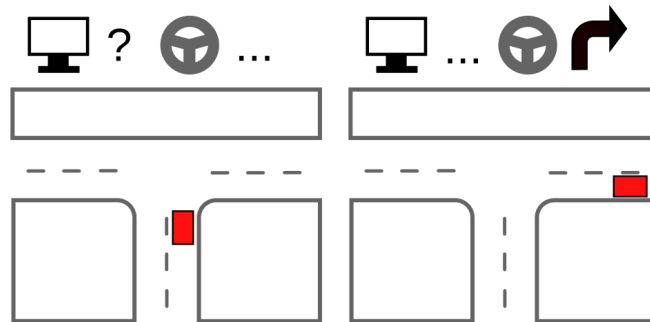


Project Name Collaborative Control of Autonomous Cars

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Autonomous control of cars, trucks, and other vehicles has been seeing rapid development in the past few years. Although it has improved notably since its conception, autonomous systems are still incomplete. Often, autonomous controllers are unable to determine what to do if the roads are arranged unusually, if road lines wear down over time, or if harsh weather conditions affect the system’s detection abilities. Currently, when the autonomous controller finds itself unable to determine what it should do next, it defaults to making no changes. When this occurs, it can lead the car to go down roads it shouldn’t, or end up off the road entirely, unless the driver intervenes. This handoff system is inconvenient for most drivers and often defeats the use of autonomous vehicles as a tool for reducing the cognitive load on drivers.

The intent of the collaborative control software is to make the handoff system smoother, both in passing control to the driver and passing it back to the autonomous controller. This is used both to assist the autonomous controller when it cannot make a decision and to allow the driver to make a decision differently from the autonomous controller and smoothly pass control back to it afterward (see the figures below). This handoff system improves the ability of autonomous vehicles to reduce the cognitive load on drivers, rather than hindering it.



Above: The autonomous car reaches an intersection, but for an unknown reason the autonomous controller is unable to determine what it should do next. The autonomous controller informs the driver, who takes control and turns right. The car turns right.

Below: The autonomous car reaches an intersection. The autonomous controller wants to turn right, but the driver wants to turn left. The autonomous controller informs the driver it intends on turning right. The driver takes control and turns left. The autonomous controller cedes control to the driver. The car turns left.

