

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

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

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

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

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

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

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

References

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