

TABLE I

COMPARISON OF RELATED WORKS IN THE LITERATURE ON ADAPTIVE INFORMATION SAMPLING. THE INFORMATION FUNCTIONS USED TO OBTAIN THE NEXT WAYPOINTS FOR SUCCESSIVE SAMPLING ARE ADAPTED FROM THE RESPECTIVE REFERENCES IN THIS TABLE.

Ref.	Information Function	Scalability		Robot type	Sampling Type	Objective	Property/Process Measured	Prediction Model	Exploration or Exploitation
		Single Robot	Multi Robot						
[1]	$I(\mathcal{P}_{\mathbf{x}, \mathbf{x}'}) = \frac{1}{ \mathcal{P}_{\mathbf{x}, \mathbf{x}'} } \sum_{\tau \in \mathcal{P}_{\mathbf{x}, \mathbf{x}'}} H(\tau)$	✓		Ground	Discrete	Mapping	Magnetic Field Intensity	Gaussian Processes	Exploration
[2]	$\mathcal{I}_{i,j} = -\frac{\partial^2 \mathcal{L}(\theta_m)}{\partial \theta_{m,i} \partial \theta_{m,j}}$	✓	✓	Ground	Discrete	Mapping and source localization	Radio Signal Strength	Gaussian Processes	Mix
[3]	$I(Z_A; Z_B) = I(Z_B; Z_A) = H(Z_A) - H(Z_A Z_B)$	✓		Marine	None	Monitoring	Salinity	Sparse Gaussian Processes	Exploration
[4]	$I^{rss}(x) = \frac{\max(\mu) - \mu^*(x)}{\max(\mu) - \min(\mu) + \epsilon}$	✓		UGV	Continuous	Path Planning	Wi-Fi	Gaussian Processes	Exploitation
[5]	None	✓		Ground	Discrete (zigzag waypoints sweeping pattern)	Mapping	Gamma radiation	None	Exploration
[6]	$I(x) = \ln(\sigma\sqrt{2\pi e})$	✓	✓	Ground	Discrete	Mapping	Radio Signal Strength	Gaussian Processes	Exploration
[7]	None		✓	Ground and Aerial	Continuous	Localization of Sources	Radiation	None	Exploration
[8]	$\mathbb{I}[\mathbf{Y}_{x_{i+1}} d_i] = \log \sqrt{2\pi e \sigma_{Z_{x_{i+1}}^2}^2} + \mu_{Z_{x_{i+1}}^2} d_i$		✓	Underwater	Discrete	Modeling	Algae	Gaussian Processes	Mix
[9]	$I(x) = \mu_{x V_i, Y_i}^* + \beta \sigma_{x V_i, Y_i}^{*2}$		✓	Ground	Discrete	Sensing Coverage	Stalk count, Temperature	Mixture of Gaussian Processes	Mix
[10]	None		✓	Ground and Aerial	Discrete	Mapping/ Environmental Monitoring	Temperature, humidity and carbon dioxide concentration	None	Exploration
[11]	None	✓		Ground	Discrete	Mapping	Radiation	None	Exploration
[12]	None	✓		Ground	Continuous	Localization of Source/Vehicle	Wi-Fi	Gaussian Processes	Exploration
[13]	$p(z_{new,j} \mathbf{x}_*) = \Phi\left(\frac{z_{new,j} - E[z_{*j}]}{\text{var}(z_{*j})}\right)$	✓		Ground	Discrete	Robots localization	wireless signal strength	Path loss and Gaussian Processes	Exploration
[14]	None $I \varphi = \gamma_d + 1/e^{\beta_0^{1/k}}$	✓		Ground	Discrete/Continuous	Mapping	Radiation	None	Exploration
[15]	$I := \text{abs}(H(z_{1,t}) - H(z_{1,t} x_t))$	✓	None	Discrete	Localization of Hotspot		Radiation	None	Explore
[16]	$I(x) = \mu_{x V, Y}^* + \beta \sigma_{x V, Y}^{*2}$		✓	Ground and Aerial	Discrete	Mapping	Wi-Fi	Mixture of Gaussian Processes	Mix
[17]	None		✓	Ground	Continuous	Mapping	Gamma radiation	None	Exploration
[18]	None		✓	Ground and Aerial	Discrete / Continuous	Localization	Gamma radiation	None	Exploration

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