

Key Note Lecture 3



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How can we evaluate man machine interface systems?

There are many man machine interfaces in the world. It is because there are many machines in the world and in most cases these machines need to present the machine status to human operators and receive controls from them through man machine interfaces. We design and develop man machine interfaces. We often do this by following conventional methods or by engineering judgments. After we finish designing man machine interfaces we often need to evaluate the design. Then how can we evaluate man machine interfaces? It is the subject of this lecture.

There can be many evaluations methods but in this presentation we introduce only what we have developed in my laboratory so far. We can divide the evaluation methods into two: One is an analytic method and the other is an experimental method. The analytical method is suggested using the information theory and the experimental method is further divided into a subjective method and an objective method and all of these are by using HUPRESS (HUMAN Performance Evaluation Support System).

In the analytical method, complexities of a man machine interface are measured and the design of the man machine interface is evaluated. There are three kinds of complexities

– operational complexity, interface complexity and the screen complexity. All of these complexities are measured by using informational entropy. As the quantitative complexities are measured lower, the man machine systems are considered better.

In the experimental method, the users of the man machine interfaces are asked to answer some questions after they use the interfaces and can judge the man machine systems subjectively. These methods are most frequently used evaluation method of the man machine systems in the real world. Some exemplary forms of the questions are NASA-TLX and some others. Another way of evaluating man machine interfaces by experiments is by measuring various things of the users of the interfaces. We could measure eye movements of an operator by using eye tracking systems and/or we can use the brain waves of the operator while they are using interfaces. We could use many other psycho-physiological measurements of the operators to evaluate the man machine interfaces.

In this presentation, I will present some details of these analytical and experimental methods one by one.

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