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Smart Fish Aquarium System Using IOT

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ABSTRACT: Fishes are one of the pets that want in-depth care as compared to different pets like cats, rabbits, and hamsters were given that they stay withinside the water. Usually, fish have been deserted with a scarcity of care consisting of unclean water withinside the aquarium or fish breeding ponds. An IoT-primarily based clever aquarium tracking gadget is one of the answers to cater to the problems. This study provides an evolved prototype of an IoT-primarily based Smart Aquarium Monitoring System to hold clean water withinside the aquarium for fish existence habitats. The gadget capabilities to display the freshwater for more healthy fish existence habitats. This gadget operates as a fish feedings gadget and is managed through a telephone in its operation. NodeMCU controllers are used withinside the designed gadget. Wi-Fi conversation at the NodeMCU is used among the telephone and the controller to manipulate the operation. control lighting in an aquarium with help of LED. The coding is created through the usage of the NodeMCU software program is used to create software program packages for the Android running gadget. The gadget is designed to display the pH fee this is appropriate with the kind of fish existence and manipulate the fish feeding the usage of a telephone withinside the android application.

KEYWORDS: Energy efficient algorithm; Manets; total transmission energy; maximum number of hops; network lifetime

I. INTRODUCTION

Since the sunrise of time, human beings generally have had their puppy as an existing companion. Fish is certainly considered one among pets that stay in water that human beings usually had now no longer handiest as existence companion, however as an intellectual remedy and as residence decoration. Even though it is regular the fish may be deserted via way of means of the proprietor as the preservation is a chunk complicated as compared to every other animal like cat and dog. Hence, there are critical elements for fish which might be the water first-rate and sufficient each day feeding. An IoT-primarily based Smart Aquarium Monitoring System has been designed to encourage human beings to attend to their puppy (fish) effortlessly and lovingly. The capabilities of this clever aquarium help human beings to deal with their fish perfectly. The pH cost indicator via way of means of LCD show makes the person apprehend the cycle of the water alternative that want for his or her fish aquarium. This pH indicator additionally enables human beings to decide the cost both for freshwater fish or saltwater fish. The IoT characteristic through Wi-Fi module may be managed via way of means of person the usage of a telephone as they need to feed the fish at whenever and anywhere.

II. MOTIVATION

To increase or format automatic fish aquarium devices using sensors like temperature moreover, the device maintains fishes needs like water degree of the aquarium, clearing of aquarium and fish have to grow to be the feed frequently or now not. Usually, Aquarium caretakers face severe issues withinside the maintenance of the health and strength of Fish along with the presentation of the Aquariums. Some of the issues faced are changing the aquarium water, feeding the fish, keeping the temperature of the Aquarium, and controlling the Lights. So, the idea is to lower the trouble of fish keepers or aquarists through the manner of approach of shifting it from the manual to automatic mode. Fish keepers or aquarists now ought to not be cautious and maintain a watch constant on their Aquarium and Fish over again and over again. The SMART aquarium may be there if any trouble occurs.

A. Internet of Things (IoT):

Based on authors in [1], the Internet of Things (IoT) is one of the subjects have a look at that has benefits of Wireless Sensor and Actuator Networks (WSAN) and Pervasive Computing domains. The protection demanding situations are rooted withinside the generation and the way data are received and manipulated via way of means of this generation [2]. IoT may be very crucial to stand a hassle in accessibility in each bodily and environments each day. The IoT gives a technique for probably removing those obstructions [3]. IoT holds promise blessings to rising and growing economies including in sustainable agriculture, water high-satisfactory and usage, healthcare, industrialization, and environmental management [4]. ITU (International Telecommunication Union), proved the main imaginative and prescient of IoT, in which a surroundings matters are capable of talk even as their records may be processed via way of means of machines to do desired tasks [5]. Enabling technology for the IoT may be divided into 3 classes which might be technology that enable “matters” to get the data, to method data and technology to enhance protection and privacy [6]. Many demanding situations confronted to make IoT as said from studies in [7], if gadgets from specific producers do now no longer use the identical standards, interoperability could be more difficult, requiring greater gateways to translate from one widespread to another. The implementation of an IoT utility calls for the combination of more than a few data and conversation technology withinside the shape of hardware and software program [8]. For data with a purpose to be created, need to have the capability to attain a few generalizable ends from the interpreted sensor data [9]. In phrases of investment, IoT has broadly speaking been withinside the development of software program for clever houses and homes via way of means of private investor [10].

III. LITERATURE REVIEW

SR.NO	TITLE	AUTHORS	YEAR	METHODOLOGY
1)	An IoT-Based Smart Aquarium Monitoring System	Ahmad Kamal Pasha Mohd Daud, Norakmar Arbain Sulaiman, Yuslinda Wati Mohamad Yusof, Murizah Kassim	2020	Internet of Things (IoT), Smart Aquarium, pH water monitoring, fish feeders, pH Sensor
2)	Fish Talk: An IoT-Based Mini Aquarium System	YI-BING LIN, HUNG-CHUN TSENG	2019	Aquarium, Internet of Things (IoT), message lost, NB-IoT, performance evaluation.
3)	A Novel Design and Implementation of Automated Feeding Mechanism in Fish Aquariums	Mohammad Abdul Hye, Md Manjurul Akter, Atiq Mohammad Jahangir and Hasan U. Zaman	2018	smart fish feeder; RTC Module; Wi-Fi Module; website; servomotor; arduino mega; remote accessibility.
4)	The Internet of Things (IoT) Applications and Communication Enabling Technology Standards: An	<u>Porkodi Dr. R</u> Bhuvaneswari Velumani	2014	The Internet of Things (IoT) is the most promising area which penetrates the advantages of Wireless Sensor and Actuator Networks (WSAN) and Pervasive Computing domains. covers the different applications

	Overview			that adopted smart technologies so far. The second fold of this paper presents the overview of the sensors and its standards.
5)	Internet of Things (IoT): Education and Technology The relationship between education and technology for students with disabilities	Leanne McRae Katie Ellis Mike Kent	2018	The Internet of Things (IoT) is a key feature of this vision. The IoT enables advanced services through the interconnecting of information and communication technologies. While much of the popular literature about IoT focuses on implications in the home, its benefits to education are just starting to be explored.
6)	Design of Real-Time Aquarium Monitoring System for Endemic Fish on the Smartphone	Naufal Inas Fikri, Vito Louis Nathaniel, MuchamadSyahrulGunawan, TomyAbuzairi		The high rate of decreasing population of endemic fish species is becoming more severe over time. Therefore, it needed an effort to bring back the stability of the number. One of the reasons for the decreasing population is the changing environment due to climate change and the difficulty of treatment for this species. This research aims to design an aquarium monitoring system for endemic fish.
7)	An IoT-Based Smart Aquarium Monitoring System	Ahmad Kamal Pasha Mohd Daud; NorakmarArbainSulaiman; YuslindaWati Mohamad Yusof; MurizahKassim	2020	Fish is one of the pets that need intensive care compared to others pet like cat, rabbit and hamster since they live in the water. Usually, fish had been abandoned with lack of care such as unclean water in the aquarium or fish breeding ponds. An IoT-based smart aquarium monitoring system is one of the solutions to cater the problems.
8)	SMART FISH TANK USING IOT	Shweta Patel, Aakanksha Gaikwad, Dhanoj Gupta, SonalDharangonar	2019	proposes the design of Smart Fish tank: An IoT-based Aquarium System. Smart Fish tank system using microcontroller and Arduino based android application to overcome Through this system owner can feed their fish on time and can change water on a time. the user can set schedules for feeding the fish through the solenoid valve and changing the water thought the relay time.

9)	Aquarium Monitoring System Based on Internet of Things	Wen-Tsai Sung Shuo-Chen Tasi and Sung-Jung Hsiao	2021	With the ever-increasing richness of social resources, the number of devices using the Internet of Things is also increasing. Currently, many people keep pets such as fish in their homes, and they need to be carefully taken care of. In particular, it is necessary to create a safe and comfortable environment for them and to maintain this environment continuously
10)	Fish Tank Monitoring System Using IoT	Dr. Narayanaswamy Ramaiah, Deepa T.P Sherwin Koppam Sridhar, Nirlipta Chatterjee, Rahul S.N ,Basana Khadka	2020	In day-to-day life human experimentation is tiresome and also gives improper outcomes for estimating the environmental change. In this paper we discuss how to replace manual maintenance of aquariums with an automated system using IoT to automatically monitor, control, and provide real-time status of pressure, temperature, water level, and the light intensity to applications running on user smartphones.

IV. PROBLEM STATEMENT

To develop or design automatic fish aquarium system using sensors like temperature also the system maintains fishes needs like water level of aquarium, clearing of aquarium and fish are getting the feed regularly or not.

V. OBJECTIVE

1. The targets are as follows:
2. System will help to automate daily tasks performed in aquarium.
3. With this application we can feed and take care of fish's form anywhere.
4. objective of our project is to perform following tasks automatically, when really required.
 - a) Feed on a regular basis
 - b) Stabilize temperature

VI. METHODOLOGY

Agile Methodology Classification Techniques used for the mode

1. Agile Methodology:

That means Agile is fast or versatile. Agile strategies damage obligations into smaller iterations or components that don't without delay contain long-time period planning. The mission scope and necessities are laid down at the start of the improvement technique. Plans concerning the wide variety of iterations, the duration, and the scope of every generation are described in advance. The department of the whole mission into smaller

components facilitates to decrease the mission threat and to lessen the general mission shipping time necessities. Each generation includes a crew running via complete software program improvement lifestyles cycle inclusive of planning, necessities analysis, design, coding, and checking out earlier than a running product is validated to the client. The agile software development emphasizes on four core values.

1. Individual and team interactions over processes and tools
2. Working software over comprehensive documentation
3. Customer collaboration over contract negotiation
4. Responding to change over following a plan

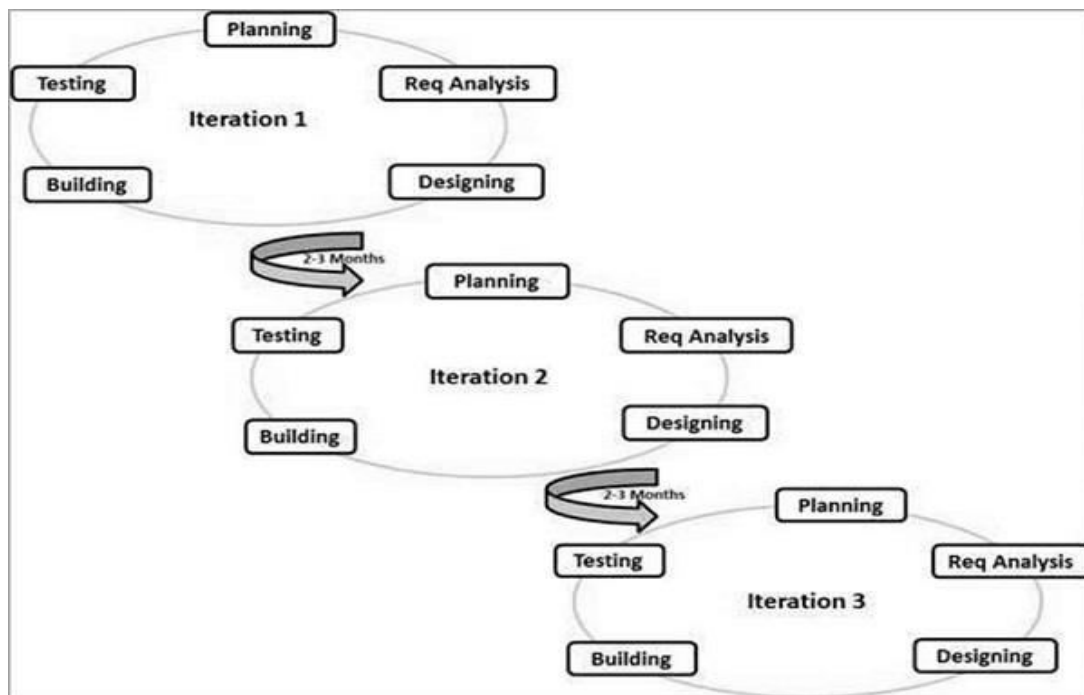


Fig.Agile Methodology

2. Relevant Mathematics Associated with The Project:

$I = \{i_1, i_2, i_3, \dots, i_n\}$

Where I is a set of inputs

I_1 = temperature sensor

I_2 = feed command

I_3 = start pump command

$F = \{F_1, F_2, \dots, F_n\}$

Where F is a set of functions

F_1 = login

F_2 = registration

F_3 = connect cloud

F_4 = hardware interface

F_5 = mqtt cloud interface

$O = \{o_1, i_2, \dots, O_n\}$

Where O is a set of outputs

O1= start feeding

o2= start pump

VII. SYSTEM ARCHITECTURE

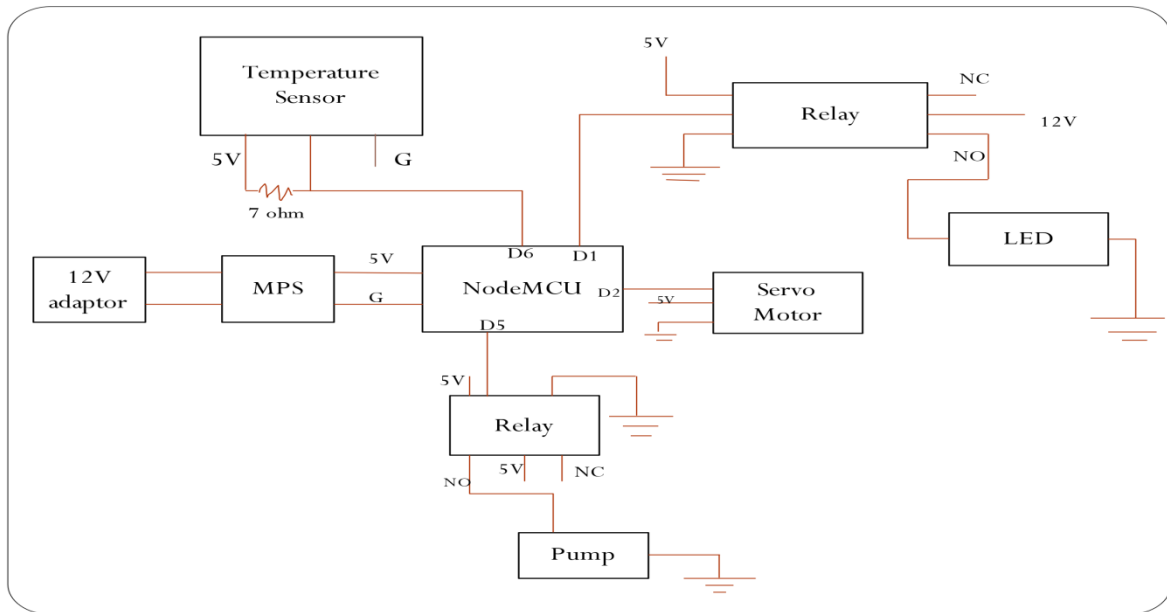


Fig.3 System Architecture

VIII. SEQUENCE DIAGRAM

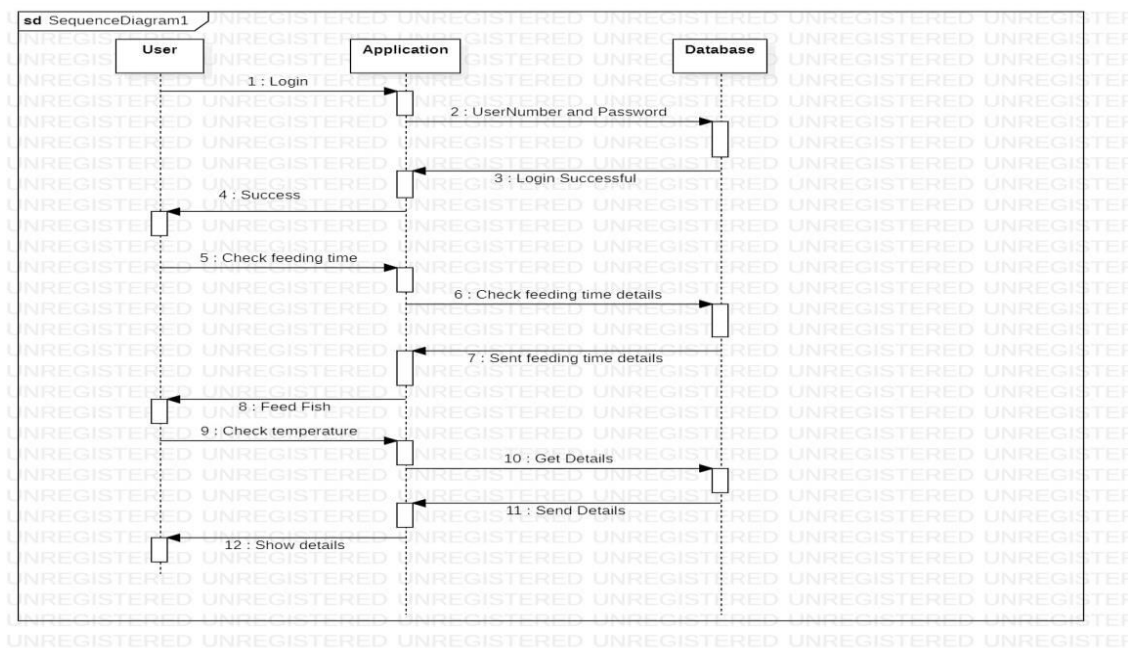


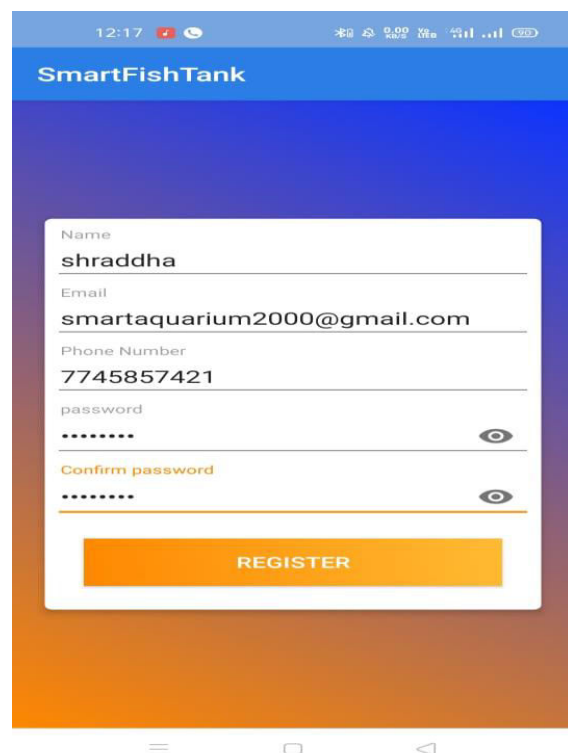
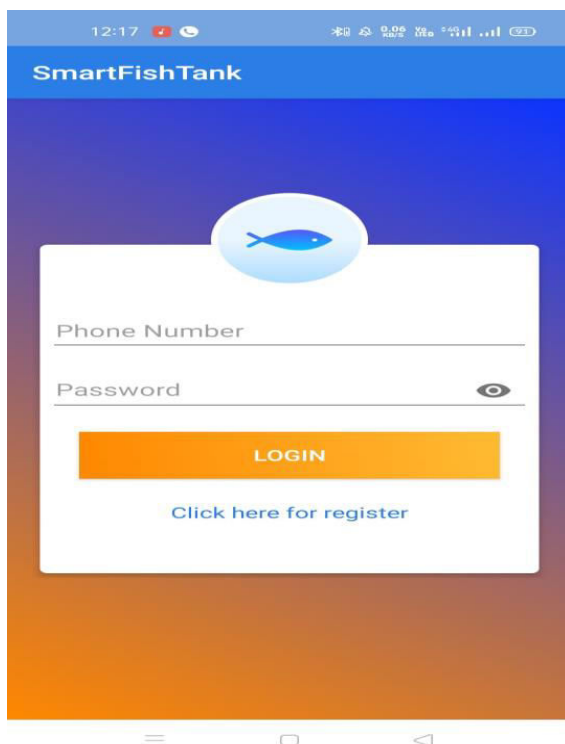
Fig.Sequence Diagram

VIII. RESULTS

a) Application Frontend:



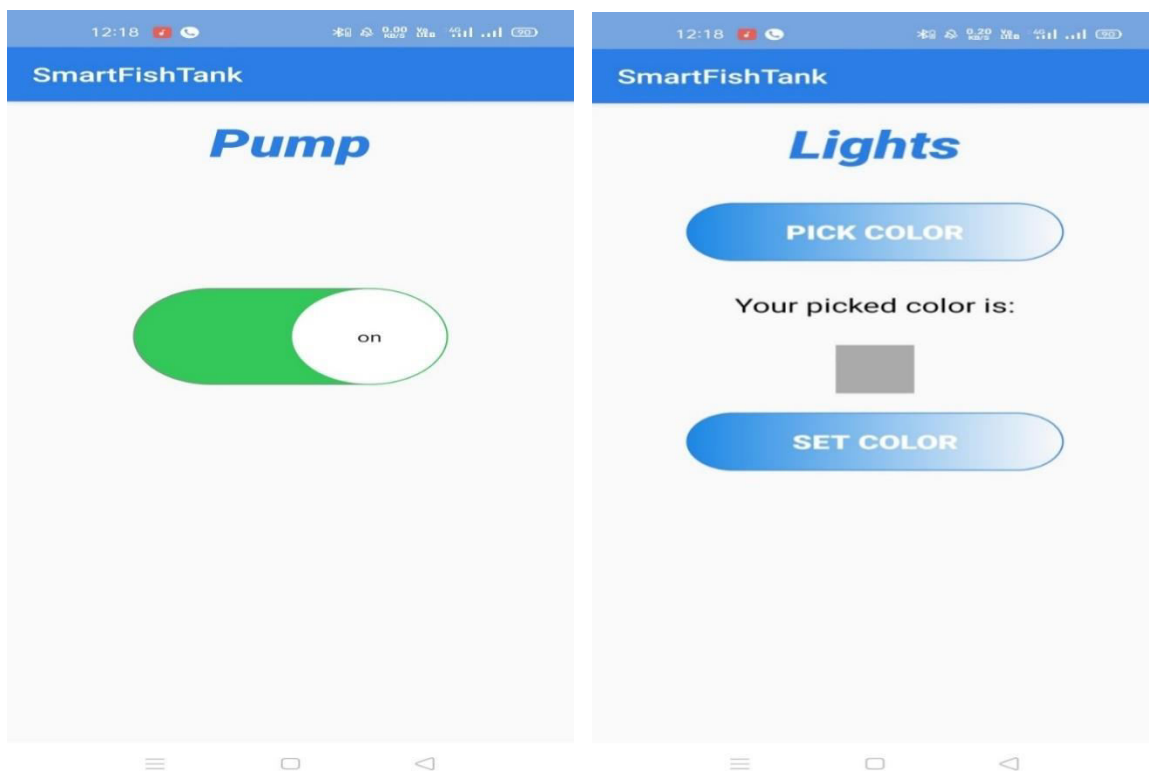
b) Login Page:



c) Options in Application:



d) Features in Application:



IX. CONCLUSION

In the conclusion, this assignment can supply many blessings to human beings especially among the fish keeper nowadays. The improvement of the Internet of Things (IoT) could be very beneficial for the phone consumer in this era. As the result, consumers can understand whether or not the circumstance of water is a consolation or want to get replaced with brand new water. At the equal time, with the IoT capabilities for feeding the fish, it robotically can ease the consumer to feed their fish on every occasion and everywhere. Now, human beings don't want to fear approximately their fish, if they preserve busy outstations for both paintings or vacation. The enjoy displaying the brand-new issue could be very beneficial especially on making new matters to make it beneficial for human beings' prospect. Lastly, this Smart IoT Aquarium is one of the new ventures and beneficial for fish keepers all around the world.

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