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Document type

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Source type

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ISBN

978-166548510-4

DOI

10.1109/JCSSE54890.2022.9836249

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Developing Autopilot Agent Transparency for Collaborative Driving

[Kridalukmana, Rinta](#) ; [Eridani, Dania](#) ; [Septiana, Risma](#) ; [Rochim, Adian F.](#) ;[Setyobudhi, Charisma T.](#) [Save all to author list](#)^a Diponegoro University, Department of Computer Engineering, Semarang, Indonesia[Full text options](#) [Export](#) [Abstract](#)[Author keywords](#)[Indexed keywords](#)[SciVal Topics](#)**Abstract**

Collaborative driving is considered as a form of human-autonomy teaming (HAT) in which the advanced driving assistance system (ADAS) with an autopilot feature plays a role as the human driver counterpart, not merely as an automation tool. However, such a collaborative driving raises a problem for the human driver's situational awareness development, particularly because of the lack of mechanisms to comprehend the autopilot agent's behaviours. The human driver becomes overly trust to the agent and is vulnerable to distractions. As a result, many road incidents occur because of such mental model. It is believed that the transparency of the autopilot agent can help its human counterpart to calibrate their trust in this agent. However, a lack of studies investigating how such transparency is delivered to the human driver. Hence, this study aims to develop autopilot agent transparency for collaborative driving. The developed transparency is implemented and simulated using open-source software for autonomous driving called Carla simulator. The findings show that the transparency can help the human driver to understand and predict the autopilot agent's behaviours better. Such transparency is critical to enhance human-machine interaction, particularly in a collaborative driving context. © 2022 IEEE.

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Kridalukmana, R. , Eridani, D. , Septiana, R. (2022) *International Conference on Electrical Engineering, Computer Science and Informatics (EECSI)*

Component-Based Transparency to Comprehend Intelligent Agent Behaviour for Human-Autonomy Teaming

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-
- 1 Tran, D., Du, J., Sheng, W., Osipych, D., Sun, Y., Bai, H.
A Human-Vehicle Collaborative Driving Framework for Driver Assistance

(2019) *IEEE Transactions on Intelligent Transportation Systems*, 20 (9), art. no. 8556397, pp. 3470-3485. Cited 30 times.
<http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=6979>
doi: 10.1109/TITS.2018.2878027

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-
- 2 Kridalukmana, R., Lu, H.Y., Naderpour, M.
A supportive situation awareness model for human-autonomy teaming in collaborative driving ([Open Access](#))

(2020) *Theoretical Issues in Ergonomics Science*, 21 (6), pp. 658-683. Cited 13 times.
<http://www.tandfonline.com/toc/ttie20/current>
doi: 10.1080/1463922X.2020.1729443

[View at Publisher](#)
-
- 3 Kloth, M.
What to expect from Advanced Driver Assistance Systems

(2010) *Traffic Engineering and Control*, 51 (9), pp. 331-333.
-
- 4 Abe, G., Sato, K., Itoh, M.
Driver trust in automated driving systems: The case of overtaking and passing

(2018) *IEEE Transactions on Human-Machine Systems*, 48 (1), art. no. 8234642, pp. 85-94. Cited 39 times.
<http://ieeexplore.ieee.org/xpl/mostRecentIssue.jsp?punumber=6221037>
doi: 10.1109/THMS.2017.2781619

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-
- 5 Körber, M., Baseler, E., Bengler, K.
Introduction matters: Manipulating trust in automation and reliance in automated driving ([Open Access](#))

(2018) *Applied Ergonomics*, 66, pp. 18-31. Cited 194 times.
www.elsevier.com/locate/apergo
doi: 10.1016/j.apergo.2017.07.006

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-

- 6 Banks, V.A., Eriksson, A., O'Donoghue, J., Stanton, N.A.
Is partially automated driving a bad idea? Observations from an on-road study ([Open Access](#))
- (2018) *Applied Ergonomics*, 68, pp. 138-145. Cited 147 times.
www.elsevier.com/locate/apergo
doi: 10.1016/j.apergo.2017.11.010
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-
- 7 Endsley, M.R.
From Here to Autonomy: Lessons Learned from Human-Automation Research
- (2017) *Human Factors*, 59 (1), pp. 5-27. Cited 322 times.
<http://hfs.sagepub.com/>
doi: 10.1177/0018720816681350
- [View at Publisher](#)
-
- 8 Janssen, C.P., Donker, S.F., Brumby, D.P., Kun, A.L.
History and future of human-automation interaction ([Open Access](#))
- (2019) *International Journal of Human Computer Studies*, 131, pp. 99-107. Cited 92 times.
<http://www.elsevier.com.proxy.undip.ac.id:2048/inca/publications/store/6/2/2/8/4/6/index.htm>
doi: 10.1016/j.ijhcs.2019.05.006
- [View at Publisher](#)
-
- 9 Neuhaus, R., Hassenzahl, M., Laschke, M., Sadeghian, S., Theofanou-Fülbier, D.
Exploring the impact of transparency on the interaction with an in-car digital AI assistant
- (2019) *Adjunct Proceedings - 11th International ACM Conference on Automotive User Interfaces and Interactive Vehicular Applications, AutomotiveUI 2019*, pp. 450-455. Cited 5 times.
<http://dl.acm.org/citation.cfm?id=3349263>
ISBN: 978-145036920-6
doi: 10.1145/3349263.3351325
- [View at Publisher](#)
-
- 10 Wortham, R.H., Theodorou, A., Bryson, J.J.
What does the robot think? Transparency as a fundamental design requirement for intelligent systems
(2016) *IJCAI-2016 ethics for artificial intelligence workshop*. Cited 36 times.
-
- 11 Chen, J.Y.C., Lakhmani, S.G., Stowers, K., Selkowitz, A.R., Wright, J.L., Barnes, M.
Situation awareness-based agent transparency and human-autonomy teaming effectiveness ([Open Access](#))
- (2018) *Theoretical Issues in Ergonomics Science*, 19 (3), pp. 259-282. Cited 123 times.
<http://www.tandfonline.com/toc/ttie20/current>
doi: 10.1080/1463922X.2017.1315750
- [View at Publisher](#)
-

- 12 Chen, J.Y., Procci, K., Boyce, M., Wright, J., Garcia, A., Barnes, M.
Situation awareness-based agent transparency
(2014) *Army Research Lab Aberdeen Proving Ground MD Human Research And Engineering Directorate*. Cited 159 times.
<https://apps.dtic.mil/dtic/tr/fulltext/u2/a600351.pdf>
-
- 13 Langley, P., Meadows, B., Sridharan, M., Choi, D.
Explainable agency for intelligent autonomous systems
(2017) *Twenty-Ninth IAAI Conference*. Cited 101 times.
-
- 14 Sanneman, L., Shah, J.A.
A Situation Awareness-Based Framework for Design and Evaluation of Explainable AI ([Open Access](#))

(2020) *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, 12175
LNAI, pp. 94-110. Cited 22 times.
<https://www.springer-com.proxy.undip.ac.id/series/558>
ISBN: 978-303051923-0
doi: 10.1007/978-3-030-51924-7_6

View at Publisher
-
- 15 Selkowitz, A.R., Lakhmani, S.G., Chen, J.Y.C.
Using agent transparency to support situation awareness of the Autonomous Squad Member

(2017) *Cognitive Systems Research*, 46, pp. 13-25. Cited 27 times.
http://www.elsevier.com.proxy.undip.ac.id:2048/wps/find/journaldescription.cws_home/620288/description#description
doi: 10.1016/j.cogsys.2017.02.003

View at Publisher
-
- 16 Endsley, M.R.
Toward a theory of situation awareness in dynamic systems

(1995) *Human Factors*, 37 (1), pp. 32-64. Cited 5467 times.
doi: 10.1518/001872095779049543

View at Publisher
-
- 17 Nigro, J.-M., Loriette-Rougegrez, S., Rombaut, M.
Driving situation recognition with uncertainty management and rule-based systems

(2002) *Engineering Applications of Artificial Intelligence*, 15 (3-4), pp. 217-228. Cited 18 times.
doi: 10.1016/S0952-1976(02)00070-2

View at Publisher
-
- 18 Zhu, H., Singh, G.
A communication protocol for a vehicle collision warning system ([Open Access](#))

(2010) *Proceedings - 2010 IEEE/ACM International Conference on Green Computing and Communications, GreenCom 2010, 2010 IEEE/ACM International Conference on Cyber, Physical and Social Computing, CPSCom 2010*, art. no. 5724897, pp. 636-644. Cited 18 times.
ISBN: 978-076954331-4
doi: 10.1109/GreenCom-CPSCom.2010.100

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-

-
- 19 Dosovitskiy, A., Ros, G., Codevilla, F., Lopez, A., Koltun, V.
CARLA: An open urban driving simulator
(2017) *Proceedings of the 1st Annual Conference on Robot Learning*, pp. 1-16. Cited 2054 times.
-

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Collaborative driving is considered as a form of human-autonomy teaming (HAT) in which the advanced driving assistance system (ADAS) with an autopilot feature plays a role as the human driver counterpart, not merely as an automation tool. However, such a collaborative driving raises a problem for the human driver's situational awareness development, particularly because of the lack of mechanisms to comprehend the autopilot agent's behaviours. The human driver becomes overly trust to the agent and is vulnerable to distractions. As a result, many road incidents occur because of such mental model. It is believed that the transparency of the autopilot agent can help its human counterpart to calibrate their trust in this agent. However, a lack of studies investigating how such transparency is delivered to the human driver. Hence, this study aims to develop autopilot agent transparency for collaborative driving. The developed transparency is implemented and simulated using open-source software for autonomous driving called Carla simulator. The findings show that the transparency can help the human driver to understand and predict the autopilot agent's behaviours better. Such transparency is critical to enhance human-machine interaction, particularly in a collaborative driving context.

Published in: 2022 19th International Joint Conference on Computer Science and Software Engineering (JCSSE)

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I. Introduction

Collaborative driving refers to level 4 of six levels (0-5) partially automated driving according to the Society of Automotive Engineering [1]. This type of driving has the on-board ADAS that provides cognitive supports to the human driver in the manual driving mode. Still, it also has a certain level of autonomy to perform driving tasks when the autopilot mode is activated. Such an autonomy includes a teammate role, in which the ADAS can back the human driver up in case of they experience situational awareness development. When inattentive driving and high collision risk are detected, the ADAS can take over the manual control from the human driver to execute emergency manoeuvres such as stopping the vehicle as in a collision avoidance system. From this perspective, the relation between the human driver and the ADAS can be considered as a form of human-autonomy teaming (HAT). Driving becomes an activity that involves two collaborating agents [2]. Hence, such a driving is called collaborative driving.

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