**University of Pavia**
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## Just-Noticeable Difference (JND) Formulation: Turning Limitations Of Human Senses Into System Advantages

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*Abstract -* As a result of the evolution, the human has developed unique characteristics in perception of viewing, hearing, smelling, touching and tasting. Just Noticeable Difference (JND) refers to the minimal amount of "X" that must be changed for the difference to be sensed by the human, where X can be any signal, derived quantity from signals such as emotion and user-experience, or even technical specifications such as resolution, asynchrony, accuracy, etc. "Perception is reality", so JND plays an important role both explicitly and implicitly throughout our work and life, from sound to smell and from engineering to marketing (e.g., advertisement, logo management, personalization, and recommendation). The scientific measurement and formulation for JND are the prerequisite for user-centric designs and for turning human perceptual sensitivities into many system advantages. In this seminar, a holistic view will be first presented on JND research and practice, followed by an in-depth case study in visual signals. JND modeling for visual signals has attracted much research interests so far, while those for audio, haptics, olfaction, gestation and other forms of signals are expected to intensify. In essence, factors to influence JND also include utility, culture and personality, as will be highlighted.

*Bio -* Dr Lin Weisi is a well-recognized researcher in image processing, video compression, perception-based signal modelling and assessment, and multimedia communication systems. In the said areas, he has published 170+ international journal papers and 230+ international conference papers, 7 patents, 9 book chapters, 2 authored books and 3 edited books, as well as excellent track record in leading and delivering more than 10 major funded projects (with $6+ m research funding). He had been the Lab Head, Visual Processing, in Institute for Infocomm Research (I$^2$R). Currently, he is an Associate Professor, School of Computer Science and Engineering, Nanyang Technological University, where he served as the Associate Chair (Graduate Studies) in 2013-2014. He is a Fellow of IEEE and IET, and an Honorary Fellow of Singapore Institute of Engineering Technologists. He has been an Associate Editor for IEEE Trans. on Image Processing, IEEE Trans. on Circuits and Systems for Video Technology, IEEE Trans. on Multimedia, IEEE Signal Processing Letters, Quality and User Experience (as a Founding Associate Editor), and Journal of Visual Communication and Image Representation.

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Seminar in English.
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