

# Internet of Things (IoT) Smart Rubber Scale (SRS) System Using Arduino Platform

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**Abstract**— In the new era of innovation, the ordinary strategy which is the conventional method is still been employed to measure rubber. In the conventional method, the settler needs to bring the rubber to be measured, calculate the result and physically recorded the data into the logbook before bringing the logbook into the FELDA office. Besides, the rubber officer needs to ensure that the weight in which the settler shows match with the recorded data. This routine may lead to misinformation or the information can be faded, lost and misplaced. It takes a lot of time, energy and cost since the settler needs to get the result of total rubber information every day, week and month to be reported to the FELDA office. Therefore, the Smart Rubber Scale (SRS) System is proposed which inspired from the conventional process and it was made into the cloud system where it is measured by using the Arduino platform and all the data will be sent automatically into the database using Internet of things (IoT) technology. The SRS hardware devices consist of load cell sensor, scale sensor, Arduino UNO R3, sensor module HX711, Bluetooth module and LCD display. The SRS website is develop by using notepad++ programming, PHP, CSS, SQL, and HTML language. In this system, the staff in the FELDA office and the settler can use it for their convenience. The system will help the staff to automatically store all the rubber weight into the system and it would prevent misinformation, unlike the conventional method whereby the information needs to be recorded manually in the logbook. The settler can see the information anywhere and anytime. The system will record rubber details and the total of rubber collected by settler for every month.

**Keywords**— *Smart Rubber Scale System, IoT, Arduino, database*

## I. INTRODUCTION

Rubber or its scientific name *Hevea Brasiliensis* was brought by British colonists to Singapore in 1877 through Brazil, Kew Gardens in London, Sri Lanka to Singapore and Kuala Kangsar [1]. Malaysia has a perfect hot-wet climate and soil that suitable for rubber growth. Malaysia is the leading producer of natural rubber in the world. There are about 46% of the total world's rubber is produced in Malaysia. [2]

In Malaysia, most areas that covered the rubber industry are FELDA, FELCRA, RISDA, estate and private land that is owned by the worker. Furthermore, Rubber import has expanded by 3.9% from 20.3 million tonnes in 2015 to 21.2 million tonnes in 2016. Meanwhile, rubber export has

increased by 3.8% from the previous year to 19.9 million tons in 2016. [3].

Currently, the process of measuring rubber is done manually. A settler needs to do multiple tasks, including measuring the rubber on the rubber scales, recording the weight in a logbook, bringing the logbook to the rubber management office and awaiting confirmation from the officer before they can get their money. These processes consume time, energy and cost. Moreover, this conventional method might have several disadvantages such as incorrect data inserted due to the carelessness of a worker, fade data from the logbook or misplaced the logbook. With the advanced technology nowadays, the conventional method that used manual way to process the rubber data and information should be change to a smart approach by using the Arduino platform and Internet of things (IoT) Technology. IoT Technology was widely used for a lot of applications such as healthcare [4], air pollution monitoring [5] and smart monitoring system [6].

To solve the aforementioned problems, Smart Rubber Scale (SRS) system is proposed in this paper. The SRS system is a combination of hardware development by using Arduino and web-based applications that are designed specifically for the rubber application. The SRS system will measure the weight of the rubber automatically and send it into the database without the need to record the data in the logbook. The web-based application can be accessed by officers, staff and settlers. The SRS system can be utilized for FELDA, FELCRA, RISDA or any rubber organization. This system is easy to use and does not require a lot of staff to handle. Moreover, this system helps to provide more organized data and information storage. It also allows to go paperless to save more trees since all information required can be recorded in the database of this web-based application. Thus, this system has a lot of advantages compared to the old conventional process.

In this paper, the related research on a similar area is presented in section II. Section III explained the methodology of the system in terms of hardware and software development. The result is presented in section IV. Finally, the conclusion and future work are discussed in section V.