SOCR Tools

Distributions
This set of Java applets provides one of the most diverse set of continuous and discrete interactive distribution calculators. Users first choose a distribution of interest and the corresponding parameters and then compute probabilities or critical values for any distributions using mouse or keyboard controls.

Experiments
A number of interactive experiments used to demonstrate fundamental concepts in probability and statistics. These applets are frequently employed to motivate the introduction of new statistical concepts and methodologies.

Analyses
A suite of web-based graphical user interfaces to basic statistical analysis methods.

Games
A collection of dynamic computer games demonstrating a variety of situations where chance and variation and unavoidable.

Modeler
A data sampling and simulation tool, using the distributions provided as part of the SOCR Distributions library, that includes a complex data model fitting functionality.

Charts
SOCR Charts provide a diverse collection of tools for data plotting, charting, visualization and EDA.

Additional Resources
A number of external tools for statistical computing data visualization and analysis are linked to from within the SOCR Additional resource archive.

The goals of the SOCR Resource are to design, validate and freely disseminate knowledge. SOCR specifically provides portable online aids for probability and statistics education, technology-enhanced education and statistical computing.

SOCR Courses
Stats 10 - Introduction to Statistical Reasoning
Stats 13 - Statistical Methods for the Health and Life Sciences
Stats 100A - Probability Theory
Stats 100B - Mathematical Statistics
Stats 100C - Regression Analysis
Stats 157 - Probability and Statistics
Stats 105 - Applied Probability & Statistics
for Engineers
Stats 130D - Statistical Computing
Stat 251 - Statistical Methods for Life Sciences
Neuroscience 272 - Brain Mapping & Neuroimaging

SOCR Personel
Principal Investigator: Ivo D. Dinov, PhD
Co-PI Nicolas Christou, PhD
Robert Gould, PhD
Alexandr Kalinin, Abhishek Chowdhury
Selvam Palanimalai, Patrick Tan
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Statistics Online Computational Resource
University of Michigan, UMSN
Ann Arbor, Michigan 48109-5482
Tel: (734) 764-8152  Fax: (734) 647-2416
www.SOCR.umich.edu
Statistics@UMich.edu

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Experiments provide a plug-in framework for interactive simulations, which are essential in courses on probability and statistics. The figure below depicts one of the SOCR experiments, which illustrates the consistency of the confidence intervals definition and the relations between size of the intervals, p-values and sample sizes.

The need for hands-on computer laboratory experience in undergraduate and graduate education has been firmly established in the past decade. Typical probability and statistics courses are presently either taught with enough rigor, using classical probability theory, or entirely based on empirical observations. In both cases, there are pedagogically valuable reasons for these choices. However, some motivational, descriptive and practical aspects may be significantly downplayed by solely theoretical or entirely empirical instructional approaches.

The Statistics Online Computational Resource (SOCR) was established in 2001 to design, implement, validate and freely disseminate new methods and approaches for SOCR experiment modeling, which illustrates the theoretical underpinnings and empirical results in courses on probability and statistics education. The need for hands-on computer laboratory experience in undergraduate and graduate education has been firmly established in the past decade.