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Short Communication

Utilizing the Job Expanding Algorithm in Mokhtar Plume Tracker

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Abstract. *Robot speed up in analysing and acquiring data is one of the major tasks in all robots' design. Among all types of robot, plume tracker by their critical task to save human life and securities activity, have an important role. However, the interment shape and movement nature of odour itself bring lots of limitations like moment speed number of sensing element, etc. for these robot types. In this letter, we are proposing the expanding job to boost up processing speed and also over come their limitation by acquiring a number of sensors for our robot platform, Mokhtar. The primary result shows the upturn in robot speed and also success in this aim.*

Keywords: expanding job algorithm, Mokhtar platform, robot analysing speed up, boost up processing speed, parallel processing, plume tracker.

Nowadays, plume trackers by their vast application in industry for hazardous gas alarm detector[1], securities[2], etc. are more demanding. There are a number of plume tracker prototypes, which have designed to do the above task. However, the main break for designers over the current sensor low speed response, is the rapidity of analysis, which has made them costly. Increasing the quantity of sensors would limit the designer, especially if the designer is looking for a number of sensors to have an accurate system which can overrun the analogue to digital converter (ADC) channel of the controller[3].

To rectify this problem, having a strong controller is essential. However, over the cost, acquiring the data and analysing simultaneously, will takes time. Some researchers have attempted to collect just the data. They have used PC as a server to do analysis and navigate, but this idea was also a time–consuming process and reduce the robot efficiency.

In this letter, by investigating above problem, it has tried to present a solution through the novel idea of job expanding. Fig. 1 shows the block diagram of the job expanding idea. Recently, this idea is implemented on our robot, Mokhtar's platform. Now, by utilizing the proposed idea, Mokhatr can analyse twenty ADC channels at the same time. This task has done by using three microcontrollers, which are assigned specific job to each one of them. The main controller will just take care of controlling and navigating the robot body; and communicating with the server over USRT232 for further purposes.

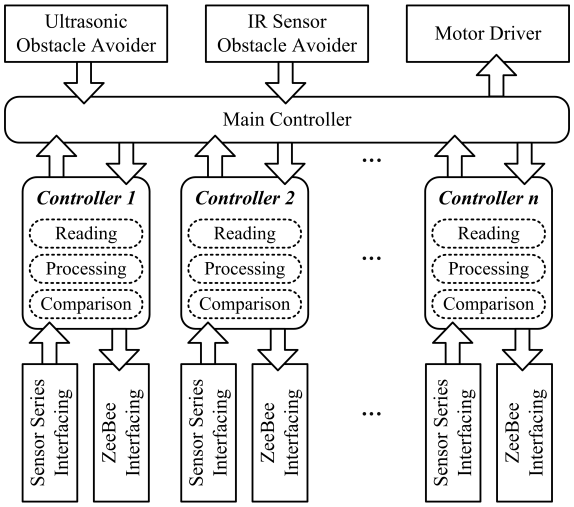

Fig. 1. Control's relation block diagrams

Then, by reducing the load on microcontrollers, the robot possibility of navigating will be increased. In this way, the main controller has the less load to have the fastest performance. Furthermore, the number of ADC channels can be amplified.

The main microcontroller has the duty to keep after:

1. The final command and specify the robot movement direction.
2. Collision avoider part (by the ultrasonic sensor and IR sensor) to avoid any obstacle at the right and left sides; and in front of the robot.
3. Communicating with the PC server.

On the other hand, other boards' tasks are:

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1. Acquiring the sensor data.
2. Comparison algorithm between the sensor reading.
3. Provision of sending the sensor data by ZigBee®.
4. Sending the final comparison result between sensors, to the master board.

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