Visualization and Analysis of Sensory Data

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ABSTRACT

Recently, California has suffered a severe drought, making water a scarce resource to its population. Many viticulturists are based in this area who rely on heavy irrigation to produce a better grape and a better wine. Not just in California, but throughout the nation, irrigation must be applied intelligently for efficient use of water and funding. By taking measurements of physical characteristics of a vineyard over time, one may be able to visualize trends in the data which lend itself to describing preferred growing methods. Wireless sensors can be used to take measurements including moisture, temperature, sunlight, and more. Sensors have been installed at multiple locations about a vineyard. A framework has been put in place to capture, adjust, and calibrate the data as well as store it for future retrieval. The data are visualized over time to see the effects of techniques in the long term. These are helpful for suggesting irrigation strategy that will lead to the best yield. Sensors are cheap and effective, but are prone to malfunction and transmission errors. When these problems occur, the faulty time-series data can be cleaned by correlating with similar time-series data in the same time span. The data system will be a necessity for competitive viticulturists, reducing cost of irrigation and improving quality of wine. In the future, the tool could be applied to other crops. Also, if any new important values must be derived or measured, the system can be extended to include them.

KEYWORDS

Visual Analytics, Viticulture, Sensory Data, Data Cleaning