PAPER

Vanishing Point Detection by Integrating Geometric, Temporal, and Semantic Cues

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SUMMARY Vanishing point detection is applicable in a lot of scenarios.

key words: *Object detection, Fast voting*

1. Introduction

$\{\mathbf{g}\}, \{\mathbf{t}\}, \{\mathbf{s}\}$

$$\arg\max_{\{\mathbf{v}^t\}} \log(P(\widetilde{\{\mathbf{g}\}}, \widetilde{\{\mathbf{t}\}}, \widetilde{\{\mathbf{s}\}}, \mathbf{v}^{t-1}|\mathbf{v}^t))$$

$$s.t. \ : \widetilde{\{\mathbf{g}\}} \subseteq \{\mathbf{g}\}, \widetilde{\{\mathbf{t}\}} \subseteq \{\mathbf{t}\}, \widetilde{\{\mathbf{s}\}} \subseteq \{\mathbf{s}\}.$$

$$\begin{aligned}&\log(P(\widetilde{\{\mathbf{g}\}}, \widetilde{\{\mathbf{t}\}}, \widetilde{\{\mathbf{s}\}}, \mathbf{v}^{t-1}|\mathbf{v}^t)) \\ &\approx \sum_{\{\mathbf{g}\}} \pi(\mathbf{g}) \log(P(\mathbf{g}|\mathbf{v}^t)) + \sum_{\{\mathbf{t}\}} \pi(\mathbf{t}) \log(P(\mathbf{t}|\mathbf{v}^t)) \\ &+ \sum_{\{\mathbf{s}\}} \pi(\mathbf{s}) \log(P(\mathbf{s}|\mathbf{v}^t)) + \log(P(\mathbf{v}^{t-1}|\mathbf{v}^t))\end{aligned}$$

$$\pi(\mathbf{x}) = \begin{cases} 1 & \mathbf{x} \in \widetilde{\{\mathbf{x}\}} \\ 0 & \text{otherwise} \end{cases} \quad \text{for } \mathbf{x} = \mathbf{g}, \mathbf{t}, \text{ or } \mathbf{s}$$

$$\mathrm{P}(S_1) = \sum_{i=1}^{m} \omega(u_i)$$

References

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