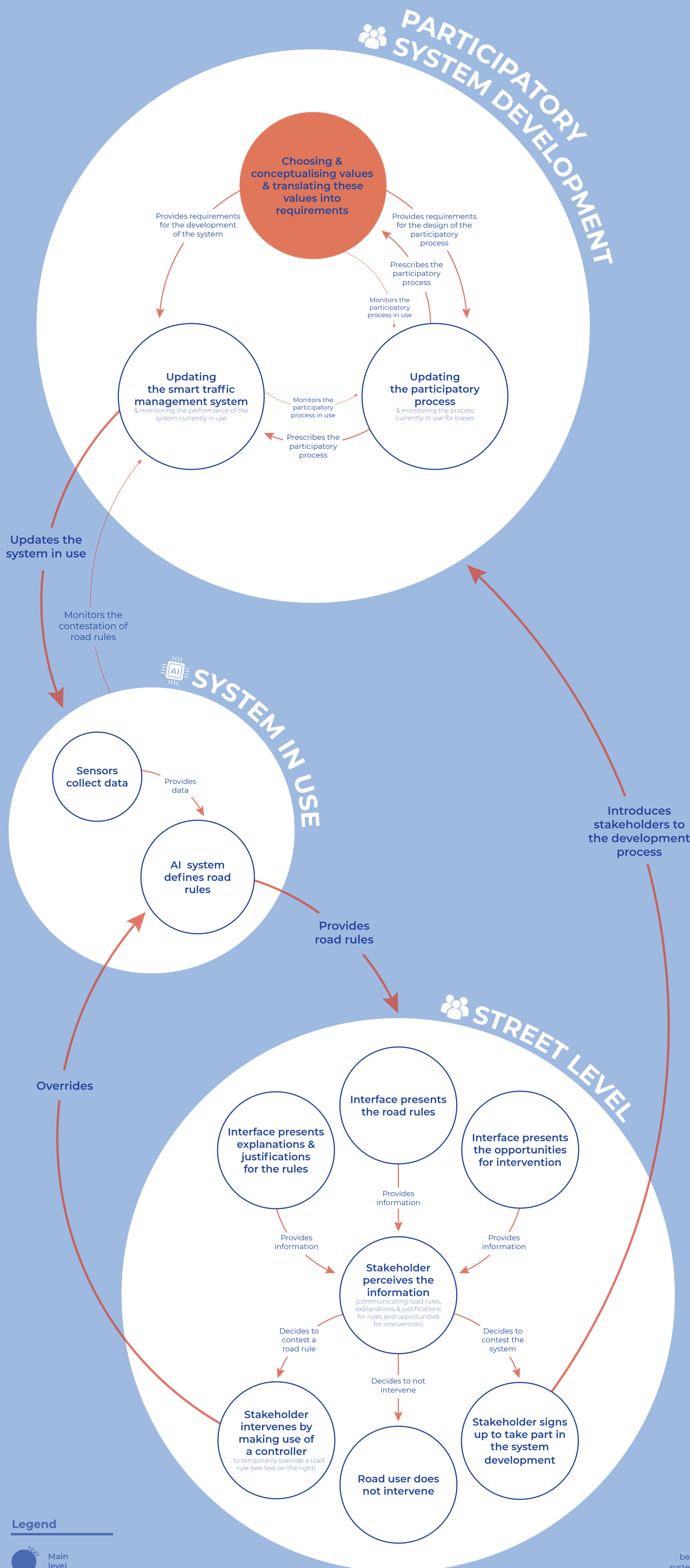


# Ensuring fairness in the smart allocation of road space



When developing a smart system governing dynamic road rules, it is necessary to carefully define which values should be promoted and hindered by the system at any given moment in time. **To ensure fairness, stakeholders such as the municipality, citizen and businesses, need to manage the system together and continuously adapt it to the changing values in society.**

**Participatory system development:** Stakeholders\* continuously participate in shaping the system allocating road space and the participatory process through values.

Stakeholders choose and conceptualise values. They then translate these values into design requirements for the smart traffic management system and the participatory design process. Stakeholders use these requirements to update the participatory design process and the traffic management system accordingly. Updating the participatory process entails defining aspects of the process such as who gets to participate, what they can have influence on, how they participate and at what point of the process they participate. Once the updated process is deployed, it prescribes the participatory process across the participatory smart system development. Updating the smart traffic management system comprises developing a new version of the system used to allocate road space. Stakeholders may participate in activities such as designing and training the smart system.

**System in use:** The smart system allocates road space by updating the rules.

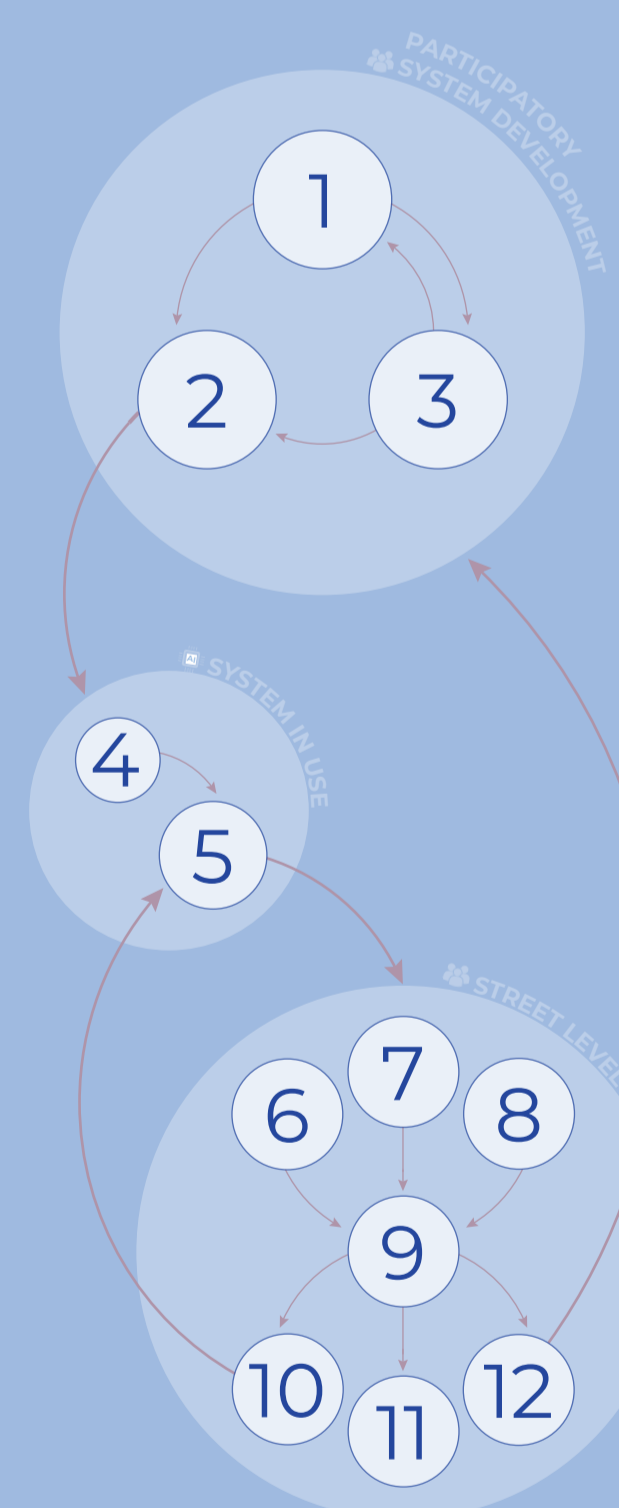
Sensors collect data necessary for the AI system to make decisions about the road rules. The AI system defines the rules at street level. Road users contesting the rules set by the system at street level may result in temporary changes to the road rules.

**Street level:** Stakeholders\* experience the road rules set by the system and have the opportunity to contest the rules or sign up to contribute to the participatory system development.

Road users perceive the road rules defined by the smart system along with justifications and explanations for the rules. They are also presented with the opportunities to contest these rules and the system defining them. Road users can choose not to intervene or contest the rules. To contest the rules, road users make use of a controller\*\* which provides them with the opportunity to temporarily override a road rule set by the smart system. Road users may also feel the need to contest the system itself. In this case they may sign up to take part in the participatory system development.

\*Stakeholders are everyone who is affected by changes in the allocation of road space.

\*\*The controller is not further defined but it can help to imagine a simple interface such as a few buttons providing limited options for intervention.



## Examples

### Participatory system development

1. Stakeholders decide that the values liveability and inclusivity are now more important than they were previously. They derive two requirements from these values: To make the neighbourhood more liveable, roads should be allocated more for leisure activities. And to make it more inclusive, children should have a say in which values guide the system's development.
2. The requirement to allocate road space for leisure activities is taken up in the development process of the traffic management system. Together with system experts, stakeholders participate in updating the system to meet the new requirement.
3. The requirement to let children participate in defining the system's values is used to redesign the participatory process. Children of the neighbourhood school now get to take part in defining the system's values through participatory events held in schools.

### System in use

4. Weather data is collected to determine when the road space may be reasonably used for outdoor leisure activities.
5. It's a sunny afternoon. The system updates the road rules for certain streets of the neighbourhood to allow leisure activities to take place in the roads. In one road, people are now allowed to relax in their garden chairs, in another road people are having a party and in yet another road kids play football.

### Street level

6. The justifications communicate that the road rules have been changed as stakeholders participating in the system development successfully advocated for using the roads for leisure activities. The explanations show that the current rules will last from 4pm to 9pm.
7. Interfaces communicate the new rules for each street.
8. The opportunities for intervention show that road users may request temporary changes of the road rules through the controller. They furthermore reveal that stakeholders, such as people from the neighbourhood, can participate in the system development through monthly stakeholder meetings.
9. People in the streets see the rules change and start using the street accordingly.
10. A group of contractors drove their van into the neighbourhood for a construction job earlier this afternoon and now want to drive back out. They use the controller to request a temporary change of rules in a specific street. The change is granted and the contractors are able to drive out of the neighbourhood.
11. People enjoy leisure activities on the roads, thus they do not intervene.
12. The party held in one of the streets is disturbing a couple with a newborn living in the neighbourhood. They believe that roads should not be used for such noisy activities. They sign up to participate in the system development to voice their ideas and contribute in shaping the system.

## Legend

- Main level
- Step
- Relation between steps

**Stakeholder\* participation**  
\*Stakeholders are everyone who is affected by changes in the allocation of road space.

**Automated decision making**