Chapter-1- version 4

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General metrics

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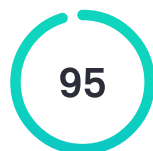characters

2,577
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189
sentences

10 min 18 sec
reading
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19 min 49 sec
speaking
time

Score

95

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Writing Issues
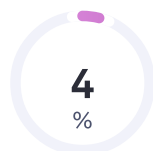
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Issues left

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Critical

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Plagiarism

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sources

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Writing Issues

13 **Correctness**

2   Incorrect noun number

4   Determiner use (a/an/the/this, etc.)

1   Incorrect phrasing

2   Misplaced words or phrases

4   Incorrect citation format

2 **Delivery**

1   Inappropriate colloquialisms

1   Tone suggestions

49 **Clarity**

17   Wordy sentences

20   Unclear sentences

9   Passive voice misuse

3   Intricate text

2 **Engagement**

2   Word choice

Unique Words

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32%

unique words

Rare Words

Measures depth of vocabulary by identifying words that are not among the 5,000 most common English words.

41%

rare words

Word Length

Measures average word length

5.4

characters per word

Sentence Length

Measures average sentence length

13.6

words per sentence

Chapter-1- version 4

PAMANTASAN NG LUNSOD NG SAN PABLO

COLLEGE OF ENGINEERING

ii

ARDUINO-BASED FISH DEHYDRATOR FOR SELECTED RETAIL FISH VENDOR IN SAN PABLO CITY PUBLIC MARKET

A Design Project Presented to the Faculty of College of Engineering

Pamantasan ng Lungsod ng San Pablo

Brgy. San Jose, San Pablo City

In Partial Fulfilment of the Requirements for the Degree of

Bachelor of Science in Computer Engineering

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TABLE OF CONTENTS

PAMANTASAN NG LUNSOD NG SAN PABLO

COLLEGE OF ENGINEERING

1

CHAPTER I

THE PROJECT AND ITS BACKGROUND

Introduction

Fresh fish is a highly delicate food item with a brief time frame for storage before it spoils. It requires careful handling and storage to prevent spoilage, maintain microbial safety, and sustain market appeal. Consumers today prefer minimally processed foods, reflecting concerns about additives, especially in fresh fish. Consequently, there is a growing exploration of emerging preservation methods as potential alternatives to traditional techniques. These

innovations aim to ensure food safety and prolong the shelf life of fresh fish without compromising its safety (Tsironi, 2020).

Drying food, an ancient preservation technique, extends to fish, employing methods ranging from traditional sun-drying to modern computer-controlled industrial processes wherever the fish are caught (Doe, 2020). According to Rasul(2018), sun-drying, specifically, stands out as a cost-effective and efficient means of preserving fish by reducing moisture content. Widely adopted across the globe, especially in Asian and African countries, this method effectively extends the shelf life of fish.

However, traditional open sun-drying methods, as noted by Patil(2019), often result in poor-quality dried produce due to exposure to external elements such as dust, rain, wind, insects, birds, rodents, and domestic animals. In response to these limitations, the concept of automatic fish drying has emerged, presenting an innovative approach to address the challenges posed by traditional methods.

In light of these technological advancements, the automatic fish drying system, meticulously engineered for efficient fish dehydration and uniform heat distribution through a palette rotation mechanism, emerges as a promising solution. Beyond its potential to enhance drying effectiveness, this innovation holds economic promise for coastal communities (Raynaldo, 2021).

With a targeted focus on a specific beneficiary, Mr. Efrain Maranan Jr., a retail fish vendor at San Pablo City Public Market, this project aims to directly address the challenges faced by vendors like him, particularly concerning the issue of unsold fish at the end of the day. Mr. Maranan was selected not only for his practical experience in dealing with unsold fish but also for his knowledge of traditional fish drying methods. Standing at the forefront of integrating technological solutions into his practices, he becomes a pivotal figure in

unlocking new possibilities for efficiency and economic viability in fish preservation.

The components and tools essential to this venture include an Arduino microcontroller for precise control, temperature and humidity sensors for monitoring environmental conditions, a reliable heating element for controlled drying, strategically positioned fans for efficient air circulation, and solid-state relays for precise heating control. Advanced coding skills are indispensable for programming the Arduino microcontroller to orchestrate temperature and humidity regulation for optimized fish drying.

In this pursuit, the developers aim not only to advance technological capabilities but also to empower local communities, creating a bridge between tradition and innovation. As the details of this automatic fish drying project unfold, its significance becomes apparent, promising benefits that extend beyond preservation to economic and societal advancements.

Background of the Project

In addressing the persistent challenge of unsold fish, both locally and globally, innovative approaches have been observed. Malaysia, during the movement control order (MCO), utilized a solar dryer dome through collaboration between the Malaysian Fisheries Development Authority (LKIM) Sarawak and the Buntal Fishermen Association (PNKB) to tackle the issue of unsold fish, Silong(2020). However, the manual fish drying process, identified by Alvinika (2021), remains time-consuming, taking 4-7 days to achieve a 10% water content.

The San Pablo City Public Market, home of retail fish vendors, is facing a pressing predicament, especially with Tamban and Galunggong. The livelihoods of these vendors are intricately tied to fish sales, making the increasing volume of unsold fish a potential threat to their income. Additionally, the presence of

unsold fish poses risks to the quality of the fish, reducing market worth and consumer demand (Estrada et al., 2023)

According to the same study, most of the sellers experience having unsold fish for 3-4 days a week, and the average volume of these leftover fish is 7-9kg. Almost half of these sellers resort to selling these unsold fish for lower prices. The beneficiary of this project reported that he lowered his price to about 20-50 pesos depending on the volume of supply. Additionally, 19.5% of the sellers reported that they faced difficulties in receiving more supply of fresh fish due to the huge amount of unsold fish.

To decisively mitigate issues and enhance profitability, the developers will develop a project design that incorporates new technology and employs effective project management techniques. This initiative aims to alleviate constraints faced by retail fish vendors in San Pablo City Public Market. Recognizing the time constraints of fish sellers, the creation of an automatic fish dehydrator proves advantageous by substantially reducing drying time. According to Alvinika (2021), this technology enables automatic fish drying in approximately 9 hours. Consequently, the developers aim to design a project that automates the dehydration process specifically for selected fish seller in San Pablo City Public Market, offering a solution that is both time-efficient and user-friendly for those lacking experience in fish drying.

Objectives of the Project

General Objective:

The general objective of the design project is to create a device that may help the selected retail fish vendor in San Pablo City Public Market to lessen the impact of having unsold fish by creating a device that will transform unsold fish into value-added products.

Specific Objectives:

Specifically, it aims to:

Design and develop a device that performs the following functions:

Detect the temperature and humidity inside the fish dehydrator;

Adjust the heat output and fan speed based on the temperature inside the dehydrator;

Automatically turns off after reaching the desired humidity;

Option for manual configuration of temperature and time;

Evaluate using ISO 25010 with the following software standards: functionality, performance efficiency, usability, reliability, security, compatibility, maintainability, and portability, which can ensure the quality of the design project.

Develop a deployment plan for the device.

Scope and Limitations

This project aims to conceptualize, develop, and execute a solution for Mr. Efrain Maranan Jr., a fish vendor in San Pablo City Public Market, to overcome the challenge of unsold fish while introducing a value-added product. The proposed initiative involves the design and implementation of an automated fish dehydrator with the capacity to efficiently dry up to 10kg of small fish varieties, such as Galunggong and Tamban. Larger fish must be chopped in order to fit inside.

The project spans the entire academic year of 2023-2024, covering conceptualization, evaluation, testing, and implementation across both semesters.

To ensure an optimal drying process, the project incorporates an Arduino-controlled automatic drying system. This feature includes humidity and temperature sensors for continuous monitoring. Upon the detection of these variables, the device will activate the heating element, and the fan will start to

ensure that the heat is disseminated evenly. The device automatically shuts off when the desired humidity level is reached, preventing over-drying and accommodating users with limited drying experience. Additionally, users can manually configure the device, specifying their desired temperature and time settings for drying other fish or food products.

However, the automatic fish dehydrator is optimized for drying fish of uniform sizes within a single batch. Drying fish of varying sizes in the same batch may result in uneven drying, potentially leading to overdrying in smaller pieces and underdrying in larger pieces. For optimal results, it is recommended to separate fish into batches of similar sizes during the drying process. Additionally, the fish dehydrator does not include a self-cleaning feature. Users are responsible for cleaning and maintaining the dehydrator after each use to ensure optimal performance and hygiene. Regular cleaning is essential for preserving the quality of dried fish and preventing cross-contamination between batches.

Due to budget constraints, a single fish vendor from the San Pablo City Public Market was chosen to receive the prototype. The selection criteria focused on factors including need, potential impact, and a willingness to actively participate in the testing and feedback phases of the project. Additionally, only 5kg of each Tamban and Galunggong will undergo testing in the drying process, as these are commonly left unsold in the market.

Significance of the Project

The project was significant for the following:

Fish Vendors. The design project will help them minimize losses and increase their profitability by introducing or supplying dried fish.

Consumers. The additional supply of dried fish resulting from the project contributes to a more stable and potentially lower price for consumers. This not

only increases the availability of a preserved fish product but also makes it more affordable for a wider consumer base.

Developers. The project will help the developers in honing their abilities in relation to their selected program. Their technical abilities and understanding of engineering principles will grow as a result.

Future Developers. Future developers who are interested in working on similar studies will benefit from this project. It is possible to enhance or adjust the project to provide more effective results because technology is constantly developing.

Theoretical Framework

The theoretical basis of this study is the Innovation Theory of Entrepreneurship by Joseph Schumpeter. Schumpeter argued that entrepreneurs are willing to take risks and invest resources in developing and commercializing new innovations. This process of innovation is often disruptive to existing businesses, but it is also essential for economic growth (Mehmood, 2019). Turning unsold fish into dried fish using a dehydrator can offer several advantages. Firstly, the removal of the fish's moisture through osmotic dehydration and evaporative drying aids in its preservation and prolongs its lifespan over time (Richa, 2022). This aligns with Schumpeter's idea of entrepreneurs investing resources to develop new innovations that can disrupt traditional business models. Secondly, by employing technology to control the drying process, the device can ensure consistent quality and safety standards for the dried fish (Y. Alvinika, 2021). In essence, the Arduino fish dryer not only addresses the problem of unsold fresh fish but also introduces a novel product to the market, potentially creating a new niche and contributing to economic growth, as Schumpeter's theory suggests.

The Arduino fish dryer, [51] besides preserving unsold fish in line with Schumpeter's innovation principles, also promotes environmental sustainability. Converting unsold fish into dried fish extends shelf life and addresses environmental concerns associated with traditional disposal methods. This innovation reflects a dual impact, which is the economic [52] viability through a novel product and environmental responsibility by reducing food waste and fostering sustainable practices.

EVALUATION

Output

Automated Fish dehydrator

Conceptual Framework of the Project

Process

ARDUINO-BASED

FISH DEHYDRATOR FOR SELECTED RETAIL FISH VENDOR IN SAN PABLO CITY PUBLIC MARKET

Input

Device

Arduino

Relay

B. Device Sensor

Temperature and Humidity Sensor

C. Other Materials

Heating Element

Fans

Stainless Steel Mesh grills

Aluminum Sheet

Figure 1.2 Conceptual Framework of the Project

The first section is the "Input". The materials used to make the fish dehydrator were Arduino Uno for controlling the system, a heating element for raising the required temperature, stainless steel mesh grills where the fish will be layered, temperature and humidity sensor for sensing the required heat and moister inside the device, fans for circulating air inside the device, aluminum plate for the device's body, relay for additional control of the signals, and so forth.

The project will involve the 'Process' of building the fish dehydrator for automatic fish drying. The developers will design and configure the Arduino program to control the hardware components based on the readings in sensors.[5] In the "Output" phase, the culmination of the project[54] is the production of dried fish or other food products through the automated fish dehydrator developed by the developers. This output represents the practical application of the fish dehydrator and reflects the success of the design and configuration process. The primary objective of the device is to achieve efficient and uniform drying of fish while maintaining high-quality standards.

The evaluation phase is the last step in the design of the Arduino-based fish dehydrator. The evaluation was carried out by a group consisting of three project evaluators. The ISO 25010 standard criteria, which include functionality, reliability, performance efficiency, useability, security, compatibility, maintainability, and portability, will be used by the critic to assess the project.

Definition of Terms

To provide clarification, the terms listed below are defined in the context of the project:

Arduino is a microcontroller that the developers will use to control access to data from sensors and configure the output of fans and the heating element.

Fish dryer is a device that efficiently dries fish inside a closed environment, preventing contamination and speeding up the drying process. This ensures high-quality, uniformly dried fish by creating a controlled environment.

Humidity is the amount of water vapor in the air inside the fish dehydrator.

Spoilage is the process by which a food item becomes unsafe for a customer to consume.

Temperature and humidity sensors are integrated into the fish dehydrator to monitor the internal environment and send the data to the microcontroller.

Unsold fish pertains to the inventory of fish that remains at the end of a selling day. These are the fish that have not been purchased or consumed during the course of the daily sales activities.

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Y. Alvinika, D. B. (2021). "IoT-based monitoring and design of automatic fish drying equipmentusing fuzzy logic,". IOP Conf. Ser. Earth Environ. Sci., vol. 704, no. 1, 2021, doi: 10.1088/1755-1315/704/1/012042.

1.	~~VENDOR~~ → VENDORS	Incorrect noun number	Correctness
2.	THE SAN	Determiner use (a/an/the/this, etc.)	Correctness
3.	*I*	Inappropriate colloquialisms	Delivery
4.	~~in~~	Wordy sentences	Clarity
5.	*Consequently, there is a growing exploration of emerging preservation methods as potential alternatives to traditional techniques.*	Unclear sentences	Clarity
6.	*According to Rasul(2018), sun-drying, specifically, stands out as a cost-effective and efficient means of preserving fish by reducing moisture content.*	Unclear sentences	Clarity
7.	*However, traditional open sun-drying methods, as noted by Patil(2019), often result in poor-quality dried produce due to exposure to external elements such as dust, rain, wind, insects, birds, rodents, and domestic animals.*	Unclear sentences	Clarity
8.	*Mr. Maranan was selected not only for his practical experience in dealing with unsold fish but also for his knowledge of traditional fish drying methods.*	Unclear sentences	Clarity
9.	*Standing at the forefront of integrating technological solutions into his practices, he becomes a pivotal figure in unlocking new possibilities for efficiency and economic viability in fish preservation.*	Unclear sentences	Clarity
10.	*In this pursuit, the developers aim not only to advance technological capabilities but also to empower*	Unclear sentences	Clarity

local communities, creating a bridge between tradition and innovation.

11.	*In addressing the persistent challenge of unsold fish, both locally and globally, innovative approaches have been observed.*	Unclear sentences	Clarity
12.	*been observed*	Passive voice misuse	Clarity
13.	~~, Silong~~	Incorrect phrasing	Correctness
14.	~~resort to selling these~~ → sell	Wordy sentences	Clarity
15.	~~volume of supply~~ → supply volume	Wordy sentences	Clarity
16.	~~huge~~ → vast, massive, enormous	Word choice	Engagement
17.	*Additionally, 19.5% of the sellers reported that they faced difficulties in receiving more supply of fresh fish due to the huge amount of unsold fish.*	Unclear sentences	Clarity
18.	*To decisively mitigate issues and enhance profitability, the developers will develop a project design that incorporates new technology and employs effective project management techniques.*	Unclear sentences	Clarity
19.	the San	Determiner use (a/an/the/this, etc.)	Correctness
20.	~~the creation of~~ → creating	Wordy sentences	Clarity
21.	~~seller~~ → sellers	Incorrect noun number	Correctness
22.	the San	Determiner use (a/an/the/this, etc.)	Correctness
23.	*This project aims to conceptualize,*	Unclear sentences	Clarity

develop, and execute a solution for Mr. Efrain Maranan Jr., a fish vendor in San Pablo City Public Market, to overcome the challenge of unsold fish while introducing a value-added product.

24.	*The proposed initiative involves the design and implementation of an automated fish dehydrator with the capacity to efficiently dry up to 10kg of small fish varieties, such as Galunggong and Tamban.*	Unclear sentences	Clarity
25.	*be chopped*	Passive voice misuse	Clarity
26.	*To ensure an optimal drying process*	Misplaced words or phrases	Correctness
27.	*To ensure an optimal drying process, the project incorporates an Arduino-controlled automatic drying system.*	Unclear sentences	Clarity
28.	~~the detection of~~ → detecting	Wordy sentences	Clarity
29.	*is disseminated*	Passive voice misuse	Clarity
30.	*is reached*	Passive voice misuse	Clarity
31.	*is optimized*	Passive voice misuse	Clarity
32.	~~pieces~~	Wordy sentences	Clarity
33.	*For optimal results, it is recommended to separate fish into batches of similar sizes during the drying process.*	Unclear sentences	Clarity
34.	*is recommended*	Passive voice misuse	Clarity
35.	*was chosen*	Passive voice misuse	Clarity
36.	~~their~~	Wordy sentences	Clarity

37.	~~resulting~~	Wordy sentences	Clarity
38.	*This*	Intricate text	Clarity
39.	~~wider~~ → broader	Word choice	Engagement
40.	*This not only increases the availability of a preserved fish product but also makes it more affordable for a wider consumer base.*	Unclear sentences	Clarity
41.	~~in relation to~~ → about, to, with, concerning	Wordy sentences	Clarity
42.	*The project will help the developers in honing their abilities in relation to their selected program.*	Unclear sentences	Clarity
43.	~~who are~~	Wordy sentences	Clarity
44.	*It is possible to enhance or adjust the project to provide more effective results because technology is constantly developing.*	Unclear sentences	Clarity
45.	~~new~~	Wordy sentences	Clarity
46.	*This process of innovation is often disruptive to existing businesses, but it is also essential for economic growth (Mehmood, 2019).*	Unclear sentences	Clarity
47.	~~the removal of~~ → removing	Wordy sentences	Clarity
48.	*This*	Intricate text	Clarity
49.	~~new~~	Wordy sentences	Clarity
50.	*In essence, the Arduino fish dryer not only addresses the problem of unsold fresh fish but also introduces a novel product to the market, potentially creating a new niche and*	Unclear sentences	Clarity

contributing to economic growth, as Schumpeter's theory suggests.

51.	*The Arduino fish dryer, besides preserving unsold fish in line with Schumpeter's innovation principles, also promotes environmental sustainability.*	Unclear sentences	Clarity
52.	*This innovation reflects a dual impact, which is the economic viability through a novel product and environmental responsibility by reducing food waste and fostering sustainable practices.*	Unclear sentences	Clarity
53.	sensor readings	Wordy sentences	Clarity
54.	project's culmination	Wordy sentences	Clarity
55.	*was carried out*	Passive voice misuse	Clarity
56.	*To provide clarification*	Misplaced words or phrases	Correctness
57.	*are defined*	Passive voice misuse	Clarity
58.	The fish, or A fish	Determiner use (a/an/the/this, etc.)	Correctness
59.	*This*	Intricate text	Clarity
60.	~~the process by which~~ → when	Wordy sentences	Clarity
61.	~~the course of~~	Wordy sentences	Clarity
62.		Tone suggestions	Delivery
63.		Incorrect citation format	Correctness
64.		Incorrect citation format	Correctness
65.		Incorrect citation format	Correctness

66.		Incorrect citation format	Correctness
67.	*In Partial Fulfilment of the Requirements for the Degree of*	Top PDF Growth studies with lettuce : a thesis presented in partial fulfilment of the requirements for the degree of Doctor of Philosophy at Massey University - 1Library https://1library.net/title/growth-studies-lettuce-presented-fulfilment-requirements-philosophy-university	Originality
68.	*It requires careful handling and storage to prevent*	What is the safest crypto wallet? - adidaswilson https://adidaswilson.com/what-is-the-safest-crypto-wallet/	Originality
69.	*due to exposure to external elements such as*	A Simple Guide to Help You Restore Old Furniture - Blog by NewMika Laminates https://www.newmika.com/blog/a-simple-guide-to-help-you-restore-old-furniture	Originality
70.	*aims to directly address the challenges faced by*	About Ruddy Nice - Ruddy Nice https://ruddynice.com/about-ruddy-nice/	Originality
71.	*The device automatically shuts off when the desired humidity level*	10 Products to Make Your Home Less Dry in the Winter | Family Handyman https://stage.familyhandyman.com/list/products-to-make-your-home-less-dry-in-winter/	Originality
72.	*also introduces a novel product to the market,*	The Role of Spiritual Capital in Innovation and Performance: Evidence from Developing Economies	Originality
73.	*Temperature and humidity sensors are integrated into the*	Top 10 Ws-8157u-ch-it Atomic Digital Wall Clock with Forecast and Weather – Weather Monitoring Clocks – View Prime D8	Originality

		https://viewprimed8.com/top-10-ws-8157u-ch-it-atomic-digital-wall-clock-with-forecast-and-weather-weather-monitoring-clocks/	
74.	*In IOP Conference Series: Earth and Environmental Science*	Load Rejection Transient Process Simulation of a Kaplan Turbine Model by Co-Adjusting Guide Vanes and Runner Blades	Originality
75.	*International Research Journal of Engineering and Technology (IRJET*	GST- Awareness, Perception and Practical Difficulties of Retail Traders- Evidences from Kerala	Originality
76.	*2018). Biochemical, Microbiological, and Sensory Properties of Dried Silver Carp (Hypophthalmichthys molitrix) Influenced by Various Drying Methods. Fishes,*	Evaluation of microbiological quality of dried baim (Mastacembelus armatus) in Bangladesh	Originality
77.	*In Proceedings of the 2nd International Conference on*	Wear and surface formation during sanding of spruce with different tools https://www.th-owl.de/elsa/record/3922	Originality