# Belief Space Metareasoning for Exception Recovery

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Due to the complexity of the real world, autonomous systems use decision-making models that rely on simplifying assumptions to make them computationally tractable and feasible to design. However, since these limited representations cannot fully capture the domain of operation, an autonomous system may encounter unanticipated scenarios that cannot be resolved effectively. We first formally introduce an introspective autonomous system that uses belief space metareasoning to recover from exceptions by interleaving a central decision-making process with exception handlers. We then apply introspective autonomy to autonomous driving. Finally, we demonstrate that an introspective autonomous vehicle is effective in simulation and on a fully operational prototype. The result is robust belief space metareasoning for exception recovery in autonomous systems.

The full paper has been submitted. Please use the following link. I am sorry I could not create a PDF/A version and was not able to upload the file.

**http://rbr.cs.umass.edu/shlomo/papers/SWWBZiros19.pdf**