CODECHECK certificate 2025-019

https://doi.org/10.5281/zenodo.15771677

Item	Value
Title	Fuzzy-Logic-based model predictive control: A paradigm integrating optimal and common-sense decision making
Authors	Filip Surma (0000-0002-6756-9598) Anahita Jamshidnejad (0000-0001-9151-2607)
Publication	https://doi.org/10.48550/arXiv.2503.21065
Publication repositories	Main code repository: https://doi.org/10.4121/319168f0-bc62-4051-84c2-f32718c05386.v1 Data repository: https://doi.org/10.4121/2479c468-624b-49b6-9e2e-63bd633c9bc2.v1
Codechecker	João Guimarães (0000-0002-6545-3102)
Date of check	2025-06-11
Summary	Figures 3-8 from the manuscript were successfully reproduced. Figures 1-2 and Tables 1-3 were not covered by this CODECHECK. To avoid the lengthy execution time required to run the full experiments, the pre-computed results used to generate the figures were provided in a separate repository.
CODECHECK repository	https://github.com/codecheckers/certificate-2025-019

Table 1: CODECHECK summary

Summary

The author provided the main code repository with most of the code needed to reproduce all the figures (https://doi.org/10.4121/319168f0-bc62-4051-84c2-f32718c05386.v1). The code to reproduce Figure 6 was sent by the author to the codechecker during the CODECHECK process and is made available via the CODECHECK repository (https://github.com/codecheckers/certificate-2025-019/tree/main/COPY_TO_MAINREPO/Figure6).

To avoid the lengthy execution time required to run the full experiments, the pre-computed results used to generate the figures were provided in a separate data repository (https://doi.org/10.4121/2479c468-624b-49b6-9e2e-63bd633c9bc2.v1).

The instructions to integrate all these resources and reproduce Figures 3-8 were sent by the author to the codechecker during the CODECHECK process, and are made available in the CODECHECK repository (https://github.com/codecheckers/certificate-2025-019/tree/main?tab=readme-ov-file#codecheck-certificate-2025-019).

The manuscript also contains Figures 1-2 and Tables 1-3 which were not covered by this CODECHECK.

Output	Comment
Figure3_first_case_study.jpg	Manuscript Figure 3
Figure4A_likelihood_cellstate_obstacle.jpg	Manuscript Figure 4A
Figure4B_likelihood_cellstate_human.jpg	Manuscript Figure 4B
Figure4C_cell_uncertainty.jpg	Manuscript Figure 4C
Figure4D_time_steps.jpg	Manuscript Figure 4D
Figure5L_uncertainty.jpg	Manuscript Figure 5 Left
Figure5R_measurement_consistency.jpg	Manuscript Figure 5 Right
Figure6_number_of_victories.jpg	Manuscript Figure 6
Figure7_second_case_study.jpg	Manuscript Figure 7
Figure8TL_mission1_singlelevelFLMPCsystem.jpg	Manuscript Figure 8 Top Left
Figure8TR_mission4_singlelevelFLMPCsystem.jpg	Manuscript Figure 8 Top Right
Figure8BL_mission1_parentchildFLMPCsystem.jpg	Manuscript Figure 8 Bottom Left
Figure8BR_mission4_parentchildFLMPCsystem.jpg	Manuscript Figure 8 Bottom Right

Table 2: Summary of output files generated

Codechecker notes

The authors have made available all the necessary code and data required to reproduce the Figures 3-8 in the manuscript. These resources are hosted across 3 different repositories:

- The main code repository where most of the code needed to reproduce all the figures was made available: https://doi.org/10.4121/319168f0-bc62-4051-84c2-f32718c05386.v1;
- The repository created for this CODECHECK, which contains additional code from the author to reproduce Figure 6 (https://github.com/codecheckers/certificate-2025-019/tree/main/COPY_TO_MAINREPO/Figure6), in addition to the README with the instructions that the codechecker followed to integrate all the resources and reproduce all the figures (https://github.com/codecheckers/certificate-2025-019/tree/main?tab=readme-ov-file#codecheck-certificate-2025-019);
- The data repository with the pre-computed results used to generate the figures, in order to avoid the lengthy execution time required to run the full experiments: https://doi.org/10.4121/2479c468-624b-49b6-9e2e-63bd633c9bc2.v1.

Setup

The figures were reproduced on a Windows machine using the following tools:

- Matlab 2023b

Further, the codechecker cloned the main code repository to his local machine (https://data.4tu.nl/datasets/319168f0-bc62-4051-84c2-f32718c05386/1) and copied to the repository's main folder the following data:

- The folder *recordings* containing all the pre-computed results (stored in https://doi.org/10.4121/2479c468-624b-49b6-9e2e-63bd633c9bc2.v1)
- The folder *Figure6* containing the code to reproduce Figure 6 (see https://github.com/codecheckers/certificate-2025-019/tree/main/COPY_TO_MAINREPO/Figure6).

For more details please check the CODECHECK repository README section on the preparation steps: https://github.com/codecheckers/certificate-2025-019/tree/main?tab=readme-ov-file#preparation-steps.

Reproducing the Results

During the CODECHECK, the explicit instructions to reproduce the Figures 3-8 were not available in the main code repository's documentation. Instead, the instructions were directly shared by the author to the codechecker and can be found in the CODECHECK repository: https://github.com/codecheckers/certificate-2025-019/tree/main?tab=readme-ov-file#reproducing-results.

The codechecker reproduced most figures by running sets of commands directly in the Matlab terminal and eventually rotating the figures after being generated, whereas reproducing Figure 5 also required the usage of Matlab's Fuzzy Logic Designer tool. For

more details please check the CODECHECK repository README section on the reproducing the results: https://github.com/codecheckers/certificate-2025-019/tree/main?tab=readme-ov-file#reproducing-results.

Manifest Files

Figure3_first_case_study.jpg

Comment: Manuscript Figure 3

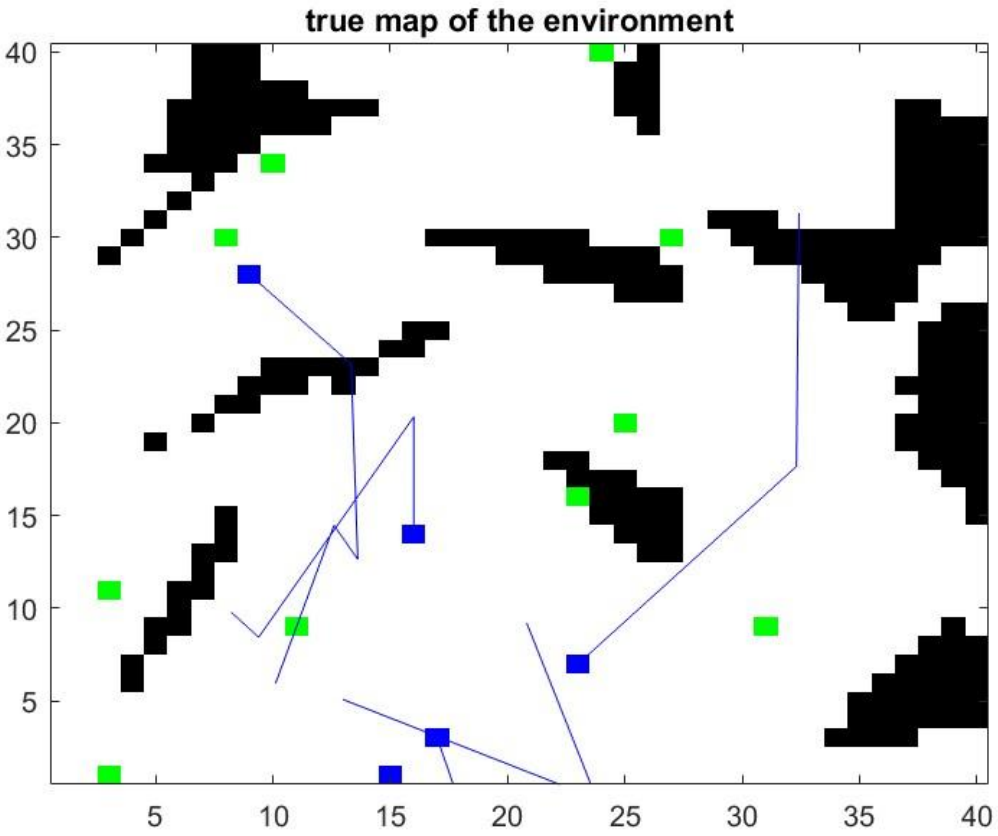


Figure4A_likelihood_cellstate_obstacle.jpg

Comment: Manuscript Figure 4A

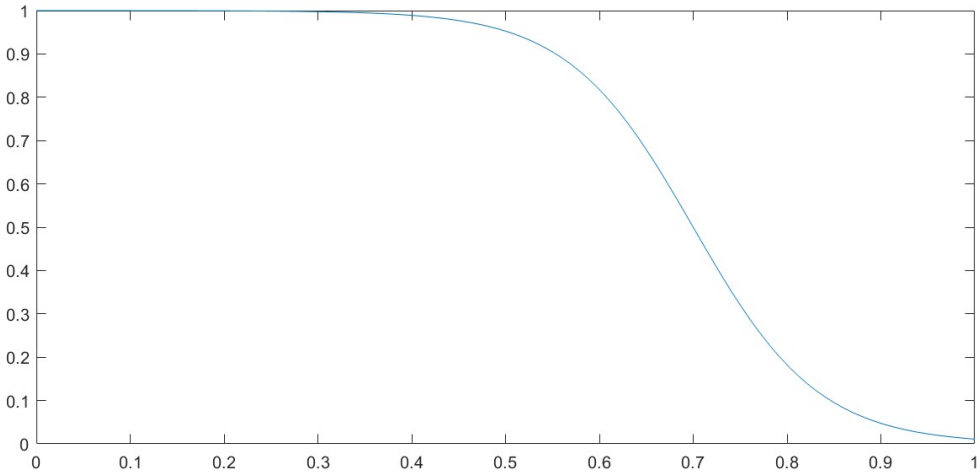


Figure4B_likelihood_cellstate_human.jpg

Comment: Manuscript Figure 4B

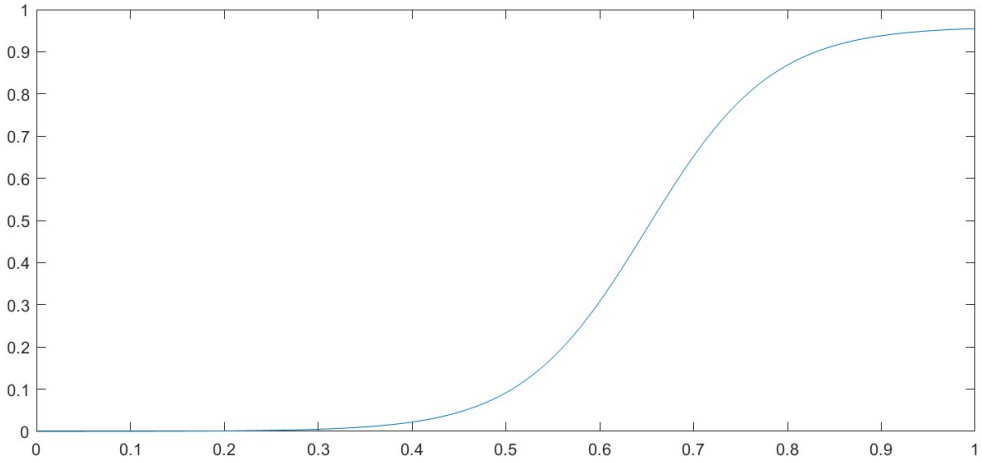


Figure4C_cell_uncertainty.jpg

Comment: Manuscript Figure 4C

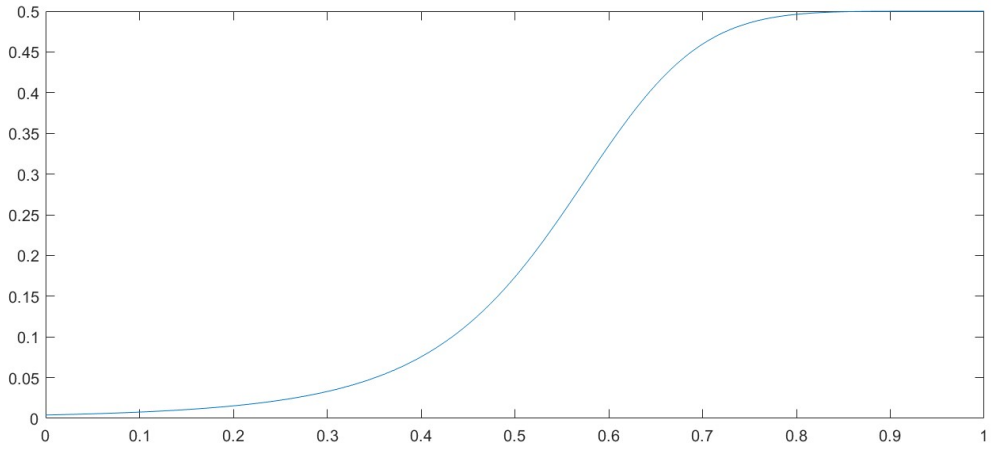


Figure4D_time_steps.jpg

Comment: Manuscript Figure 4D

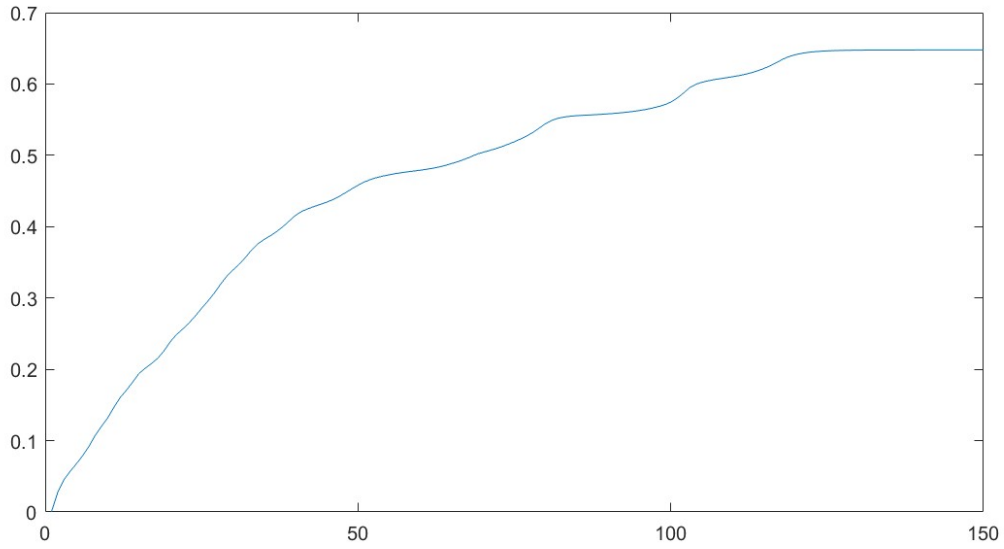


Figure5L_uncertainty.jpg

Comment: Manuscript Figure 5 Left

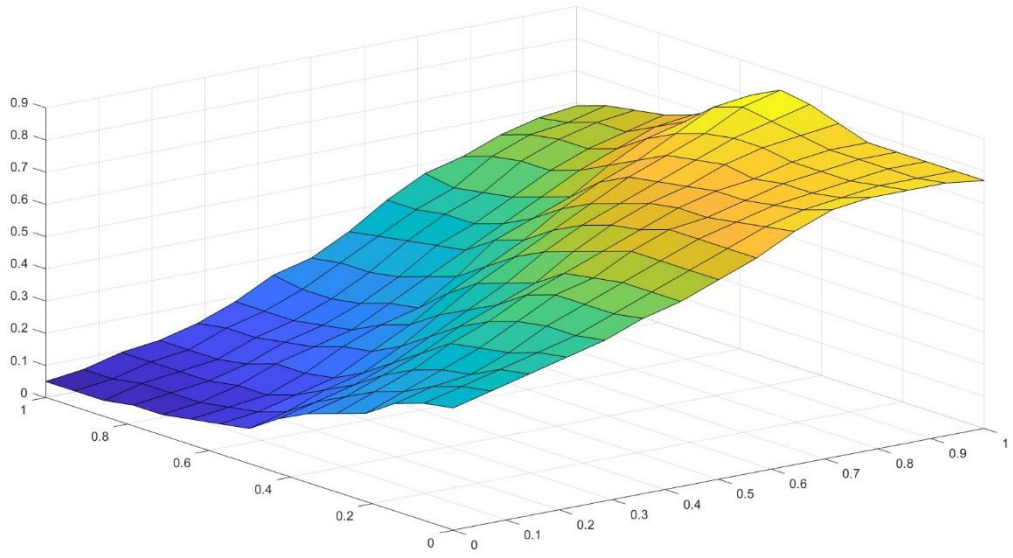


Figure5R_measurement_consistency.jpg

Comment: Manuscript Figure 5 Right

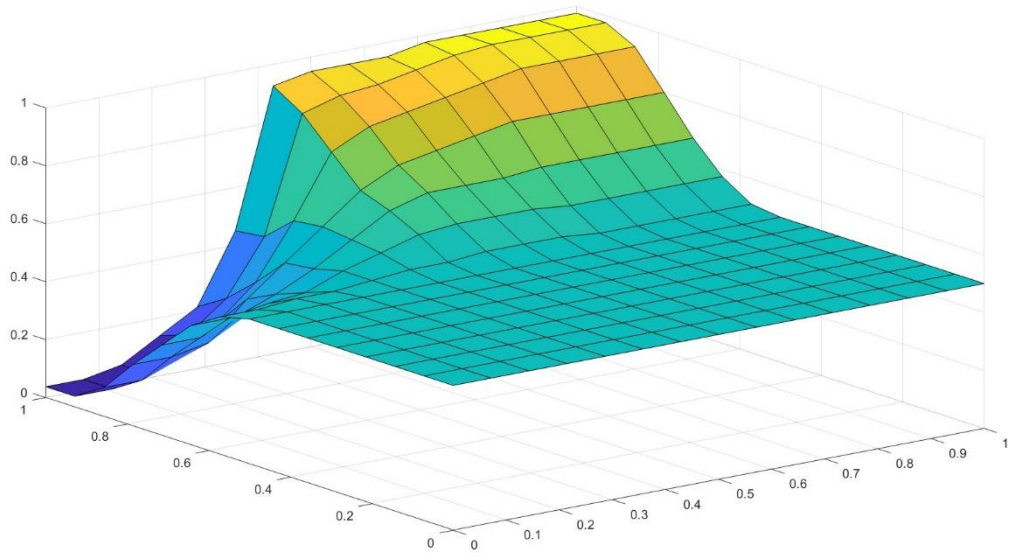


Figure6_number_of_victories.jpg

Comment: Manuscript Figure 6

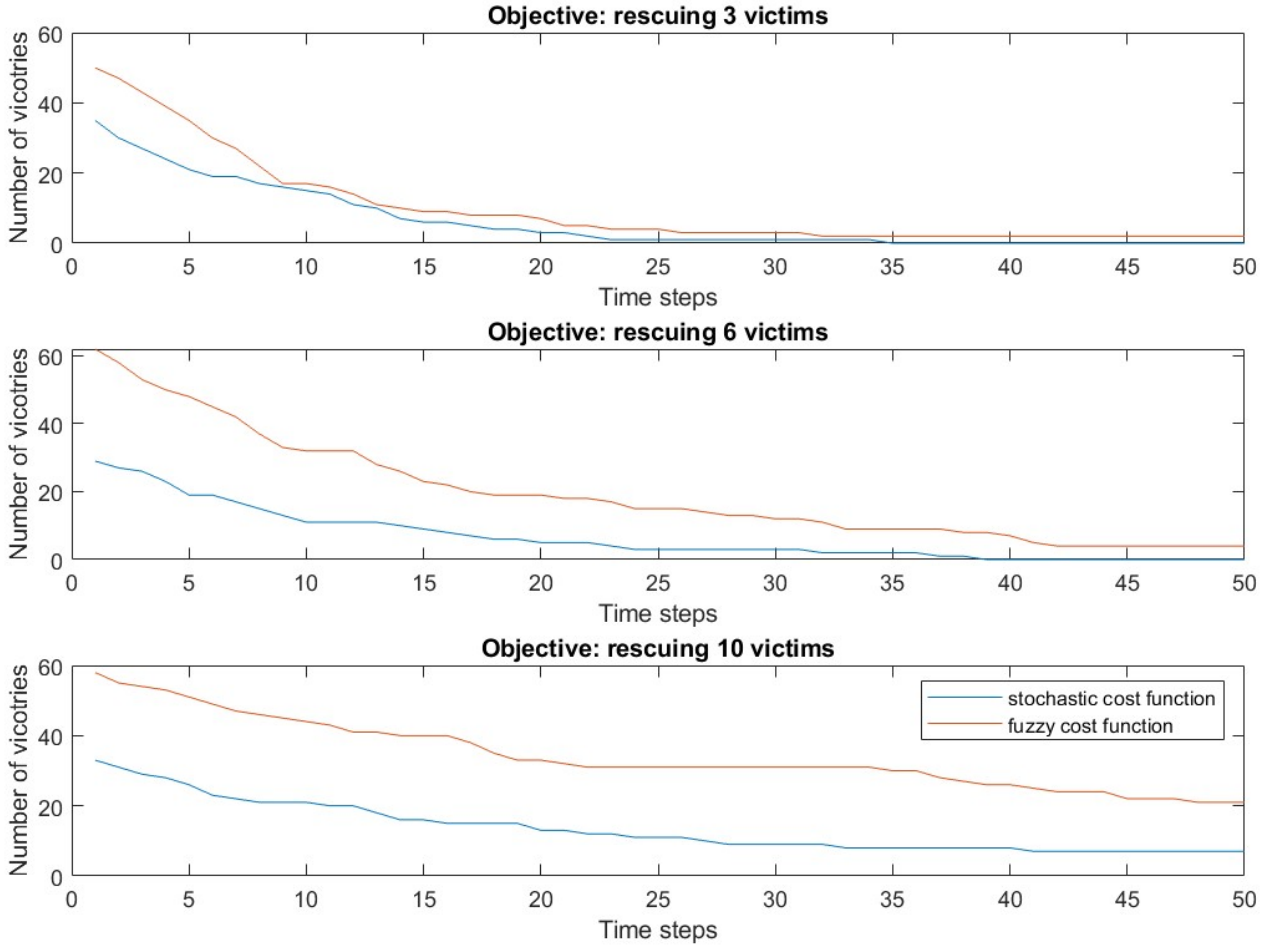


Figure7_second_case_study.jpg

Comment: Manuscript Figure 7

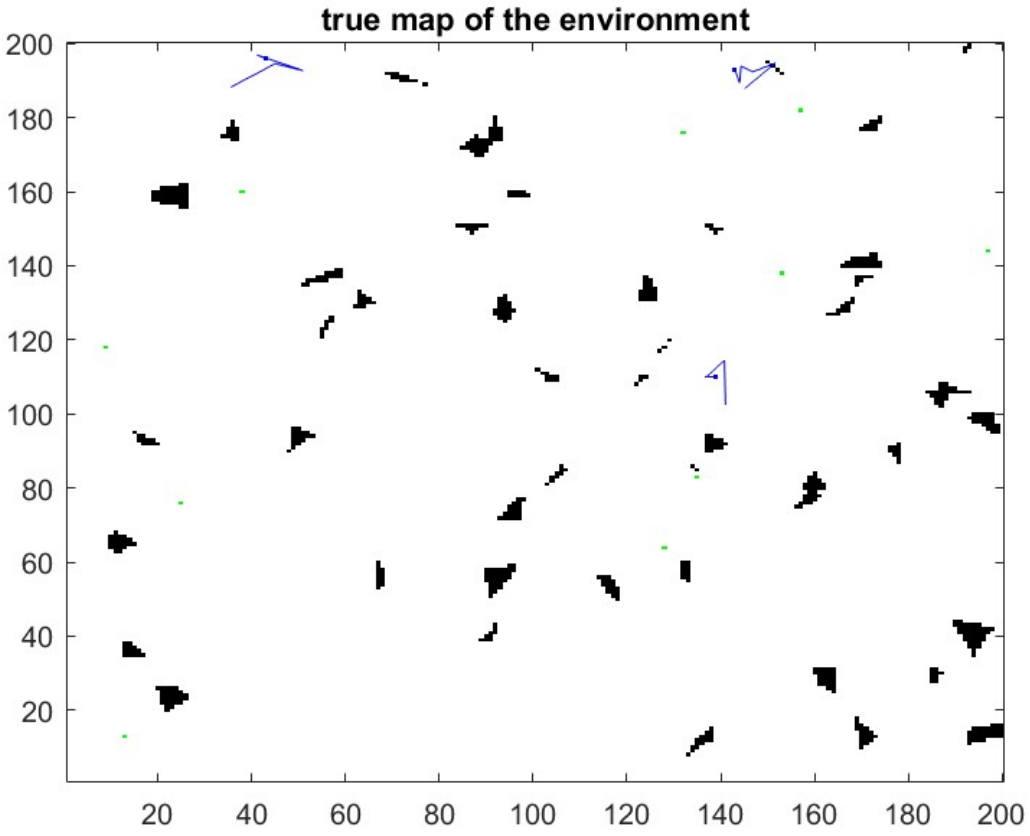


Figure8TL_mission1_singlelevelFLMPCsystem.jpg

Manuscript Figure 8 Top Left

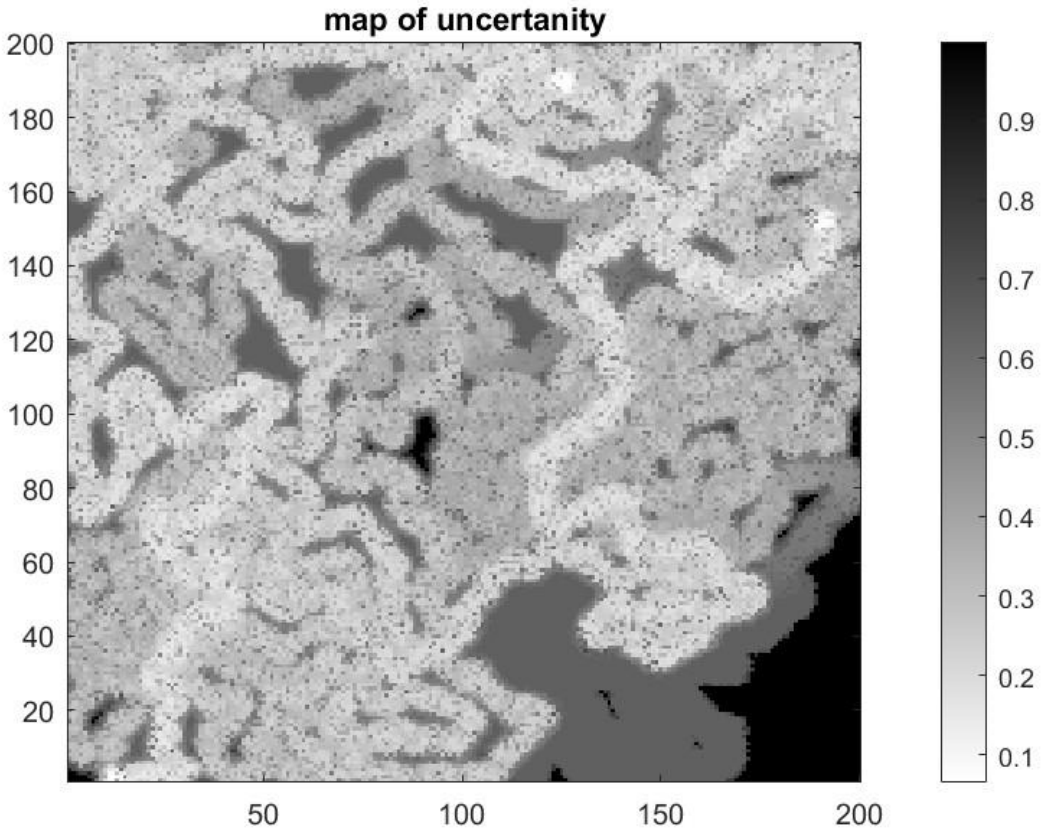


Figure8TR_mission4_singlelevelFLMPCsystem.jpg

Manuscript Figure 8 Top Right

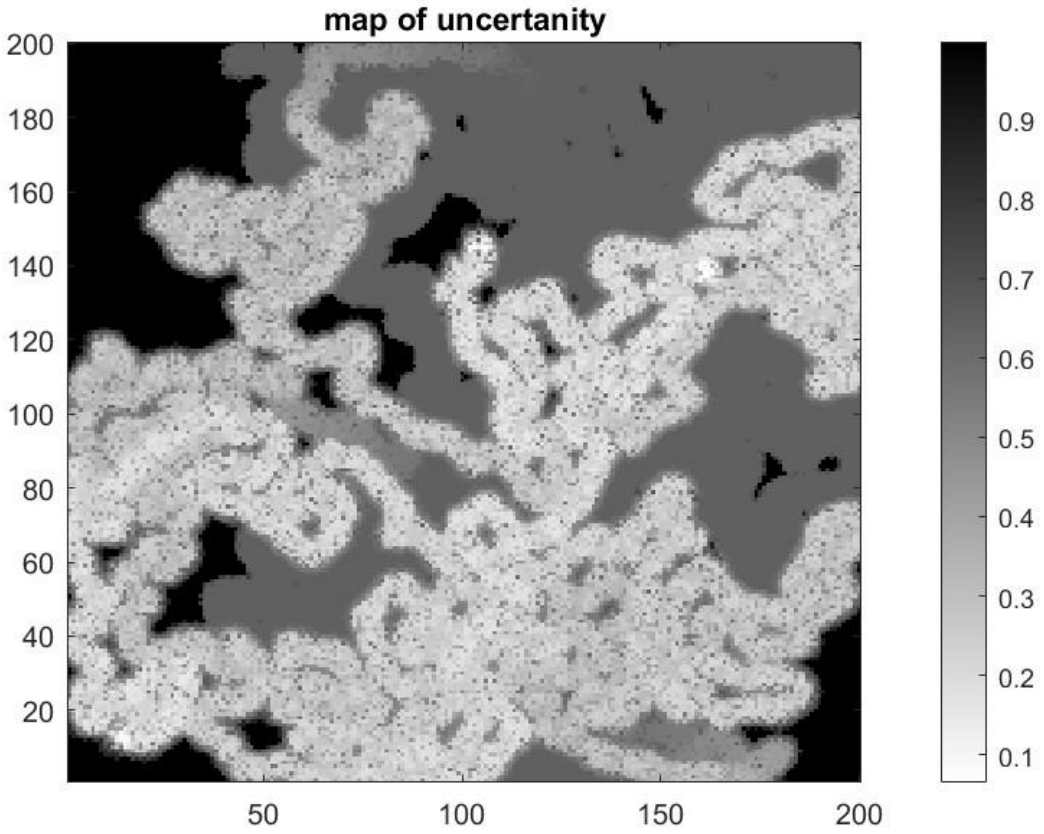


Figure8BL_mission1_parentchildFLMPCsystem.jpg

Manuscript Figure 8 Bottom Left

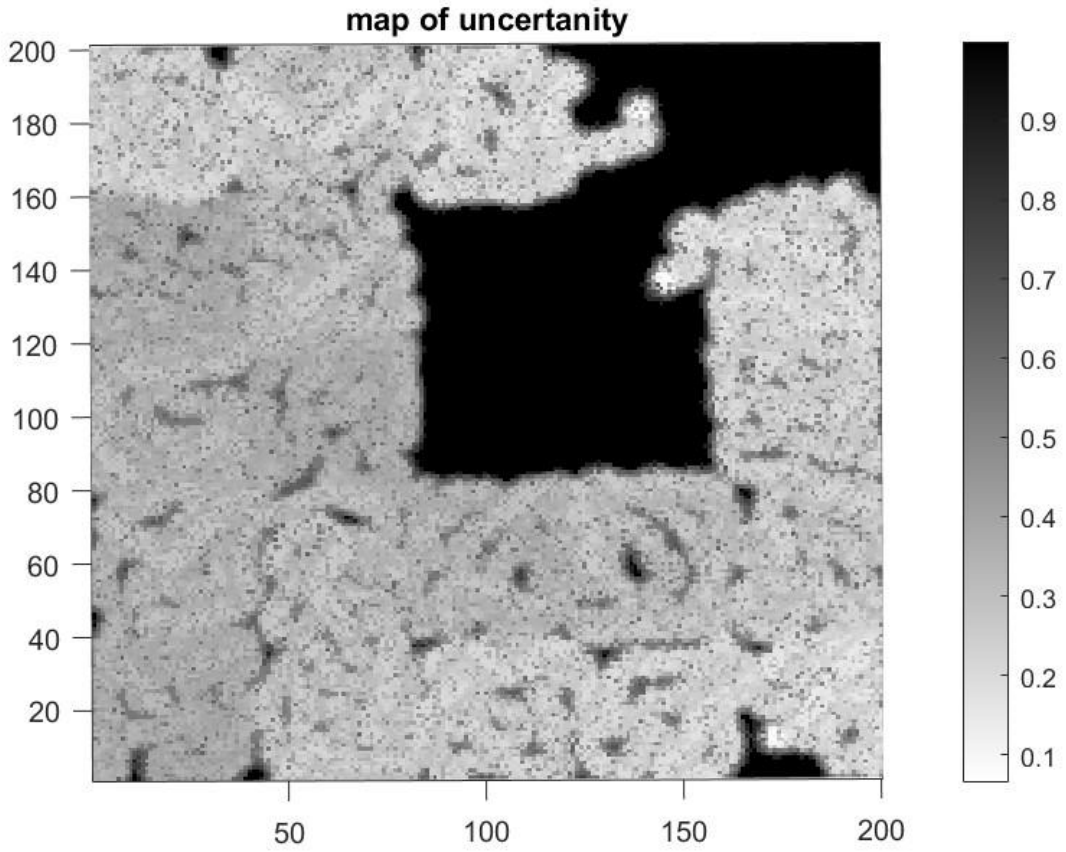
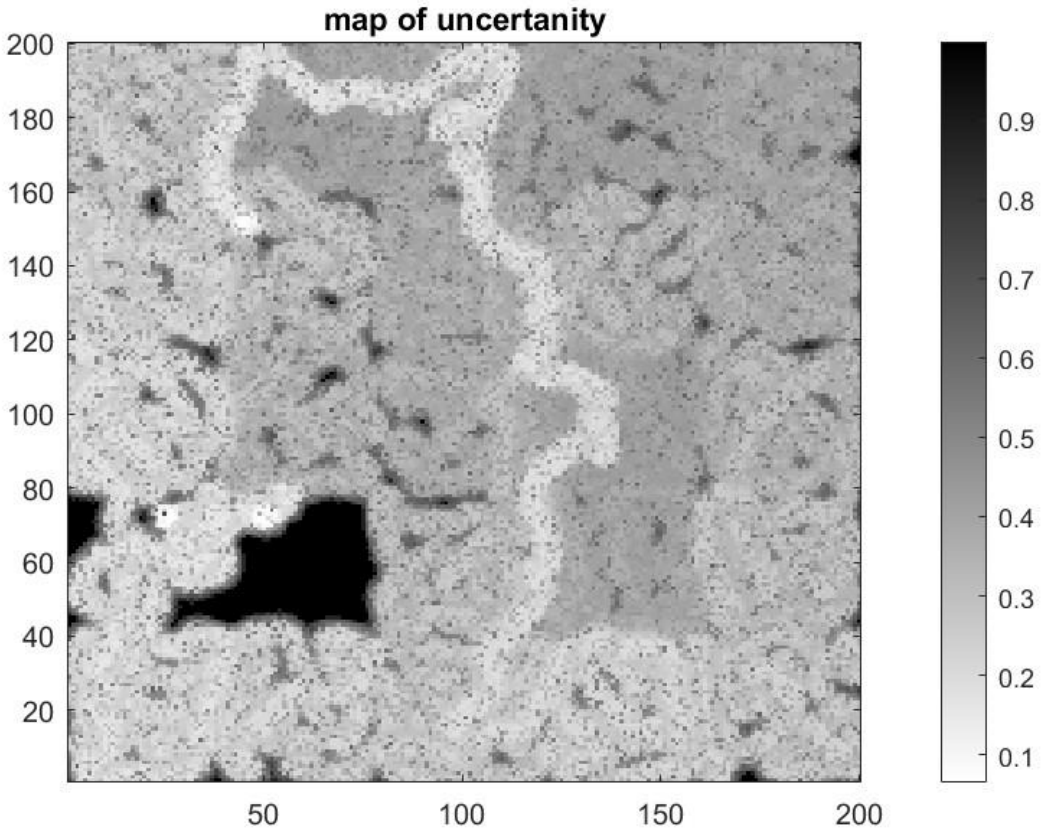


Figure8BR_mission4_parentchildFLMPCsystem.jpg

Comment: Manuscript Figure 8 Bottom Right



Acknowledgements

This CODECHECK was done as part of the Reproducibility Check initiative led by TU Delft's Digital Competence Centre and 4TU.ResearchData.

The codechecker would like to thank the author Filip Surma for promptly answering any questions and requests that came up during the CODECHECK process.

Citing this document

Guimaraes, Joao. (2025). CODECHECK Certificate 2025-019. CODECHECK. https://doi.org/10.5281/zenodo.15771677.

About CODECHECK

This certificate confirms that the codechecker could independently reproduce the results of a computational analysis given the data and code from a third party. A CODECHECK does not check whether the original computation analysis is correct. However, as all materials required for the reproduction are freely available by following the links in this document, the reader can then study for themselves the code and data.