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Imprecise Probabilities for Cybersecurity Applications

In cybersecurity and cryptanalysis, the measurement of cyber-risk is important and crucial for protection against cyberattacks. In cyber threats, probabilistic models can be thought of, and selected to measure the risk of occurrence of cyberattacks and threats. Imprecise probabilities are used to present the differences in prior beliefs amongst cryptanalysts, on cyber breaches and their probabilities of occurrence. Imprecise probabilities do capitalize the prediction margin of several types of cyber-risk, and can also give the cryptanalyst the opportunity to reduce it. For each threat/attack, there will be lower and upper bound probability estimates, based on implementing Bayesian methods with sets of prior probability distributions. Prior changes will be investigated to test on their impact on posterior distributions of risky cyberattacks. Furthermore, with imprecise probabilities, there is a window to evolve higher Bayesian methods for reducing uncertainty on protection and prediction against cyberattacks.