Gender of Respondents, Population-based on Location, Population of Gardeners from Cebu Province, Motivation for Gardening, Gardening Business Rate, Gardening Business Medium, and Preference towards Application Development. The main factor of response was the population of individuals and experience related to Gardening.

During the data gathering procedures, the researchers observed that most of the respondents who are into Gardening are from Cebu City, with a total percentage of 28.4%. A further 19.7% are from Mandaue City, 9.2% from Lapu-Lapu City, 9.6% from Toledo City, 9.2% from Danao City, and 15.6% from Talisay City.

Respondents of all ages (Below 20 to over 40 Above) were represented, with slightly more significant numbers in the lower age bracket 20-30 and 30-40 categories accounting for 85.8% of the respondents. Specifically, respondents aged 20-30 accounted for 75.7% of the total respondents, while respondents aged 30-40 accounted for 11%. The proportion of ages between males and females was about 48.2% and 50.9% in all age groups, while the remaining quantities accounted for the respondents who preferred not to state their gender.

The findings of this study showed that 83.1% of the total sample population had experience gardening; however, only 18.3% of the total sample size committed to gardening and have been doing it for specific reasons. Most respondents, 37.2%, do gardening simply because they like collecting flowers and beautifying their gardens or houses. A further 29.8% do gardening for entertainment purposes or as a hobby, and 16.1% do gardening to grow food either as a source of nutrition or income. While 83.1% of the respondents enjoy gardening, 16.9% claim they do not do it for various reasons. The findings of this study revealed that most of this percentage has a work schedule that is too busy and needs

more time for gardening. A 9.2% admit they do not have enough space to start a garden, and 6.4% state that Gardening takes too much time.

A considerable proportion of 145(66.5%) of the respondents had experienced doing businesses of various kinds with their flower and plant collections. The findings of this study are further supported by the study of Johanna O. Bajenting, who stated, "There is an increasing demand of plant and flower sellers from all over Cebu, which dramatically increases during the COVID-19 Lockdown." "With high demand, people's plants from home gardens are practically now finding their way into the internet. Even growers from the highlands now are into online selling," she said.

The findings from the study revealed that the majority, 176(80.7%) of the respondents, would consider using an online business medium that could bring convenience targeted especially to buyers and sellers alike. Meanwhile, 17.4% are still determining whether or not they might need the proposed application. In addition, a considerable number, 155(71.1%) of participants, stated that they had experience using a similar application with the same operation; however, almost the same number, 154(75.9%) of participants, claimed that previous applications do not offer most features this proposed study aims to provide. Thus, 95% of the respondents support entirely the development of this application, and the remaining 5% are still determining their answers.

IV. DISCUSSION

According to the data gathered, as gardening-related businesses became a trend and people from all over Cebu started Gardening and collecting various plants and flowers, the need for an online gardening-business platform increased drastically. Thus, the researchers view this study with utmost importance to reinforce and provide users with an application that makes business transactions and other business features easier to operate.

With these goals in mind, the researchers openly offer to develop a feature that utilizes Image Processing using the CNN algorithm. This would allow the system to provide "easy-searching" within its database while making it convenient for both young and digital immigrant individuals to use the system.

Utilizing the data gathered from the survey, the application's user interface will be made user-friendly in terms of screen layouts, button organization, and website color schemes, which are all in accordance with the users' needs and preferences. These are viewed to result in a much bigger impact in terms of user-friendliness and usability than other previous applications failed to provide.

V. CONCLUSIONS

There is a need to create and develop a web-based business application integrated with the CNN Image Processing Algorithm for convenience targeted to users who utilize gardening-related businesses. This will allow business people who use Gardening for supplies, trading, and sales to increase their productivity for the benefit of all shareholders. This statement is based on the outcome and result of the respondent's perception of the survey performed. With this, the respondents who will become the system's users will positively use it when it is fully developed and implemented.

From an objective point of view, strictly based on the data gathered and the findings of this study, the researchers conclude that the majority of the respondents, coming from different chartered cities in Cebu province, gathered strategically with the help of the Sample Calculator, agree with and support the development of this proposed system.

REFERENCES

- [1]. Millican, J. J. et al. (2018). Gardening in Displacement: The Benefits of Cultivating in Crisis. *Journal of Refugee Studies*, 31(3), 351–371. <https://doi.org/10.1093/jrs/fey033>.
- [2]. Merriam-Webster. (n.d.). Gardening. In Merriam-Webster.com dictionary. Retrieved May 31, 2021, from <https://www.merriam-webster.com/dictionary/gardening>.
- [3]. Midmore, D. J. et al. (1999). Household Gardening Projects in Asia: Past Experience and Future Directions. *Academia.edu*. <https://www.academia.edu/30199978>.
- [4]. Clatworthy, J. et al. (2013). Gardening as a Mental Health Intervention: A Review. *Mental Health Review Journal* 18(4), 214-225. <https://doi.org/10.1108/MHRJ-02-2013-0007>.
- [5]. Gregory, A. (2019, February 19). The Pros and Cons of Starting a Gardening Business. *The Balance Small Business*. <https://www.thebalancesmb.com/the-pros-and-cons-of-starting-a-gardening-business-2951474>.
- [6]. Gardening Blooms in the Philippines. (2020, September 25). *DIYinternational.com*. <https://www.diyinternational.com/home/news/article/gardening-blooms-in-the-philippines>.
- [8]. Ocampo, K. R. (2020, September 1). Plantitos and plantitas sprout with Profiteers. *Philippine Daily Inquirer*. <https://newsinfo.inquirer.net/1329557/plantitos-plantitas-sprout-with-profiteers>.
- [9]. Bajenting, J. O. (2020, July 5). Plant, Pottery Businesses Boom. *Sun Star Cebu*. <https://www.sunstar.com.ph/article/1862547/Cebu/Business/Plant-pottery-businesses-boom>.

- [10]. Urban Gardening Gaining Ground in Covid-19 Era. (2020, August 5), Sun Star Cebu. <https://www.sunstar.com.ph/article/1865946/Cebu/Local-News/Urban-gardening-gaining-ground-in-Covid-19-era>.
- [11]. Davies, S. (2013). Growing your own gardening business. *The Horticulturist*, 22(2), 13–15. <https://www.jstor.org/stable/48518459>.
- [12]. Whallon, A. P. (1931). This New Big Business of Gardening. *Scientific American*, 144(6), 388–390. <http://www.jstor.org/stable/24975705>.
- [13]. Barrios, S. & Barrios, D. (2004). Reconsidering Economic Development: The Prospects for Economic Gardening. *Public Administration Quarterly*, 28(1/2), 70–101. <http://www.jstor.org/stable/41288214>.
- [14]. Schimmenti, E. et al. (2014). The Quality of Websites and their Impact on Economic Performance: Gardening Businesses. *International Journal of Electronic Marketing and Retailing*, 6(1), 72-87. <https://www.inderscience.com/info/inarticle.php?artid=64880>.
- [15]. Kumar, S. et al. (2016). Smart Autonomous Gardening Rover with Plant Recognition Using Neural Networks. *Procedia Computer Science*, 93, 975- 981. <https://doi.org/10.1016/j.procs.2016.07.289>.
- [16]. Department of Biobased Products and Energy Crops (340b), Institute of Crop Science, University of Hohenheim, Fruwirthstrasse 23, 70593 Stuttgart, Germany
- [17]. Matsumoto, T. et al. (1990). Several image processing examples by CNN. *IEEE International Workshop on Cellular Neural Networks and their Applications*, 100-111, <https://doi.org/10.1109/CNNA.1990.207512>.
- [18]. Potluri, S. et al. (2011). CNN-based high-performance computing is used for real-time image processing on GPU. *Proceedings of the Joint INDS'11 & ISTET'11*, 1-7. <https://doi.org/10.1109/INDS.2011.6024781>.
- [19]. Perez-Munuzuri, V. et al. (1993, March). Autowaves for image processing on a two-dimensional CNN an array of excitable nonlinear circuits: flat and wrinkled labyrinths. *IEEE Transactions on Circuits and Systems I: Fundamental Theory and Applications*, 40(3), 174-181. <https://doi.org/10.1109/81.222798>.
- [20]. Berger, M. (2005). Upgrading the System of Innovation in Late-Industrialising Countries: The Role of Transnational Corporations in Thailand's Manufacturing Sector. <https://core.ac.uk/download/250312908.pdf>
- [21]. Yossy, E. H. Design Domestic Products Application Model using iDempiere for Local Brand Supporter. <https://core.ac.uk/download/328808204.pdf>
- [22]. Ow, S. Y., Kamaruddin, N. K., & Ahmad, N. (2020). Hubungan antara amalan pengurusan rantaian bekalan hijau (GSCM) dan prestasi rantaian bekalan di sektor pembuatan, Batu Pahat, Johor. <https://core.ac.uk/download/12008062.pdf>
- [23]. V-Model | Hope's Brain. <https://garden.umutyildirim.com/docs/software-engineering/models/v-model/index.html>
- [24]. Farmers Adoption of Improved Technology in Cassava Production and Processing. <https://www.iprojectdownload.com/farmers-adoption-of-improved-technology-in-cassava-production-and-processing/hellen-nyakundi> <https://studylib.net/doc/25724795/hellen-nyakundi>
- [25]. Gerdes, M., Aistis, L., Sachs, N., Williams, M., Roberts, J., Rosenberg Goldstein, R., & Rosenberg Goldstein, R. (2022). Reducing Anxiety with Nature and Gardening (RANG): Evaluating the Impacts of Gardening and Outdoor Activities on Anxiety among U.S. Adults during the COVID-19 Pandemic. *International Journal of Environmental Research and Public Health*, 19(9), 5121.
- [26]. Gardening as a mental health intervention: a review, *Mental Health Review Journal* | 10.1108/MHRJ-02-2013-0007 | DeepDyve. <https://www.deepdyve.com/lp/emerald-publishing/gardening-as-a-mental-health-intervention-a-review-gKGA0jy4I?key=emerald>
- [27]. Document Zbl 1105.34031 - zbMATH Open. <https://zbmath.org/?q=an:1105.34031>
- [28]. Yang, X. (2008). Existence and Global Exponential Stability of Periodic Solutions for General Neural Networks with Time-Varying Delays. *International Journal of Mathematics and Mathematical Sciences*, 2008(), n/a.
- [29]. Winkler, B., Lewandowski, I., Angelika, V., & Lemke, S. (2018). Transition towards renewable energy production? Potential in smallholder agricultural systems in West Bengal, India. <https://doi.org/10.3390/su10030801>
- [30]. Orazhev, A., Lyakhov, P., Baboshina, V., Kalita, D., & Kalita, D. (2023). Neural Network System for Recognizing Images Affected by Random-Valued Impulse Noise. *Applied Sciences*, 13(3), 1585.