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Artaka fish farm community empowerment in karang kepanjen village, trimulyo, sleman, sleman regency

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ABSTRACT

Kampung Karang is geographically located at an altitude of 280 meters above sea level. Designated as a green belt area or supporting food needs, the hamlet area has the potential for excellence in the agricultural sector. Kampung Karang has an SME of catfish farming farmers, namely Artaka Fish Farm. Artaka Fish Farm "Fish Farming SMEs" is located in an agricultural area in Sleman Regency, precisely in Karang Kepanjen Hamlet, Trimulyo Village, Sleman District, Sleman Regency, Special Region of Yogyakarta has been carrying out fish farming activities since 2012. Actually these SMEs have quite a market opportunity. great for aquaculture. However, this opportunity brings consequences and problems, namely the lack of a touch of innovation from the fish feeding system. The service team tries to offer solutions to these problems with a touch of science and technology, namely through the main activity of designing fish feeders. This fish feeder is controlled using an Arduino Uno type microcontroller. The DS1307 type real time clock module is used for scheduling fish feeders. This system can be arranged for scheduling fish feeders. Fish feed is given to fish by means of a fish feeder according to a specified schedule.

KEYWORDS
Fish feeder;
Microcontroller;
DS1307;
Arduino

1. Introduction

Kampung Karang is located in Karang Kepanjen Hamlet, geographically at an altitude of 280 meters above sea level. The hamlet crosses the Sempor River, which disgorges directly at the foot of Merapi, making this water resource never dry up. To take advantage of river water, three irrigation canals have been built, each on the east, middle and west side of the hamlet. The use of the three irrigation channels can be seen from the wide expanse of rice fields, as well as fish ponds built by residents at several points that pass through the irrigation canal. Karang Kepanjen Hamlet has a small fish farming business, namely Artaka Fish Farm. Artaka Fish Farm "UKM Catfish Farmers" is located in the agricultural area of Sleman Regency, precisely in Karang Kepanjen Hamlet, Trimulyo Village, Sleman District, Sleman Regency, Special Region of Yogyakarta. Mr Asdi. Actually, these SMEs have a large enough market opportunity for aquaculture. They have the ability to harvest catfish every three months. However, this opportunity brings consequences and problems, namely the lack of a touch of innovation from fish feeders. From these problems, a fish feeder tool was made which referred to previous researchers on microcontroller research. The microcontroller used by Asafa in the development of the vacuum cleaner robot [1]. Hysteresis Analysis of Thornton Magnetic Materials (IP6, IP12E and TH5V) Through Arduino Microcontroller studied by Balogun [2]. Optimal realization based on PI microcontroller for single-phase single-phase PV technical

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trends researched by Abo-Elyousr [3]. The characterization of the global network of optical magnetometers for exotic physics search (GNOME) with a microcontroller was investigated by Afach [4]. Microcontroller is used for response spectrum devices for active learning in earthquake engineering education by Slocum [5]. The effect of increasing the sample rate with respect to the PI bandwidth controller of the current control loop was carried out by Konvicny [6]. Game application development for eight-processor devices adapted to the real interface was investigated by [7]. LoRa and server-based home automation using the internet of things (IoT) researched by Islam [8]. Design and Development of Intensive Aquaculture Monitoring Model researched by Ajay [9]. Development of an Internet of Things solution to unify and analyze indoor air quality researched by Wall [10].

Agent: An open source computer controlled dry aging system for beef was researched by Lau. Optimal Design of Intelligent Mobile Microcontroller: Assembling and Maintaining Objects in 3D researched by Abbas [11]. Investigation of errors in the microcontroller interface circuit for mutual inductance sensors was investigated by Anarghya [12]. EyeCom- An Innovative Approach to Computer Interaction researched by Malik [13]. An android-based mobile robot for monitoring and surveillance was researched by Azeta [14]. Cantilever Based 1-mW Vibratory Energy Harvester with Printed Polymer Multilayer was investigated by Godard [15]. Improving the performance of digital twins through computerized numerical control firmware simulation was investigated by Kutscher [16]. 3D printed silicon platform with laser scattering protein detection under flow analysis conditions as a development of Silicone Optical Technology (SOT) was investigated by STRZELAK [17]. A low cost, open source, variable speed, and incline treadmill to study the impact of neonatal locomotion was investigated by Williams [18]. VEGO: A new design towards an adjustable and customizable head-mounted display for VR was researched by Lee [19]. An open hardware device for remote monitoring of the environment in a Cultural Heritage was investigated by Gaudenzi [20].

A low-cost, biocompatible programmable dynamic flow pumping system using the Raspberry Pi Zero and a commercial piezoelectric pump was investigated by Kassis [21]. OMIS: An Open Millifluid Demand System for small-scale chemical synthesis and analysis was investigated by LeSuer [22]. An open source low-cost power monitoring system was investigated by Oberloier [23]. The design and simulation of an automatic heating control system was investigated by [24]. The application design of a single-phase SPWM inverter with a PIC microcontroller was investigated by Birbir [25]. The neural controller for the smart home security subsystem was investigated by [26]. A new analog keyboard for embedded applications, based on integer division truncation was investigated by [27]. The automation of fizzy extraction enabled by an inexpensive open source module was investigated by Yang [28]. MakeCode and CODAL: Intuitive and efficient embedded system programming for education researched by Devine [29]. Low cost CO2 sensing: A simple microcontroller approach with calibration and field use was investigated by Brown [30].

The design of the 4 DOF parallel robotic arm and the implementation of the firmware on the embedded system for transplanting potted seedlings were investigated by K., Raheman [31]. The design of an affordable IoT open source robotic arm for online teaching of robotics courses during a pandemic contingency was researched by Benitez [32]. The development of Sensor Controlled Convertible Carts was investigated by Oyejide [33]. HydraX, a 3D printed robotic arm for Hybrid Manufacturing. Part II: Control, calibration & programming researched by Papapaschos [34]. The engineering of polymer matrix composites for PDMS-based capacitive sensors to achieve high performance and wide range pressure sensing was investigated by Tripathy [35]. An open hardware wireless controller and 3D printed pump for efficient fluid manipulation were investigated by Gervasi [36]. An array system of acoustic pressure sensors for heart sound acquisition was investigated by Wang [37]. Development of solar cells for large area position detection: proof of concept researched by Abdelmoneim [38]. The simulation results for proposing an automatic irrigation & monitoring system in crop production using fast charging & solar

charge controller were investigated by Shufian [39]. The 3D Printed Composite Keyboard Switch was researched by Peery [40].

The proposal of a low-cost and low-power embedded wireless image sensor node for IoT applications was investigated by Tresanchez [41]. Preventive measures for accidents due to mobile phones using IoT were investigated by Ambeth Kumar [42]. Class realization – A helicopter using dSPACE was investigated by Jain [43]. Ultrasonic-based apple quality determination as a non-destructive technology was investigated by Vasighi [44]. HardwareX A low cost bench-top research device for turbidity measurement by sensing the radially distributed illumination intensity at various wavelengths was investigated by [45]. Integration of IoT, IIoT and Cyber-Fiscal Systems in SEPT Learning Factory was investigated by [46]. Voice Controlled Autonomous Vehicle Using IoT was researched by Sachdev [47]. Low cost active electromyography was studied by Fortune [48]. Modular, 3D printed, 1–100m, programmable, and low-cost linear motion control systems for imaging and sensor circuits were studied by Lopez Alcala [49]. Harvesting amino acid doped KDP crystals by controlling temperature and time using the AVR microcontroller was investigated by Raghorte [50].

The study of WEDM Adaptive Servo Control Strategy Based on the Discharge State Detector was studied by Chu [51]. ScienceDirect ScienceDirect Low-cost automatic identification of nozzle clogging in a material extrusion 3D printer was investigated by Lambos [52]. Designing a decision-making authority for a smart factory was researched by Antons [53]. Finite Element Analysis (FEA) on a Static Load Autonomous Unmanned Surface Vehicle Feeder Vessel was investigated by Dabit [54]. The low-cost automatic identification of nozzle clogging in a material extrusion 3D printer was investigated by McCarthy [55]. The manufacture of medium-scale 3D components using a stereolithography system for rapid prototyping was investigated by Suryatal [56]. The development of a low-power weighing system using a cylindrical piezoelectric element was investigated by Khalili [57]. An automated low-cost device for producing sub-micrometric polymer fibers based on the blow spun method was investigated by Domínguez [58]. Energy efficient MAGLEV train prototype: A step towards cleaner rail transport researched by [59].

The problem that occurs in UKM Artaka Fish Farm is the process of feeding fish manually. Feeding fish manually can cause the growth of catfish in the pond is not as large. These problems, of course, must be addressed as soon as possible by the village community empowerment team at the University of Muhammadiyah Yogyakarta as one of the solutions for developing aquaculture business. The service team tried to offer solutions to these problems with a touch of science and technology, namely through the main activity, namely remote fish feeders. This technology uses an Arduino type microcontroller which is connected to the DS1307 sensor which is a timing sensor that can be collaborated with scheduling algorithms.

2. Method

There are two methods of activities carried out, namely the design method for making tools and the method for installing tools. The manufacturing design method is shown in Fig. 1. The Fig. 1 shows that the automatic fish feeder consists of a fish feeding tube and a fish feeding catapult. Inside the fish feed ejection device there is an electronic design design and a software design design. Arduino type microcontroller is used for scheduling fish feeders.

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Fig. 1. Design of an automatic fish feeder

The second method is the method of installing tools to partners. The first activity in the method of installing tools at UKM Artaka Fish Farm is a site survey. From the site survey, it was found that the problems faced by partners were the process of feeding fish. must be evenly distributed throughout the pool. The second activity is the manufacture of fish feeders. The third activity is the installation of fish feeders. The installation of this automatic fish feeder is assisted by KKN students and engineering lecturers who have knowledge of catfish farming.

3. Results and Discussion

This community empowerment program is carried out in Artaka fish farmer SMEs located in agricultural areas in Sleman Regency, precisely in Karang Kepanjen Hamlet, Trimulyo Village, Sleman District, Sleman Regency, Special Region of Yogyakarta. The location survey in the area is the beginning of community empowerment activities for fish farmers that are carried out to get fish farmer MSME partners as shown in Fig. 2. The picture shows that the location survey was carried out by KKN 106 students at Mr. Asdi's place on January 1, 2021. Mr. Asdi Artaka Fish Farm UMKM owner who wears a white t-shirt. Mr. asdi has 10 ponds consisting of 2 nursery ponds, 4 ponds aged 2 months, and 4 ponds 3 months.

The second activity is coordination with partners to find out the problems that exist in partners. Partner problems in the form of automatic fish feeders that are evenly distributed throughout the fish pond have not been overcome. This problem became the main program of the empowerment team consisting of team leader Mr. Dr., Ir., Iswanto, S.T., M.Eng., IPM with members Nia Maharani Raharja, S.T. lecturer in informatics engineering at UIN Sunan Kalijaga Yogyakarta, M.Eng., Alfian Maarif, S.T. lecturer in Electrical Engineering at Ahmad Dalan University, M.Eng., Dr. Adhianty Nurjanah, S.Sos., M.Sc. lecturer in communication science at Muhammadiyah University of Yogyakarta, Barbara Gunawan, SE, M.Sc., Ak., CA., CRA lecturer in Accounting Vocational at Muhammadiyah University of Yogyakarta, and Dhiya Uddin Rijalussalam, S.T. alumni of the Muhammadiyah University of Yogyakarta.

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Fig. 2. Design of an automatic fish feeder

Fish feeding equipment began to be made by the service team on January 10, 2021, the tools are shown in Fig. 3. The picture shows that the equipment consists of feeding equipment, electronic devices and software devices. The mechanical device was made by Dhiya Uddin Rijalussalam, S.T. The electronic device consists of sensors made by Nia Maharani Raharja, S.T., M.Eng., and controls made by Alfian Maarif, S.T. The installation process was coordinated by the head of the service Mr. Dr., Ir., Iswanto, S.T., M.Eng. assisted by Dr. Adhianty Nurjanah, S.Sos, M.Sc. and Barbara Gunawan, SE, M.Sc., Ak., CA., CRA.

Fig. 3. Socialization of equipment installation on site

Coordination of equipment installation at Artaka Fish Farm partners was carried out on February 20, 2021 and was attended by the entire service team and partners as shown in Fig. 4. From the picture it can

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be seen that Mr. Asdi, who wore a yellow shirt as the owner of the Artaka fish farm catfish farmer UKM, gave directions to install fish feed equipment carried out by the community service team.

Fig. 4. Coordination of equipment installation

The last activity carried out by the service team was the installation of tools which was carried out on February 25, 2021 and was attended by the entire service team and partners as shown in Fig. 5. An automatic fish feeding device to the owner of the Artaka fish farm UMKM which was shown by a young man wearing a white shirt assisted by KKN students.

Fig. 5. Installation of tools

4. Conclusion

Community service activities in empowering the artaka fish farm community are as follows, namely the first time a location survey was carried out by KKN 106 students at Mr. Asdi's place on January 1, 2021. From the site survey, problems were found regarding fish feeders. The design of fish feeding equipment began to be made by the service team on January 10, 2021. Coordination of equipment installation at Artaka Fish Farm partners was carried out on February 20, 2021. Equipment installation activities were carried out on February 25, 2021.

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Author contribution

There are two methods of activities carried out, namely the design method for making tools and the method for installing tools the automatic fish feeder consists of a fish feeding tube and a fish feeding catapult

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Conflict of interest

The authors declare no conflict of interest.

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