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# INTEGRATING PERCEPTUAL AND COGNITIVE MODELING
# -FOR ADAPTIVE AND INTELLIGENT HUMAN-COMPUTER INTERACTION-

Clasical IHCI (Intelligent Human-Computer Interaction) is extended on the interpretation of human actions acknowledged as W4 which stands for what,where,when, and who. W5+ technology explained in this paper also handles how and why questions, whereas W4 technology solely tackles the obvious perceptual side of human behavior. Technology proposed in this paper is based on four-phased framework. First phase is parsing the sensorial-motor input, second phase is the evaluation of users sentiments and motions, third phase is constructing an comprehension of user's current cognitive status. Finally it diagnoses issues related to user's current status and fit the interface pertinently.

Within this new methdology it is shown that non-verbal information facilitates exclusive type of communication where the goal is to search the inner parts of human mind previous to any verbal communication has been considered and expressed. Integration of cognitive approach to clasical HCI in order to achieve IHCI goals requires understanding of person's cognitive state. There are various indicators proposed and agreed upon which can be used to infer cognitive state of person. For instance, perpetual motion of pupils is more exacerbated under conditions of lethargy or fatigue. Another example is move-and-click movements when user is using a mouse. These movements and clicks have three categories: directness of movement towards the clicked object, pace of movement, and potency of click. These three categories are sign for the level of arousal. Lingering movements and weaker clicks joined with direct movements shows that fatigue. Slower movements and impotent clicks along with indirect movements indicate bewilderment. Swift movements and robust clicks coalesced with indirect movements demonstrate frustration. When a lot of inference like the previous examples bring together, embodied cognition modules can be constructed. These cognition modules when combined with the behavioral and perceptual processing provide a key to unlock the doors for making progress on adaptable intelligent interfaces.

To summarize, paper has described W5+ approach for IHCI which expands the interpretation of human actions an it consists of four steps. First step is processing of interactions between interface and user. Second step is nonverbal information collection by means of perceptual processing. Third step is combining embodied cognitive model with perceptual and behavioral data to yield profound understanding of user' status. Finally adapting interface according to diagnosis of user's cognitive state.