Project Summary

The word “gloss” is intuitively easy to understand, but making an optical measurement that correlates well with the perception of gloss remains a challenge. The hypothesis behind this project is that both spatial resolution (micro) and angular resolution (gonio) are required of an instrument in order to correlate meaningfully with visual perceptions of gloss and also with the underlying causes of gloss. Thus, a micro-goniophotometric instrument has been developed and demonstrated. This instrument collects polarized and un-polarized reflections from a sample wrapped in a cylindrical shape to extract the specular and diffuse components. This instrument has been successful in collecting more information than a traditional gloss meter, and the device output was correlated to human visual perception.

Concepts

Hardware:

- Detector
- Micro-Goniophotometer
- Camera
- Linear Fiber Optics Array
- Polarizer
- Sample holder
- Cylindrical shape

Software:

Data analysis and Easy to use GUI programmed in Java

Test Results

Results Consistency:

- High gloss samples will have a narrow curve (smaller angle) and higher magnitude than low gloss samples
- Results are analyzed and computed with respect to a reference sample

Potential Future Improvements

- Miniaturize the device by using a smaller camera, using only spaces needed and using a different sample loading mechanism
- Simplifying the device operation by:
  - Designing a self sensing mechanism for saturation adjustment
  - Using a controller to slide the polarizer
  - Automate the mechanism of determining the field of view
  - Integrate these processes in the Java code

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