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## Developing Gamelan Model through Scientific Work

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# Developing Gamelan Model through Scientific Work

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**Abstract.** A gamelan trigger has been designed and developed to support *karawitan* learning. A research and development method involving a series of the process has been conducted to produce this scientific artwork. This paper examines the trigger production stages which mainly focus on the work of mechanical system setting of the gamelan model. The research finally comes to the conclusion that the mechanical system of the model can meet the requirements needed for providing a real form of *gamelan* in a smaller size.

## 1. Introduction

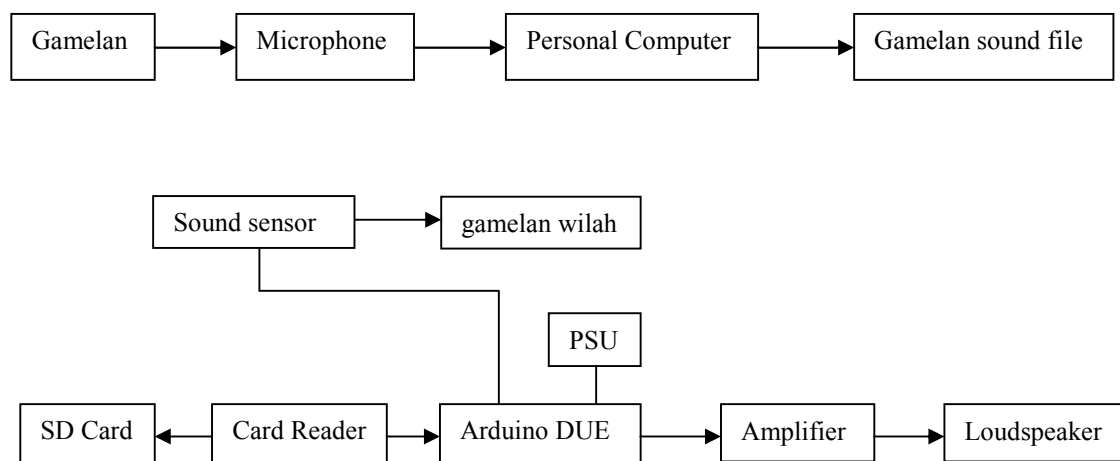
A current digital era has brought a new shift of paradigm in all aspects including the development of an artwork. Gamelan is one of the artworks that has been shifted from the traditional form into the digital one for several purposes as reported by several studies [1,2,3, 4). This paper discusses part of the second year project result aiming to develop a mechanical system of gamelan trigger prototype which can be utilised to solve the problem of providing the real gamelan in a smaller size for supporting music learning in elementary school. A series of scientific work process has been carried out to continue the production of the trigger prototype which can assist as the learning media by reviewing and solving several questions raised during the first year of the project. One question raised and considered to be answered an unrealistic sound quality produced by the sound module.

## 2. Method

The main work of the study was done in physics laboratory Universitas Negeri Semarang (UNNES). The work in this period continued the previous one by employing an adopted research and development method defined by Borg and Gall with product revision stage as the main focus.

The product revision stage was started by reviewing the problems emerged from the previous year result. After carrying out the first year project, the product, in fact, showed unrealistic sound quality performed by the sound module. It seems that the sound produced was still in digital character and did not match with the sound produced by real gamelan. Because of that, in this stage the project was focused on improving this sound quality consisting of activities related to the hardware and software used, those were wiring and programming. Figure 1 shows the stage specifically.

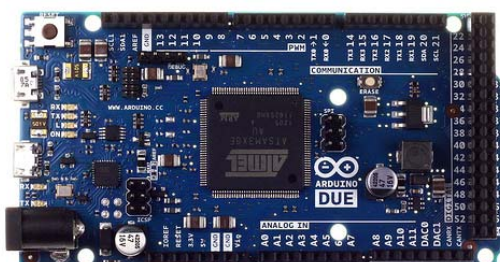




**Figure 1.** Stage of improving sound quality

### 3. Results And Discussion

The unrealistic sound quality was a major concern of the work in this second term. This sound quality has been tried to improve by carrying out several points of work. The first one was finding the cause of the uncomfortable sound. It was tried to find the cause from both hardware and software. Based on the track traced, it was detected that the cause of the unrealistic sound was the misuse of the development board causing a digital-formatted sound result. This problem cause finding was then followed by deciding the alternative solution that was the use of another kind of development board which enables it to accommodate, manage and show data of gamelan tone formatted in sound wave (filename.wav) in the larger size. This board also has different specifications including type, operating voltage, recommended input voltage, limits input voltage, digital I/O pins, analog input pins, analog output pins, total DC output current on all I/O lines, DC current for 3.3V Pin, DC Current for 5V Pin, Flash Memory available for the user applications, SRAM, Clock Speed, length, width, and weight. Figure 2 shows the development board used for the study.



**Figure 2.** The development board.

The work of improving sound quality was then continued by setting the new board on the computer. This setting process involving installation of a required software suitable for the next process, that was reading formatted wave data of gamelan sound resulted from sampling operation. For this purpose, the gamelan sound should be saved first in a memory card having at least four Gb memory size. After software installation, the library program will also need to be installed. The steps were then followed by copying the library program folder into the memory card and restarting the board program. The process of sound quality improvement in this study period ended with a series of program inputting activity to gather the data reading by using a programming language referring to the number of gamelan tones used.

#### 4. Conclusion

The sound quality improvement process gave the main result of analogue formatted sound quality through the use of new kind of arduino development board. By using the new arduino, the new sound has a characteristic of resembling the real gamelan sound which enables the gamelan model to meet the mechanical system requirements needed for providing a real form of gamelan in a smaller size.

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