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Fuzzy Modelling of Facial-Expression Analysis for Evaluating Ride Comfort

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Summary: The authors have developed an evaluation method of facial expression for evaluating ride quality of vehicles. They demonstrated that facial expression can be quantitatively characterised by introducing the concept of the Fourier Descriptor (FD) and that the relationship between one's each individual facial factor such as eyes or a mouth and his/her psychological situation can be sufficiently expressed by the optimised discriminant analysis model. The present paper deals with overall evaluation of facial expression by other people using the FDs of both eyes and mouth. The subjects were asked to exhibit the six fundamental emotions investigated in the field of psychology: happiness, surprise, fear, anger, disgust and sadness. The fuzzy measure theory was here introduced to represent human ambiguous judgement. The process of estimating one's emotion from his/her overall facial expression was modelled by means of the fuzzy integral. The contributions of each individual factor of average of both eyes' shapes, mouth's shape and difference of both eyes' shapes to the evaluation were then identified quantitatively as fuzzy measures.

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