

Gender differences in visual inspection: Connecting personal traits with machine-learned behavior

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Among manufacturing companies there is a widespread consensus that women are better suited to perform visual quality inspection, that they have higher endurance and make decisions with better reproducibility. Motivated by these seeming differences we conducted a visual inspection study with 50 female and 50 male subjects to investigate the nature of these differences. In this talk we present a composite 2-level approach to model the connection between personal properties of subjects and their decision making behavior. At the stimuli level separate decision trees are fit for each subject. From these trees characteristic properties are extracted and connections to personal properties of the subjects are modeled with a linear regression model. While utilizing the flexibility and accuracy of decision trees at the stimuli level, the presented approach facilitates interpretation of results. When employing data-driven models, experiment design is of paramount importance. Our design methodology is based on an initial decision model, the Inspection Standard, that is used to brief subjects. Centered on the decision boundary in feature (covariate) space given by this model we identify what we term the Tube of Interest from pilot experiment data. The Tube of Interest establishes a scale-invariant measure of stimulus information content that is then used to sample stimuli for the main experiment. We show connections of our approach to the query-by-committee approach from the field of Active Learning. We conclude the talk by presenting the experimentation procedure and results of our study. Despite almost equal immediate performance measures, our study shows highly significant structural differences between the fit decision trees of female and male subjects. We believe the presented approach is a valuable tool for behavioral researchers that intend to investi-

gate the otherwise hidden structural differences in repetitive cognitive tasks rather than subject's merits.