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USING REGRESSION TECHNIQUES TO PREDICT WEATHER SIGNALS
FROM IMAGE SEQUENCES

by
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ABSTRACT OF THE THESIS

Using Regression Techniques to Predict Weather Signals from Image Sequences

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Webcams are cheap sensors that capture a potentially large amount of information about a scene. This thesis considers the use of regression and correlation techniques such as Canonical Correlation Analysis (CCA) to convert these webcams into environmental sensors and predict the values of weather signals. Local environmental properties often directly affect the images we collect from the webcams; whether it is cloudy or sunny is visible by the presence of shadows; wind speed and direction is visible in smoke, flags, or close up views of trees; particulate density is reflected in haziness and the color spectrum during sunset. Using the AMOS database, which has been archiving nearly 1,000 webcams every 30 minutes for the last 3 years, we explore relationships between the amount of training data and the accuracy with which we are able to infer the values of certain weather signals including wind speed & direction and vapor pressure from inherent properties in the image. This allows the webcams *already* installed across the earth to act as generic sensors to improve our understanding of local weather patterns and variations.

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Chapter 5

Future Work

Appendix A

Camera Information

Appendix B

Weather Data

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