
Bachelor Thesis Artificial Intelligence

EFFICIENT GENERATION OF JUSTIFICATIONS

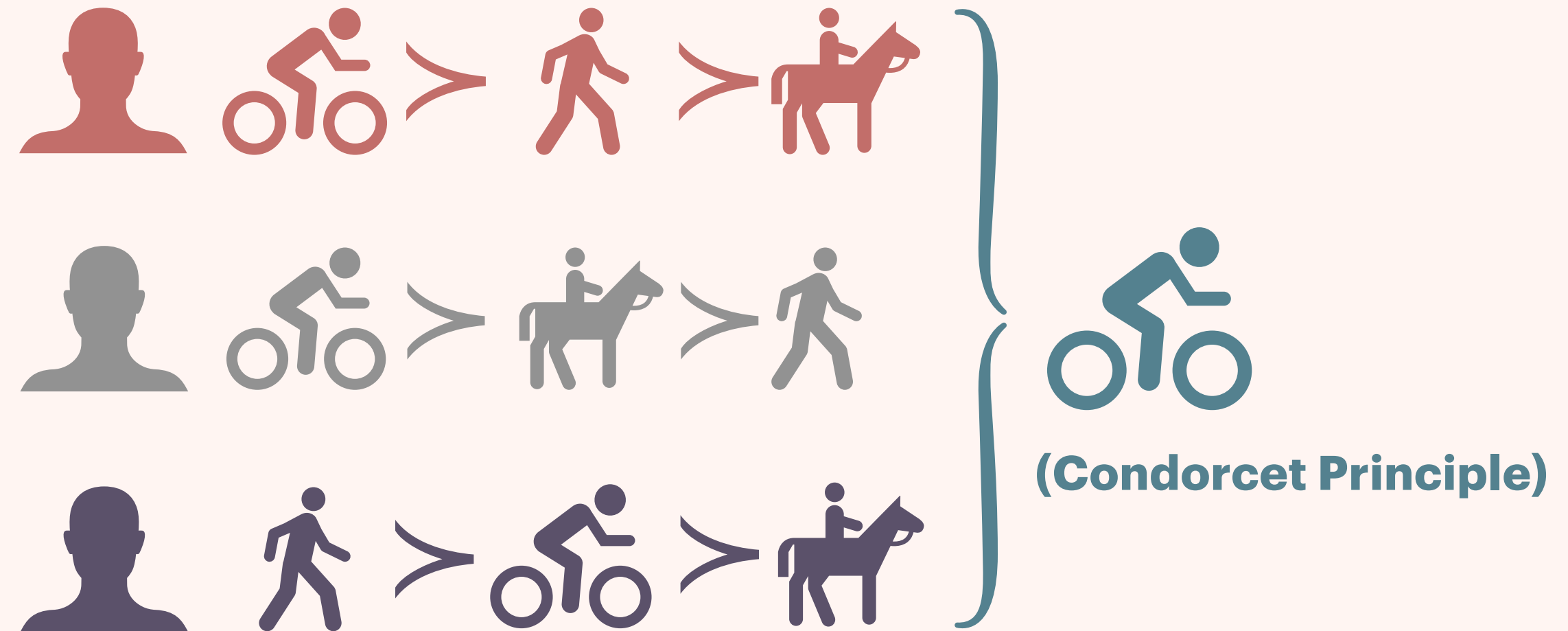
SUPERVISOR: A. BOIXEL (ILLC)

Nienke Reints, May 15th

AMSTERDAM

PROBLEM DESCRIPTION

- **Group Decision**
- **Voting Rules & Axioms**
- **Justification**
- **Efficient**



RESEARCH QUESTION

- **A. Boixel, U. Endriss (2020)**
 - **Justification = Explanation + Normative Basis**
- **Efficiency**

METHOD

- **Literature research**
- **Designing the algorithms**
- **Evaluating the efficiency**

MODEL

➤ **Agents**

$$N^* = \{ \text{red person}, \text{dark person}, \text{light person} \}$$

➤ **Alternatives**

$$X = \{ \text{bicycle}, \text{walking}, \text{horse} \}$$

➤ **Preferences**

$$\mathcal{L}(X) = \{ \text{red bicycle} > \text{red walking} > \text{red horse}, \text{dark bicycle} > \text{dark horse} > \text{dark walking}, \text{light walking} > \text{light bicycle} > \text{light horse} \}$$

➤ **Instances of axioms** $Inst_{N^*, X}$

INSTANCE

➤ **E.g. Pareto Principle**

➤ **Axiom** $y \notin F(\succ_N)$ **if** $\{i \mid x \succ_i y\} = N$

➤ **Instance** $a \succ b \succ c$

ALGORITHMS

- **Limit number of instances**

- **1 profile axioms**

 - **e.g. Pareto Principle**

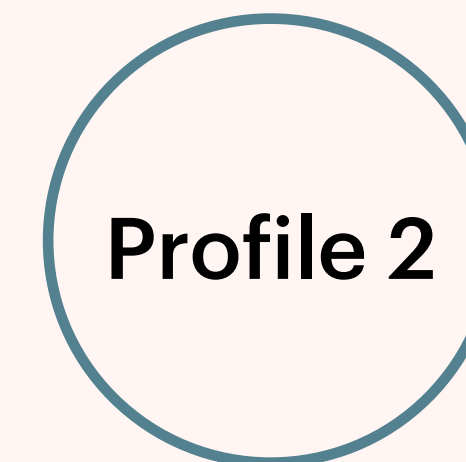
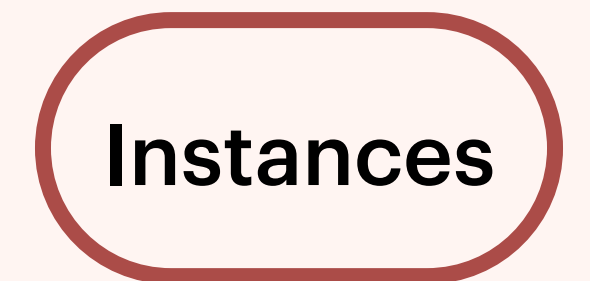
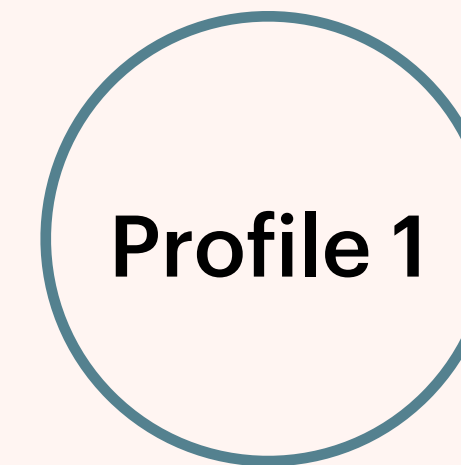
- **2 profile axioms**

 - **e.g. Anonymity**

ALGORITHM 1

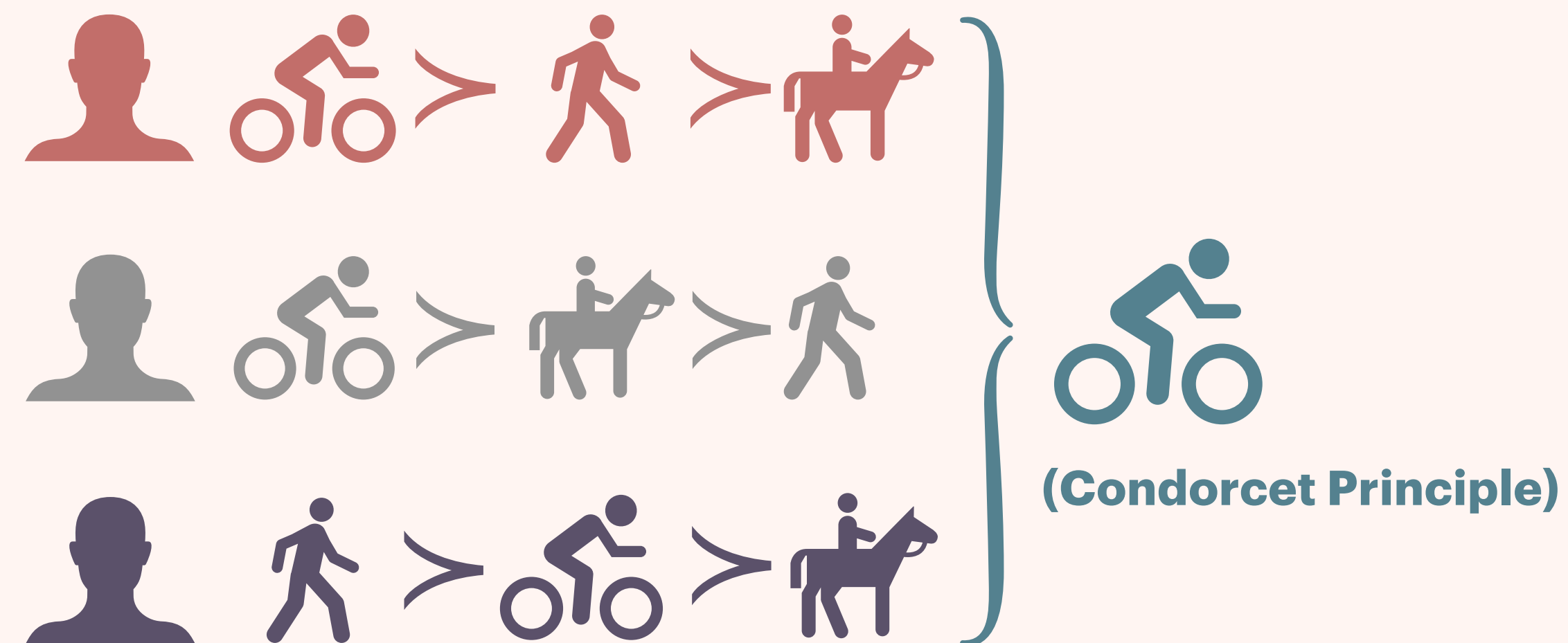
➤ **Target Profile**

➤ **Instances**



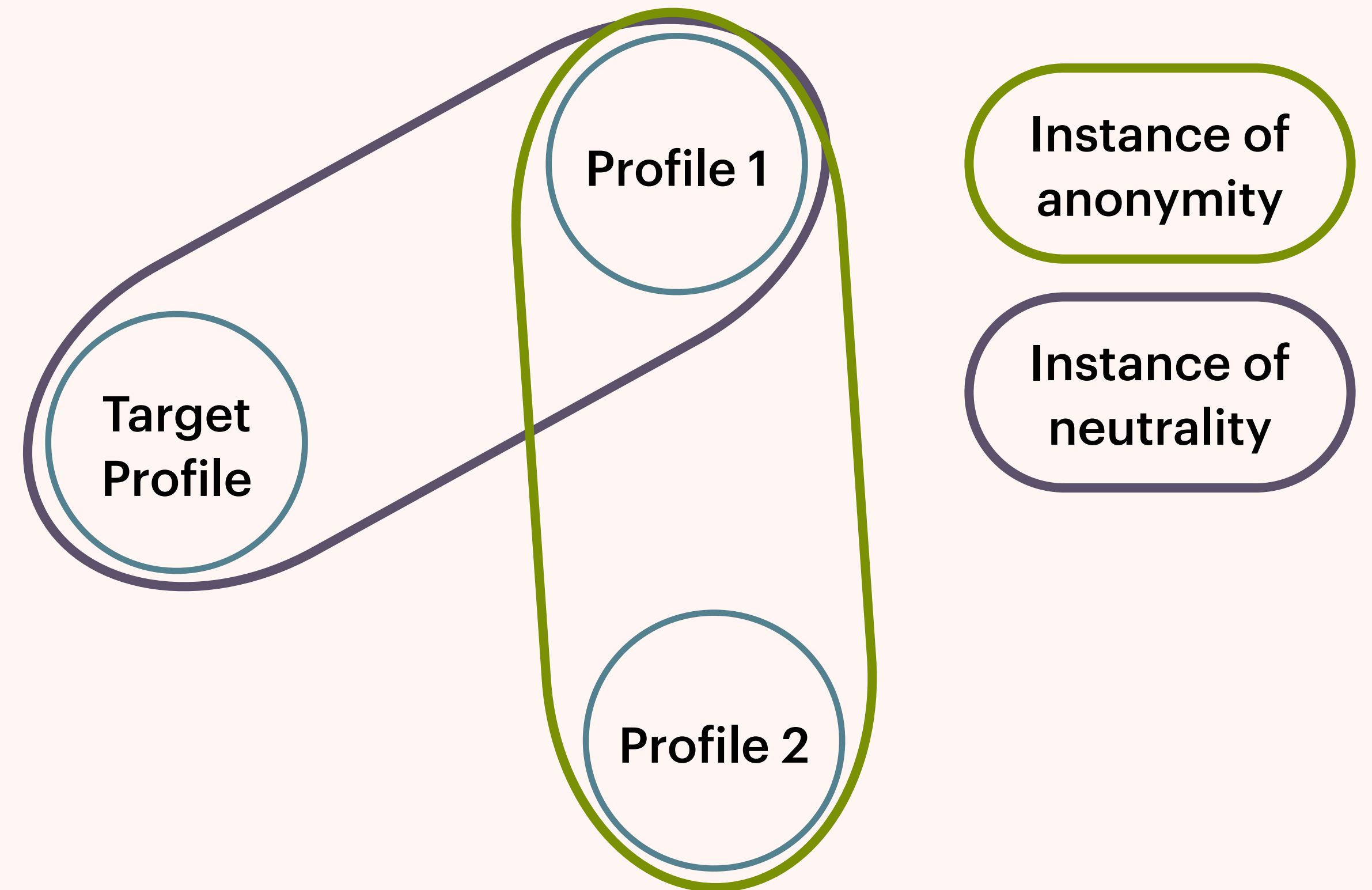
ALGORITHM 1

➤ Example



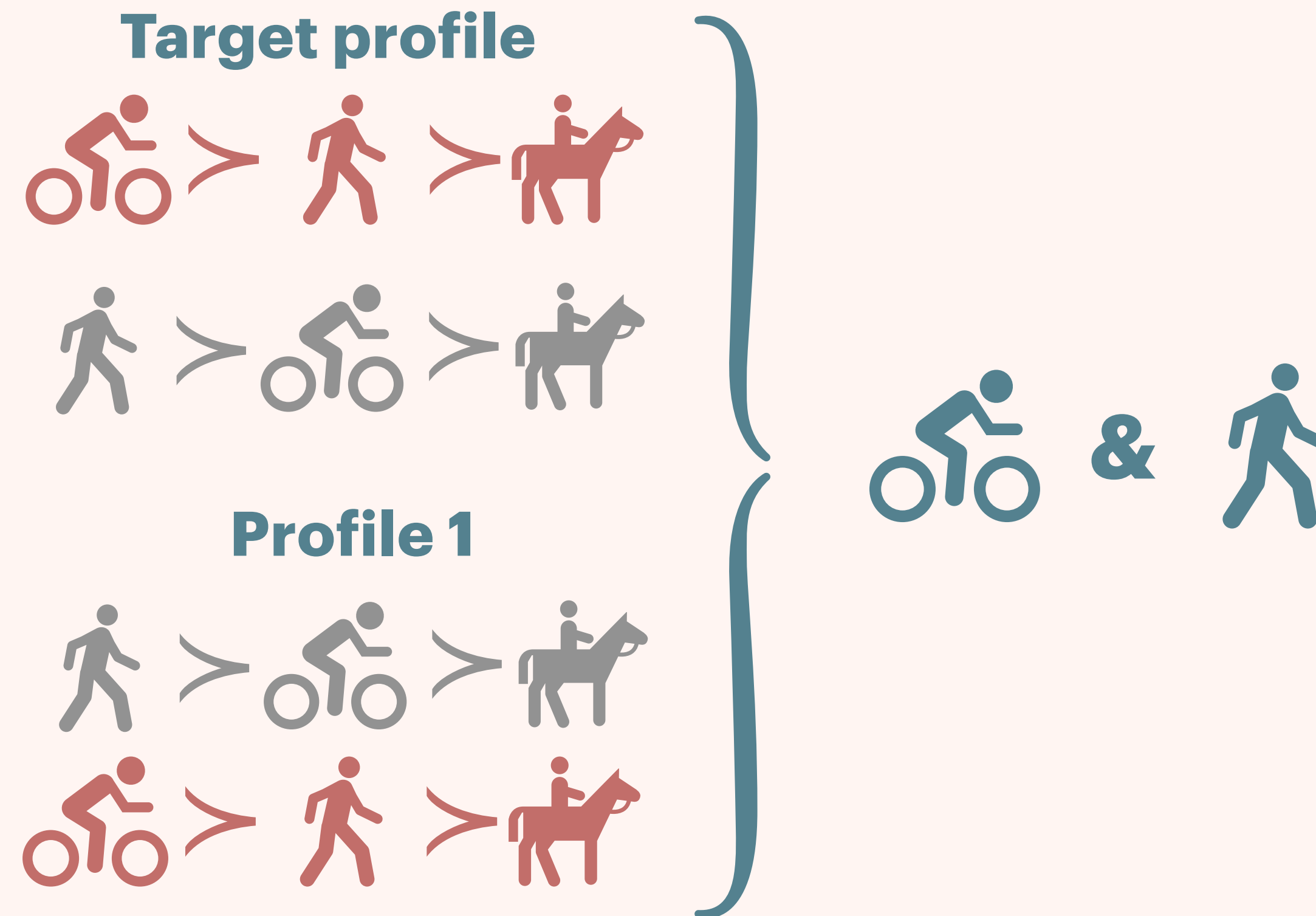
ALGORITHM 2

➤ **Breath-first approach**



ALGORITHM 2

➤ Example



NEXT MONTH

➤ **Implementation**

➤ **Evaluation**