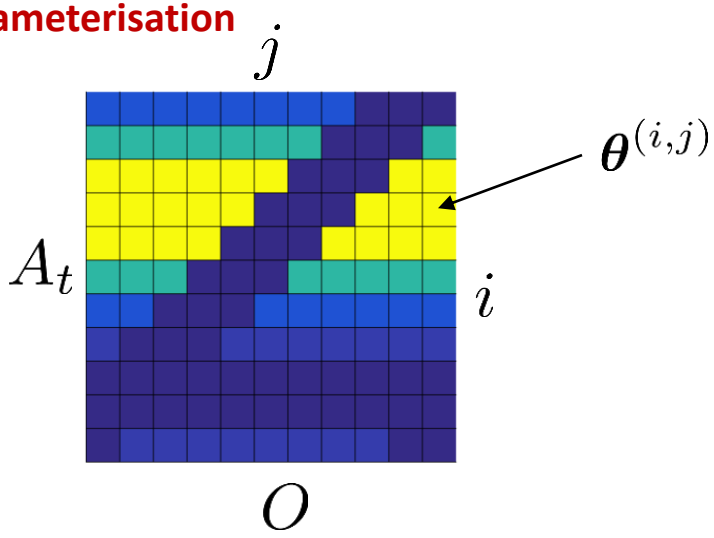
Measurement Likelihood Memory Filter (MLMF)

Histogram-SLAM **value parameterisation**

$$P(A_t, O | Y_{0:t}, u_{1:t}; \boldsymbol{\theta})$$



MLMF-SLAM **functional parameterisation**

$$P(A_t, O, Y_{0:t} | u_{1:t}; \boldsymbol{\theta}^*_o, \boldsymbol{\theta}^*_a, \boldsymbol{\Psi_{0:t}}) = P(O; \boldsymbol{\theta}^*_o)\, P(A_t | u_{1:t}; \boldsymbol{\theta}^*_a)\; P(Y_{0:t} | A_t, O, u_{1:t}; \boldsymbol{\Psi_{0:t}})$$

Measurement Likelihood Memory Filter (MLMF)

Histogram-SLAM **value parameterisation**

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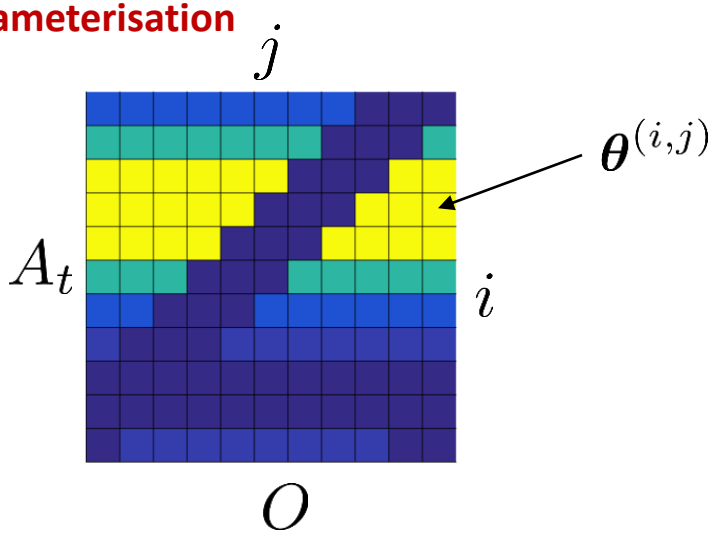
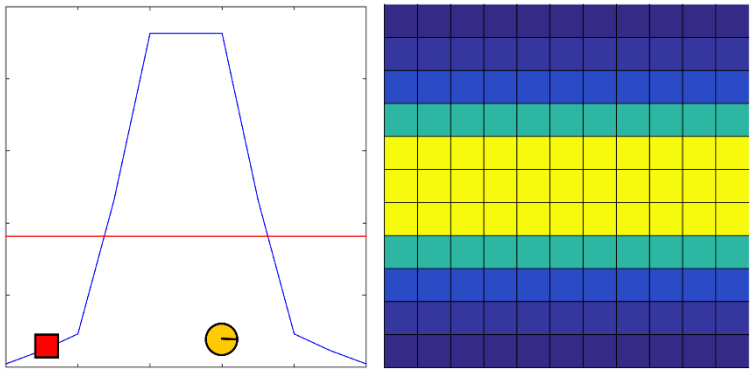


MLMF-SLAM **functional parameterisation**

$$P(A_t, O, Y_{0:t} | u_{1:t}; \boldsymbol{\theta}^*_o, \boldsymbol{\theta}^*_a, \boldsymbol{\Psi_{0:t}}) = P(O; \boldsymbol{\theta}^*_o)\, P(A_t | u_{1:t}; \boldsymbol{\theta}^*_a)\; P(Y_{0:t} | A_t, O, u_{1:t}; \boldsymbol{\Psi_{0:t}})$$



Measurement Likelihood Memory Filter (MLMF)

Histogram-SLAM **value parameterisation**

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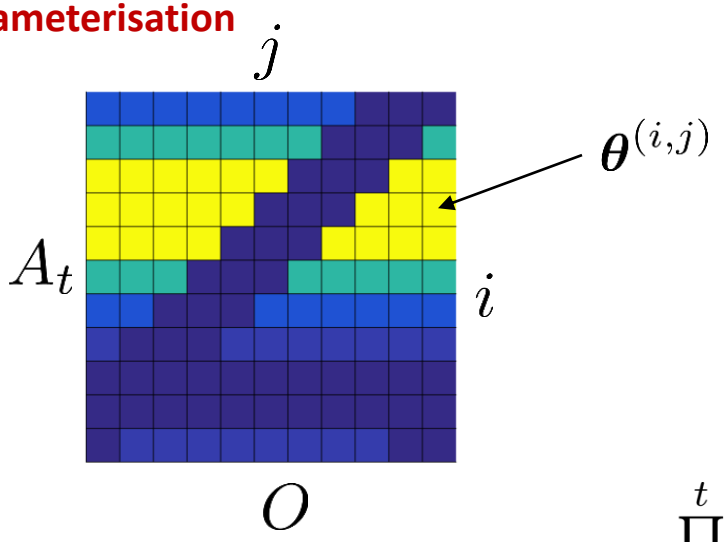
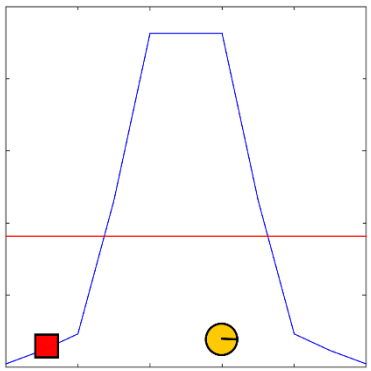
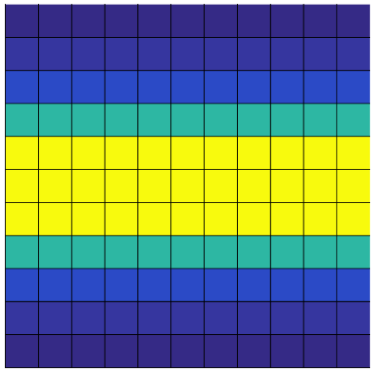


MLMF-SLAM **functional parameterisation**

$$P(A_t, O, Y_{0:t} | u_{1:t}; \boldsymbol{\theta}^*_o, \boldsymbol{\theta}^*_a, \boldsymbol{\Psi_{0:t}}) = P(O; \boldsymbol{\theta}^*_o)\, P(A_t | u_{1:t}; \boldsymbol{\theta}^*_a)\, P(Y_{0:t} | A_t, O, u_{1:t}; \boldsymbol{\Psi_{0:t}})$$

$$= \prod_{i=0}^{t} P(Y_i | A_t, O, u_{i+1:t}; l_i)$$

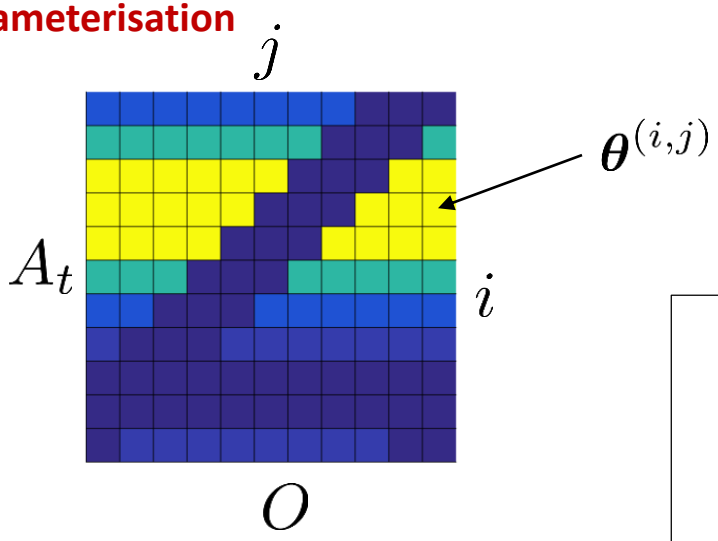




Measurement Likelihood Memory Filter (MLMF)

Histogram-SLAM value parameterisation

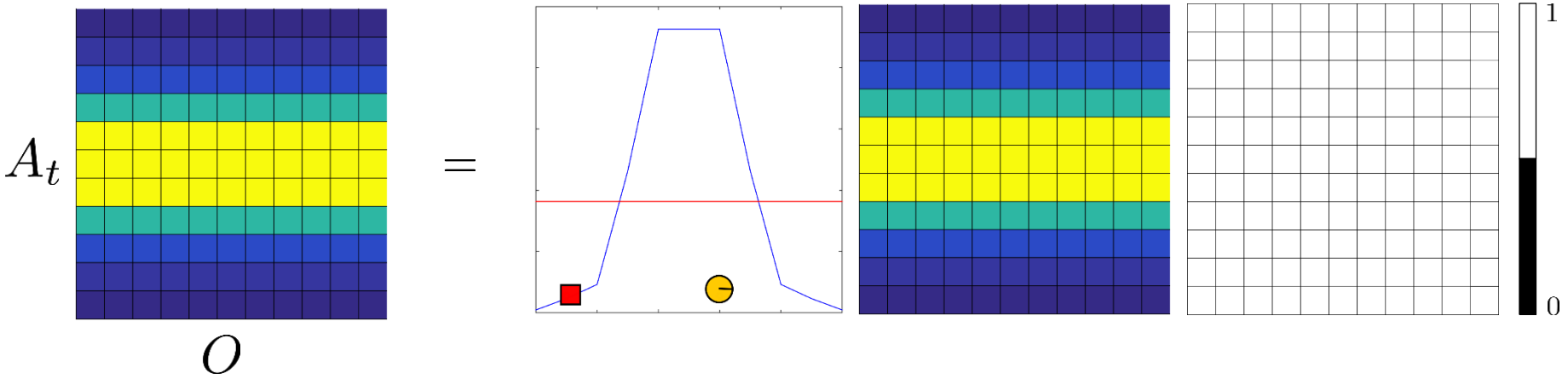
$$P(A_t, O | Y_{0:t}, u_{1:t}; \boldsymbol{\theta})$$



MLMF-SLAM functional parameterisation

$$P(A_t, O, Y_{0:t} | u_{1:t}; \boldsymbol{\theta}^*_o, \boldsymbol{\theta}^*_a, \boldsymbol{\Psi_{0:t}}) = P(O; \boldsymbol{\theta}^*_o)\, P(A_t | u_{1:t}; \boldsymbol{\theta}^*_a)$$

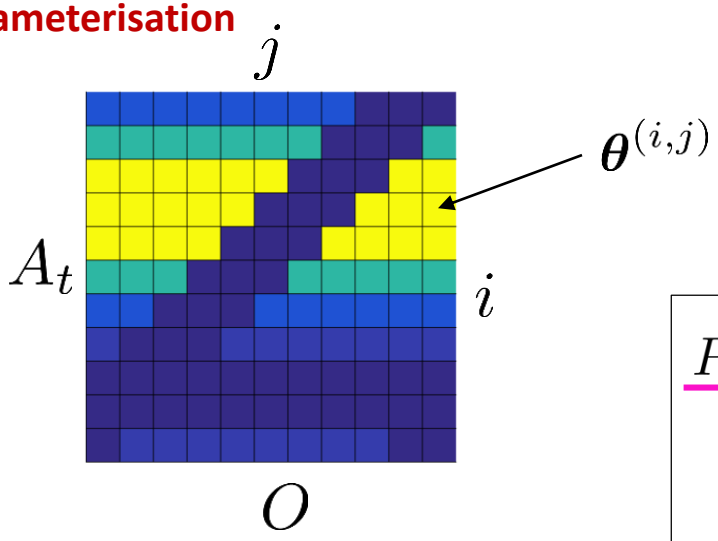
$$= P(Y_{0:t} | A_t, O, u_{1:t}; \boldsymbol{\Psi_{0:t}})$$



Measurement Likelihood Memory Filter (MLMF)

Histogram-SLAM value parameterisation

$$P(A_t, O | Y_{0:t}, u_{1:t}; \boldsymbol{\theta})$$



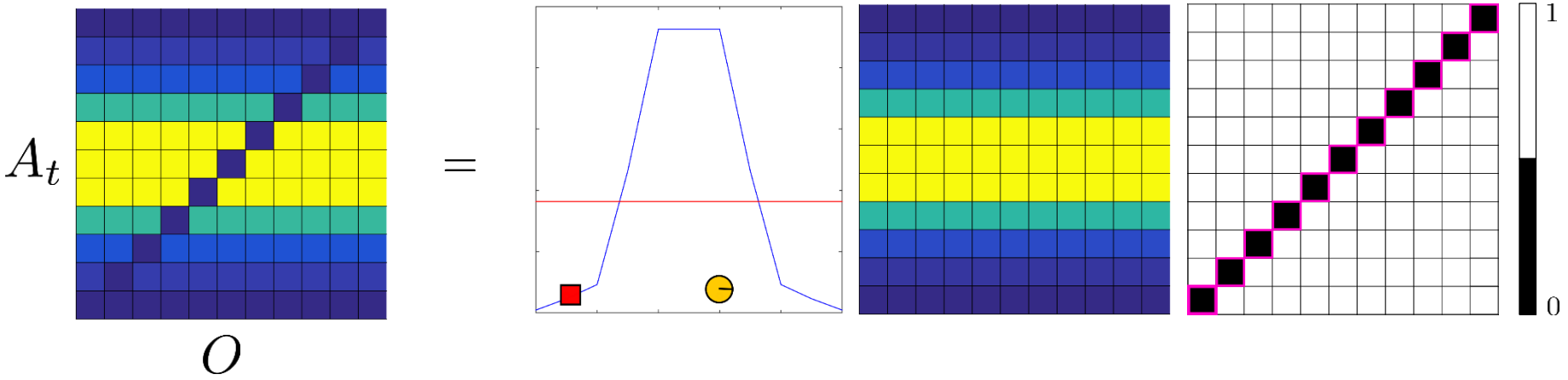
MLMF-SLAM functional parameterisation

$$P(A_t, O, Y_{0:t} | u_{1:t}; \boldsymbol{\theta}^*_o, \boldsymbol{\theta}^*_a, \boldsymbol{\Psi_{0:t}}) = P(O; \boldsymbol{\theta}^*_o)\, P(A_t | u_{1:t}; \boldsymbol{\theta}^*_a)$$

$$P(Y_0 | A_0, O; l_0 = 0)$$

$$=$$

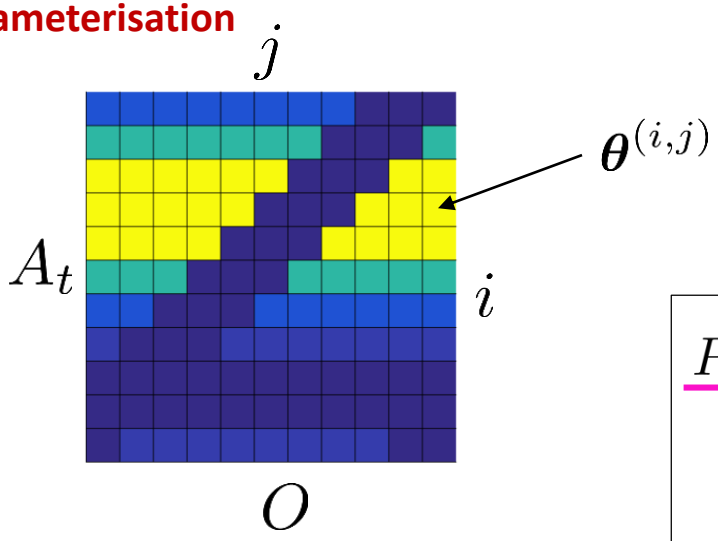
$$P(Y_{0:t} | A_t, O, u_{1:t}; \boldsymbol{\Psi_{0:t}})$$



Measurement Likelihood Memory Filter (MLMF)

Histogram-SLAM value parameterisation

$$P(A_t, O | Y_{0:t}, u_{1:t}; \boldsymbol{\theta})$$

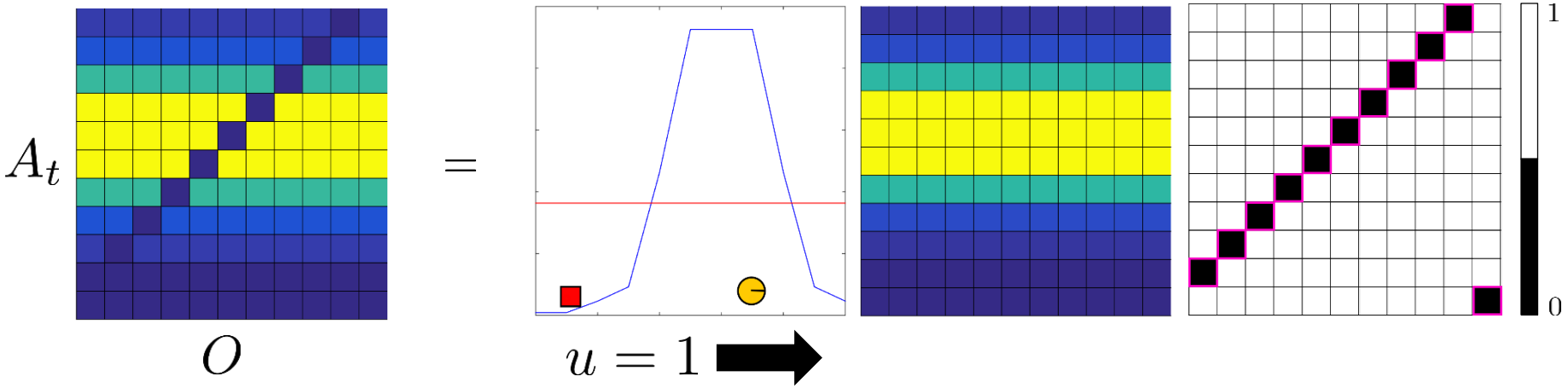


MLMF-SLAM functional parameterisation

$$P(A_t, O, Y_{0:t} | u_{1:t}; \boldsymbol{\theta}^*_o, \boldsymbol{\theta}^*_a, \boldsymbol{\Psi_{0:t}}) = P(O; \boldsymbol{\theta}^*_o)\, P(A_t | u_{1:t}; \boldsymbol{\theta}^*_a)\, P(Y_{0:t} | A_t, O, u_{1:t}; \boldsymbol{\Psi_{0:t}})$$

$$P(Y_0 | A_1, O, u_1; l_0 = 1)$$

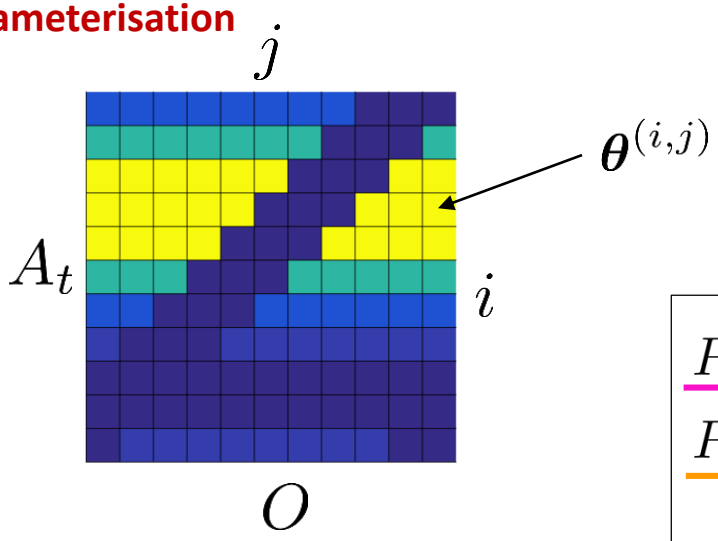
$$=$$



Measurement Likelihood Memory Filter (MLMF)

Histogram-SLAM value parameterisation

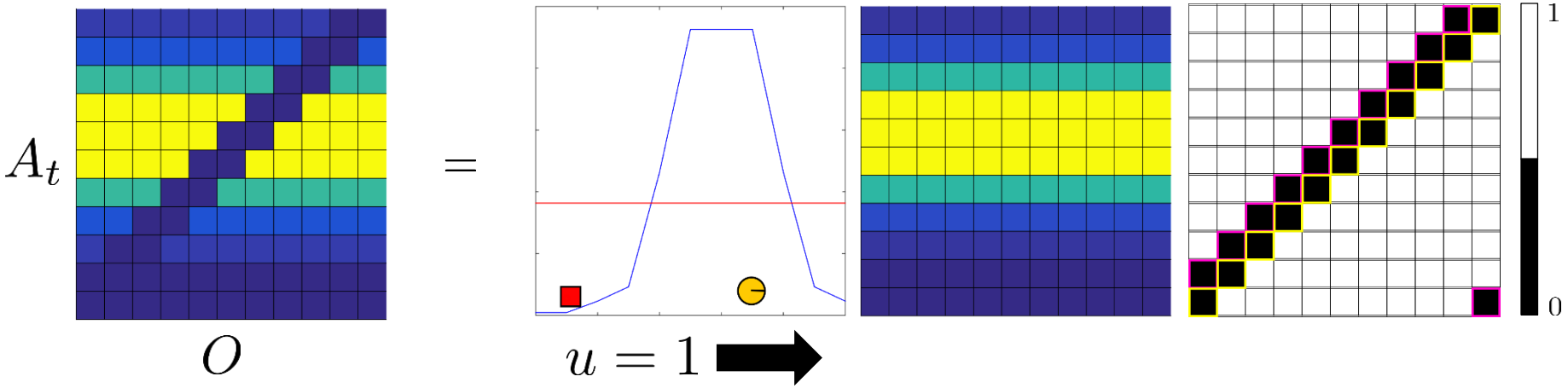
$$P(A_t, O | Y_{0:t}, u_{1:t}; \boldsymbol{\theta})$$



MLMF-SLAM functional parameterisation

$$P(A_t, O, Y_{0:t} | u_{1:t}; \boldsymbol{\theta}^*_o, \boldsymbol{\theta}^*_a, \boldsymbol{\Psi_{0:t}}) = P(O; \boldsymbol{\theta}^*_o)\, P(A_t | u_{1:t}; \boldsymbol{\theta}^*_a)$$

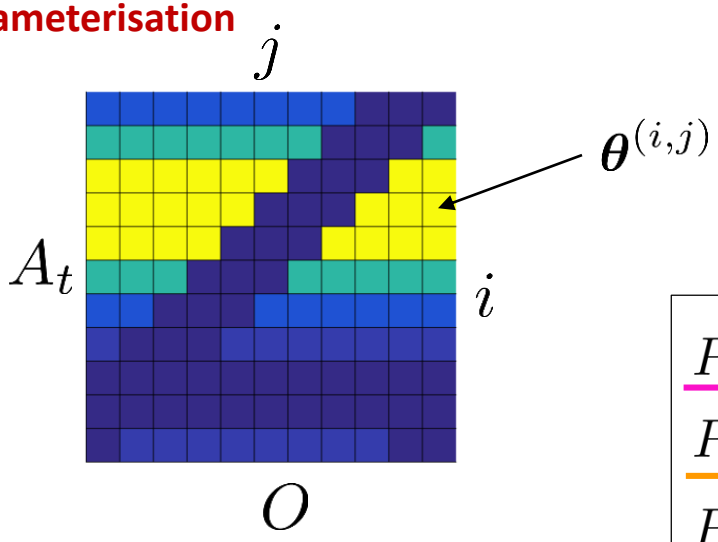
$$P(Y_0 | A_1, O, u_1; l_0 = 1)$$
$$P(Y_1 | A_1, O; l_1 = 0)$$
$$=$$
$$P(Y_{0:t} | A_t, O, u_{1:t}; \boldsymbol{\Psi_{0:t}})$$



Measurement Likelihood Memory Filter (MLMF)

Histogram-SLAM value parameterisation

$$P(A_t, O | Y_{0:t}, u_{1:t}; \boldsymbol{\theta})$$



$$\boldsymbol{\Psi_{0:t}} = \{(Y_i, l_i)\}_{i=0:t}$$

$$P(Y_0 | A_2, O, u_{1:2}; l_0 = 2)$$
$$P(Y_1 | A_2, O, u_2; l_1 = 1)$$
$$P(Y_2 | A_2, O; l_2 = 0)$$
$$=$$
$$P(Y_{0:t} | A_t, O, u_{1:t}; \boldsymbol{\Psi_{0:t}})$$

MLMF-SLAM functional parameterisation

$$P(A_t, O, Y_{0:t} | u_{1:t}; \boldsymbol{\theta}^*_o, \boldsymbol{\theta}^*_a, \boldsymbol{\Psi_{0:t}}) = P(O; \boldsymbol{\theta}^*_o)\, P(A_t | u_{1:t}; \boldsymbol{\theta}^*_a)$$