Are Machines More Effective than Humans for Graphical Perception Tasks?

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INTRODUCTION
Graphical perception: “The visual decoding of information encoded on visualizations”.

Research Questions
• Are machines more effective than humans for graphical perception tasks?
• How does data distribution affect CNNs accuracy?

EXPERIMENTS
• Goals: to measure CNNs’ accuracy and understand how sampling affect the accuracy
• Exp. 1 (Cleveland and McGill’s test [1])
  o Dependent variable: ratio of marked bars
• Exp. 2 (Talbot et al.’s test [2])
  o Dependent variable: taller marked bar height
• Hypotheses
  o H1: CNNs can have super-human accuracy
  o H2: CNNs will fail if been trained with OOD

CONCLUSION
• CNNs can complete graphical perception task with super-human accuracy with the appropriate sampling methods.
• CNNs don’t generalize well. It’s important to check whether the test set is covered.
• CNNs perform better when the visual mark has sufficient pixel. Predictions on taller bars have higher accuracy.