Automatic Tag Generation and Ranking for Sensor-rich Outdoor Videos

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Background and Motivation

Video and sensor data capturing apps:

Viewable scene modeling:

Motivation:

Keyword search support, tagging automation, ranking tag relevance, light-weight computation

Essential idea:

USC, Tommy Trojan, Bovard Auditorium, Los Angeles

Methods and Prototype Implementation

Framework

Core Functionality

Visible geo-object recognition:
• Using FOV to query objects from GIS
• Computing visibility and filtering occluded ones
• Horizontal visibility
• Vertical visibility
• Extracting textual description
• Repeating the process for each FoV

Tag ranking:
• Visual criteria
• Closeness to the FoV center
• Distance to the camera location
• Visible angle range/percentage
• Social criteria
• GIS (e.g., “landmark”, “attraction”) • Wikipedia reference

Tag association:
• Segmentation based on 0-score
• Integrating scores temporally

Extension

Textual Indexing and search support: Apache Lucene
Web service wrapping: Apache CXF

Experimental Results and Conclusion

Video dataset: 2 sites, 1 ~ 16 minutes
• Marina Bay Area of Singapore: 37 videos
• University of South California: 50 videos

GIS:
• OpenStreetMap: a open-source GIS
• GeoDec: 3D models of USC

Result Highlights:
• More higher quality tags
• Ranking consisting with human perception
• Tag association with exact video segment