Investigation of Raspberry Pi and development of intelligent watch-dog

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Raspberry Pi is one of the single-board computers in low price. Raspberry Pi3 (RPi3) and Raspberry Pi zero (RPi zero) are now on sale. Recently Raspberry Pi4 (RPi4) shows up with higher specifications than RPi3. Since they cost less than 100 US dollars, there are many users of them for field sensors and measurements in Earth science domains. Instead of the cost effects, RPi is known as its vulnerability and instability. We performed a variety of instability test on RPi zero and RPi3 to find that RPi zero is more unstable than RPi3. Many of the instabilities are believed to be caused of heat effects on CPU. However, in our examinations, both of them did not show clear dependence of irregular stopping of system on CPU temperatures. In order to overcome this vulnerability issue, we designed and implemented a new watch-dog module for RPi. The watch-dog always monitors Rasbian OS on RPis, and also provide scheduling of periodic shutdown and wake-up as well.

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