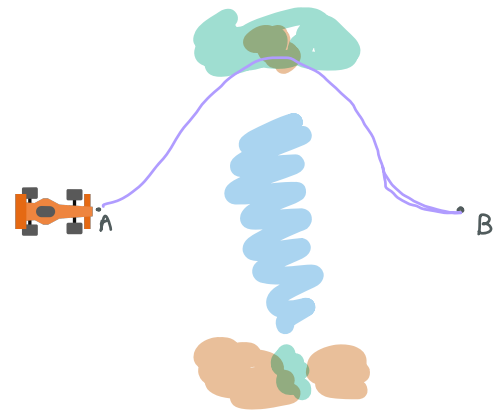


π : See all possible
MDPs Π

Minuz time + Don't wit
obstacles

MDP: $\langle S, A, T, C \rangle$
 \downarrow \downarrow \downarrow \downarrow
 $\in \mathbb{R}^2$ 4 action deterministic
 \downarrow \downarrow \downarrow \downarrow
 x, y action deterministic
 known



$$C(s) = w_1 \cdot \mathbb{1}(s \in \text{Water}) + w_2 \cdot \mathbb{1}(s \in \text{Grass}) + w_3 \cdot \mathbb{1}(s \in \text{Rock})$$

We have demonstration

$$\sum^h : (s_1, a_1, s_2, a_2, \dots)$$



Find ME A w .

$$C(\underbrace{\Sigma^h}_{\text{HUMAN DEMO}}, w) \leq C(\Sigma, w) \quad \forall \Sigma$$

$$\begin{aligned}
 C(\underbrace{\Sigma}_{\text{target}}, \underbrace{\omega}_{\text{weights}}) &= \sum_{t=1}^T w_1 f_1(s_t) + w_2 f_2(s_t) + \dots \\
 &= W^T \sum_{t=1}^T f(s_t) = W^T f(\Sigma) \\
 &= [w_1 \ w_2 \ w_3] \begin{bmatrix} \text{How much water} \\ \text{How much fuel} \\ \dots \end{bmatrix} \text{ cost}
 \end{aligned}$$

FIND ME A WEIGHT VECTOR ω

$$W^T f(\Sigma^h) \leq W^T f(\Sigma) \quad \forall \Sigma$$

$$W^T f(\Sigma^h) \leq \min_{\Sigma} (W^T f(\Sigma) - 1)$$

$$\begin{aligned}
 &\min \|w\|^2 + \beta \\
 \text{s.t.} & \quad W^T f(\Sigma^h) \leq \min_{\Sigma} \left[W^T f(\Sigma) - \gamma(\Sigma, \Sigma^h) \right] + \beta
 \end{aligned}$$

$\begin{cases} 0 & \text{if } \Sigma = \Sigma^h \\ 1 & \text{o.w.} \end{cases}$

$$\min_w \|w\|^2 + \underbrace{\left[W^T f(\Sigma^h) \right]}_{\text{HUMAN COST}} - \underbrace{\min_{\Sigma} \left[W^T f(\Sigma) - \gamma(\Sigma, \Sigma^h) \right]}_{\text{PLANNER COST}}$$