

A Visual Concept Ontology For Automatic Image Recognition

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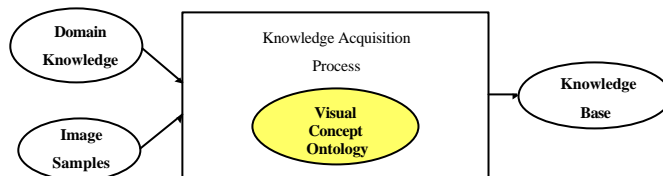
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Introduction

- Experts often use a well-defined vocabulary to describe the images of their domain (e.g. astronomy, palynology)
- We propose an ontology based knowledge acquisition process to perform this visual description
- This knowledge acquisition process is based on a visual concept ontology
- A Knowledge Acquisition Tool has been developed and applied to pollen grain description

keywords: Ontology, Data Semantics, User Interfaces

Approach



Visual Concept Ontology

The Ontology is structured in three parts :

- **Color** concepts
- **Texture** Concepts
- **Spatio-temporal** Concepts.
- **Context concepts** (e.g. point of view, acquisition sensor)

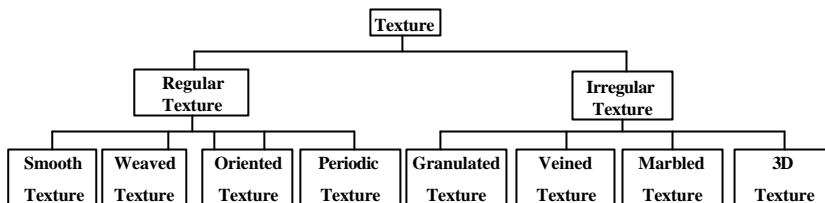
•Color Concepts (flattened view)

Derived from the ISCC-NBS color dictionary

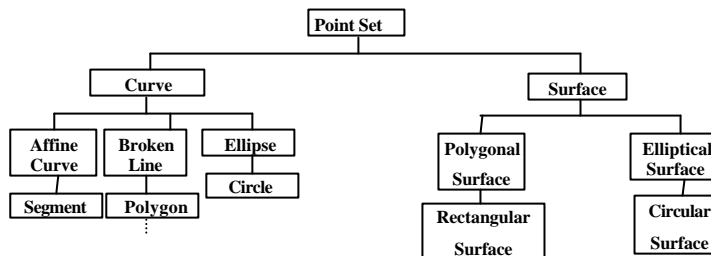
| | |
|-----------------|-----------------|
| Red | Purple |
| Reddish Orange | Reddish Purple |
| Orange | Purplish Red |
| Orange Yellow | Purplish Pink |
| Yellow | Pink |
| Greenish Yellow | Yellowish Pink |
| Yellow Green | Brownish Pink |
| Yellowish Green | Brownish Orange |
| Green | Reddish Brown |
| Bluish Green | Brown |
| Greenish Blue | Yellowish Brown |
| Blue | Olive Brown |
| Purplish Blue | Olive |
| Violet | Olive Green |

• Texture Concepts

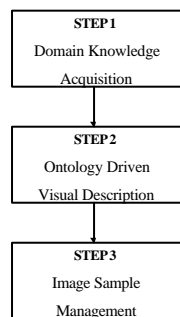
Created based on results coming from the cognitive science community



• Subset of geometric concepts



Knowledge Acquisition Tool



Acquired knowledge is expressed in DAML+OIL
The JENA API is used for that purpose

Conclusion and Future Work

- We propose an ontology driven knowledge acquisition process for image description
- A dedicated tool has been developed
- We are currently working on machine learning techniques to extract and learn visual concepts
- An important work has to be done at the image processing level (Segmentation, Configuration)

