



Optimizing Instant Herbal Drink Production with IoT-Based Sachet Forming Machines to Increase Productivity and Quality

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Abstract

MSMEs Syarimpon and Melos (Melati Losari) are Micro, Small and Medium Enterprises that focus on the production of herbal drinks in Malang Regency. However, during its development, these MSME players experienced several problems, one of which was the packaging process which was carried out manually. This makes the production process take longer and reduces work efficiency. Apart from that, the process of cutting packaging manually also causes a decrease in the quality of the packaging and its contents. To overcome this problem, one solution is to use a counter machine with an automatic counter. By using this machine, MSMEs can speed up the packaging process, produce precise and neat packaging, and provide the freedom to innovate in determining the size of the packaging to be produced. In the process of using this IoT-based Sachet Forming Machine, it has succeeded in increasing the productivity and quality of the packaging process by taking 3 -5 seconds for one herbal drink sachet so that each day it can increase production to 900 sachets per day. Where the packaging process is still done manually so it takes 4-5 minutes so the packaging process per day is only 50 to 100 PCS of herbal drinks.

Keywords: Sachet Forming Machine, IoT, MSMEs Syarimpon and Melos

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INTRODUCTION

The community has an important role in national development, especially in economic development in a region so that the micro, small and medium enterprise (MSME) sector can improve community welfare (Halim, 2020; Murdani & Hadromi, 2019; Putra, 2016; Undari & Lubis, 2021; Windusancono, 2021).

There are community groups, namely the MSMEs "Syarimpon and "Melos (melati losari)" who participate in developing this nation's economy by producing instant herbal drinks on a small to medium scale business using modern packaging technology. This group started its business by participating in a training program provided by the cooperative and MSME service in Malang Regency.

The MSME group "Syarimpon and "Melos (Melati Losari)" has been established since 2017 and was founded by Mrs. Feny as the owner of the Syarimpon business and Mrs. Dewi as the business owner of Melos and helped mobilize five business actors in this group located in Singosari District, Regency. Poor.

Figure 2 Packaging process for instant herbal drink products.



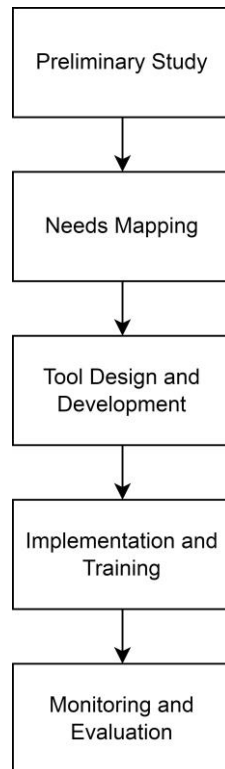
Based on the results of discussions and interviews with the two groups of MSME business owners in the Singosari area, the service team concluded the problems being faced by these partners:

1. There is a need for a tool that is capable of packaging automatically and can calculate the number of products automatically because the packaging process takes 4 to 5 minutes per pack.
2. And the packaging cutting process is still carried out using scissors, causing a lack of cleanliness in the sachet packaging, therefore the cutting process must be improved to produce fast and accurate sachet packaging.
3. The need for tools that meet GMP (Good Manufacturing Practice) standards to guarantee better product quality (Aini, Muktasam, & Hayati, 2023; Jayanti, 2021; Nurrahmah, Hartini, & Santosa, 2022; Permatasari, 2022; SETIANO, 2023; Tania, 2022).
4. The importance of conducting training on use, how to maintain and make improvements to the technology offered to optimize the use of the tools offered.

METHOD

To support community service implementation activities, a block diagram of the implementation method has been prepared in Figure 3

Figure 3 Block diagram of implementation method



1. Preliminary Study

- Conduct a literature survey regarding IoT-based sachet making machines and instant herbal drink production processes.
- Analyze current trends in the production of instant herbal drinks and related technological developments.

2. Needs Mapping

- Identifying the needs of local entrepreneurs regarding increasing productivity and quality of instant herbal drink production.
- Interview local beverage producers to understand the challenges they face in production and distribution.

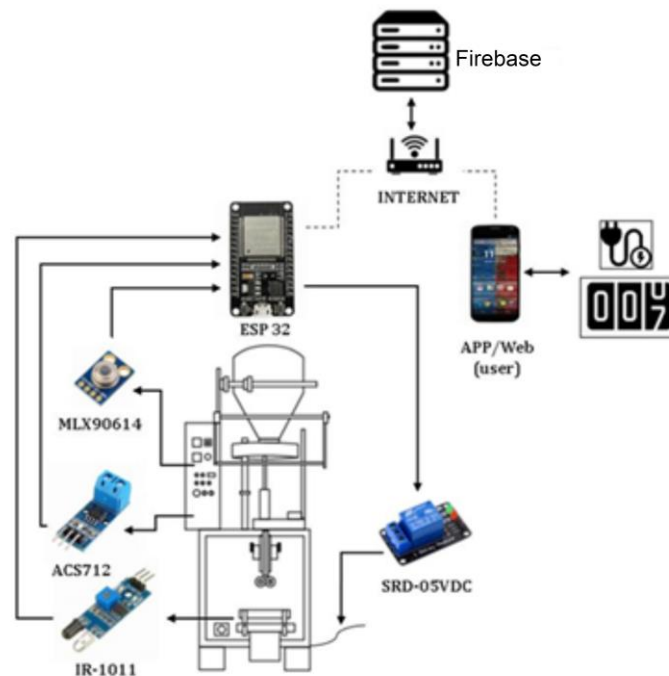
3. Tool Design and Development

- Design an IoT-based sachet forming machine prototype that suits the needs and production scale of local businesses.
- The main goal of IoT is to enable efficient data collection, intelligent use of that data, and taking appropriate actions based on the analysis of that data (Falah, Handoko, dkk., 2023; Falah, Syah, dkk., 2023; Sujito, Syah, dkk., 2021). IoT has enabled greater connectivity between devices, and the broad applications of IoT span a wide range of fields, including smart homes, smart cities, automotive industry, healthcare, agriculture, and more (Abdillah, Afandi, Falah, & Firmansah, 2020; Abdillah dkk., 2022; Sujito, Mayrawan, dkk., 2021). With the ability to connect multiple devices and collect data in real-time, IoT has opened up new opportunities for

automation, advanced data analysis, and smarter decision making. The application of the Internet of Things (IoT) to sachet forming machines can provide various significant benefits in the production process. Using IoT, these machines can connect to a network and share data in real-time, which in turn enables better monitoring, optimization of production processes, and more efficient maintenance (Al-Ali dkk., 2019; Budiarti, Tjahjono, Hariadi, & Purnomo, 2019; C.G., V.A., Liloja, & Shahzad, 2019; Dwi Putra dkk., 2020; Kumar, Atluri, & Palaparthi, 2018). The results of the reading will be displayed on the screen and in the Android application.

- Testing the functionality of the prototype with the help of beverage manufacturers to ensure compliance with their needs.
- With this automatic machine, it is hoped that it can meet increasing market needs.

Figure 4. System on Machine



4. Implementation and Training

- Implementing new sachet forming machines in the production of instant herbal drinks in several business units.
- Conduct training to operators and production managers on efficient machine operation and production management.

5. Monitoring dan Evaluation

- Monitor IoT-based machine performance and its impact on productivity and quality of instant herbal drink products.
- Conduct regular evaluations involving the manufacturer, to evaluate the effectiveness of the machine and identify areas of improvement needed.
- Comprehensively evaluate the impact of this project on the productivity, quality and sustainability of instant herbal drink businesses in the local community.

- Identify further development opportunities and suggestions for future improvements.

RESULT AND DISCUSSION

This community service program activity took place at a location in the Singosari subdistrict, Malang Regency, which was held at one of the homes of herbal drink business owners on October 16 2023 with the main aim of providing technology transfer to increase productivity and quality in the Singosari Subdistrict, Malang Regency. With a focus on improving the production process of MSMEs engaged in the production of instant herbal drinks by implementing an IoT-based Sachet Forming Machine to simplify operations so that they can increase production efficiency to meet increasing market demand. This second objective seeks to improve the quality standards of herbal beverage products by ensuring product consistency so that they can meet consumer expectations.

Figure 5 Handover of IoT-based Sachet Forming Machine



After discussing with the group of herbal drink business partners what had been explained and the need to resolve the problem by providing the right solution. By implementing an IoT-based Sachet Forming Machine, this machine is designed to carry out packaging reliably and can calculate the results of the packaging process automatically. So that when used it will be more efficient in the production process. This packaging process can be done automatically, quickly and accurately because it is no longer done manually and the presence of an automatic counter makes it easier to calculate the number of products that have been produced and can be monitored using the application to see product stock. better and can reduce the risk of errors in calculating the number of products so that it can increase efficiency and accuracy in business management and product availability.

Figure 6 IoT-Based Sachet Forming Machine



This IoT-based Sachet Forming Machine is equipped with IoT (Internet of Things) technology to calculate the number of sachet packages produced and can monitor the number of packages that have been produced. Operators can also determine the quantity to be produced by setting the required value using the application contained in the system. This IoT-based Sachet Forming Machine is also equipped with an automatic feature that can stop operations that have reached the daily production limit and this IoT-based Sachet Forming Machine is also equipped with a manual system to stop the production process manually. This IoT-based Sachet Forming Machine is also connected to an internet connection so that business owners can monitor machines that are producing and can operate the system remotely as long as the system is connected to an internet connection so that MSMEs can gain greater profits and improve the quality of their products more effectively. and efficient.

Table 1 Evaluation Before and After Community Service

| Before Community Service | After Community Service |
|--|--|
| At the time the packaging process was still done manually so it took 4-5 minutes so the packaging process per day was only 50 to 100 PCS of herbal drinks. | The process of using the IoT-based Sachet Forming Machine is carried out automatically so that the packaging process only takes 3 -5 seconds for one herbal drink sachet so that each day it can increase production to 900 sachets per day. |
| When cutting the packaging, you still use scissors, so there are several things that reduce the cleanliness aspect of the | This IoT-based Sachet Forming Machine is also equipped with a heater to cut the packaging so that there is no intervention |

| | |
|--|---|
| packaging quality. | during the cutting process and the cutting process is carried out automatically. |
| Calculating the finished product is also done manually so it is less efficient and less effective, requiring many employees to participate in producing herbal drinks. | The IoT-based Sachet Forming Machine is designed to have a system for carrying out calculations that can be directly monitored via an application so that the owner can monitor his employees so that they will be more effective and more efficient during the production process. |
| Lack of equipment that can meet GMP (Good Manufacturing Practice) standards. | This IoT-based Sachet Forming Machine is built using stainless steel material to prevent unwanted contamination and is expected to meet GMP standards. |

The hope is that this service activity will have many benefits from all aspects. The most important thing is that implementing an IoT-based Sachet Forming Machine is expected to significantly increase the productivity of MSMEs. This increase in efficiency not only has an impact on increasing production but can also optimize the use of resources which can potentially reduce costs. Apart from that, increasing the quality of instant herbal drink products is in line with the expectations of consumers who will become increasingly aware of health. It is hoped that this process can also expand market share by increasing consumer loyalty and can open up opportunities for business growth so that it can stimulate knowledge exchange and collaboration between other business owners by creating a learning and innovation ecosystem. It is hoped that this community service activity can contribute to sustainable development in the Singosari district, Malang district. To improve the quality of life of society as a whole.

CONCLUSION

This community service activity program seeks to increase productivity and quality by implementing IoT-based sachet machine forming. This program proves the potential of technology, collaboration and community participation to encourage sustainable development and innovation. The process carried out reflects a commitment to positive change where local MSMEs will develop and build a prosperous economy. By implementing IoT-based sachet machine forming development technology, it can revolutionize the instant herbal drink production process by utilizing real-time data analysis, remote monitoring and providing appropriate control mechanisms. This technology is able to increase productivity levels while ensuring consistent and efficient results. high quality. In the process of using this IoT-based Sachet Forming Machine, it has succeeded in increasing the productivity and quality of the packaging process by taking 3 - 5 seconds for one herbal drink sachet so that each day it can increase production to 900 sachets per day. Where the packaging process is still done manually so it takes 4-5 minutes so the packaging process per day is only 50 to 100 PCS of herbal drinks.

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