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智慧型機器人之近接感測器性能與干擾

The static performance and disturbance of proximity sensor for mobile robot

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ABSTRACT

In recent years, mobile robots have been attracting increasing attention from scientists and factories. With breakthrough techniques in the non-contacting proximity sensors, these sensors enable reliable mobile robot for position or object detection base on the distance between sensor and object. In fact, there are some factors to determine the static parameters of the sensor for example sensing distance, a dimension of the material, a thickness of a material and so on. However, it is necessary to measure at a static state of the inductive proximity sensor since the detective and navigation systems perform more accurately by analyzing the information signal. Therefore, the first hand-made measurement system is used to verify the relationship between the output sensor signal and the position of the sensor in the static performance with the aluminium object. The measured data have also illustrated the output signal of proximity sensor in the model and theory which is not identical. In addition, some information about the different effects of the position sensor and optimum operating range of a mobile robot is summated from the results. Moreover, most of the technology uses simple HF-oscillation principle as an inductive proximity sensor with a decrease in the quality of the oscillator circuit's electromagnetic to find the tape. By applying this technique, the external factors may cause negative effects to the system performance. To overcome this situation, another hand measurement with the objects will be put the following arrangement: the main tape- the obstruction sheet- the disturbing tape. After measuring, data results are used to analyze the influence of the obstruction sheet thickness and disturbance tape to the noise in received signals. By comparing the results achieved, giving solutions to enhance the static performance of the proximity sensor for a mobile robot, such as: choosing of material thickness ranges which is suitable for the operation of a mobile robot, setting the proper sensing distance to be the most stable. The research can also be used to lead the mobile robot based on inductive proximity sensor that becomes more robust against noises and disturbances.

Keywords: Static performance, sensor identification, sensor range, the disturbance, inductive proximity sensor, mobile robot, obstruction sheet.

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