




| TENT <br> Pre-Co <br> - Observatio <br> - Compute <br> - Compute $m=\prod$ <br> - Ignore al | Sol te Observ <br> bability Rule for a set of partia using the diss <br> $\neg \overline{\mathbf{x}} \mid \overline{\mathbf{0}} \wedge \mathrm{M}(\overline{\mathbf{x}}) \wedge$ <br> $\left.o_{i}\right)$ - number of $\mathbf{P}(\overline{\mathbf{0}} \mid \bar{x}$ <br> with probability | Probability Rul <br> $\overline{\mathbf{x}} \Rightarrow \mathbf{P}(\overline{\mathbf{o}} \mid \overline{\mathbf{x}})$ <br> nsistent $\}$ <br> nt observations |
| :---: | :---: | :---: |
| Model | Max \# of OPRs | \# OPRs Required Online |
| EO-1 | $1.77 \times 10^{8}$ | 64 |
| MarsEDL | $1.46 \times 10^{6}$ | 307 |
| ST7-A | $1.44 \times 10^{4}$ | 8 |




## Solve Mode Estimation as an Optimal Constraint Satisfaction Problem

- Use Conflict-directed $A^{*}$ with a tight admissible heuristic
- Use greedy approximation for the cost to go (BFBSE)
- Include observation probability within the heuristic (BFBSU)





## Conclusion

- Best-First Belief State Update
- Compute $k$ most likely estimates
- Remove most likely trajectory approximation by computing the most likely belief state estimates
- Remove 1 or 0 observation probability approximation by computing the proper observation probabilities
- Increased PCCA estimator accuracy by computing the Optimal Constraint Satisfaction Problem (OCSP) utility function directly from the HMM propagation and update equations
- Maintaining the computational efficiency.

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