PhD-02 EVALUATION OF THE DISSERTATION TOPIC

GENERAL INFORMATION AND PERSONAL CONTACT INFORMATION OF THE DOCTORAL CANDIDATE

First and last name, and title of the doctoral candidate:		Ivan Čeh, mag. inf. et math.
Provider of the study programme:		University of Zagreb Faculty of Electrical Engineering and Computing
Name of the study programme:		Electrical Engineering and Computing
Scientist ID of the doctoral candidate:		R-5/2019
Title of proposed topic in	*language of the dissertation:*	English
	Croatian	Agentni model razvoja programske podrške otvorenog koda
	English	Agent-based Model of Open-source Software Development
Area/field/branch (if the doctoral study is performed in a branch)**:**		Technical Sciences / Computing

MENTOR(S)

	First and last name, and title:	**Institution, country:**	**E-mail:**
First mentor:	Goran Delač, Assistant Professor	University of Zagreb Faculty of Electrical Engineering and Computing, Croatia	goran.delac@fer.hr
Second mentor:	Mario Štorga, Professor	Faculty of Mechanical Engineering and Naval Architecture, Croatia	mario.storga@fsb.hr
	First and last name, and title:	**Institution, country:**	**E-mail:**
The committee appointed for topic evaluation and mentor appointment proposal	1. Klemo Vladimir, Assistant Professor	University of Zagreb Faculty of Electrical Engineering and Computing, Croatia	klemo.vladimir@fer.hr
	2. Goran Delač, Assistant Professor	University of Zagreb Faculty of Electrical Engineering and Computing, Croatia	goran.delac@fer.hr
	3. Mario Štorga, Professor	Faculty of Mechanical Engineering and Naval Architecture, Croatia	mario.storga@fsb.hr
	4. Marin Šilić, Assistant Professor	University of Zagreb Faculty of Electrical Engineering and Computing, Croatia	marin.silic@fer.hr
	5. Blaž Rodič, Assistant Professor	Faculty of information studies, Novo Mesto, Slovenia	blaz.rodic@fis.unm.si
Session of the competent body at which the Committee was appointed, and number of item on the agenda	713th regular session of the faculty council of the Faculty of Electrical Engineering and Computing, held on December 15th, 2021, item 5.1.1.		
Session of the Ethics Committee at which consent was given to the research proposal			

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A. Report on the Public Defence of the Dissertation Topic

Based on the decision of the Faculty Council of FER from the regular 713th session held on December 15, 2021, on March 11th, 2022, a public interview was held with Ivan Čeh, mag. inf. et math., regarding the expected original scientific contribution of the proposed doctoral dissertation.

The public discussion was attended by all members of the Commission, assistants to the Department of Electronics, Microelectronics, Computer and Intelligent Systems, PhD students enrolled in the Research Seminar in Computer Science and assistants of the Chair of Design and Product Development, Faculty of Mechanical Engineering and Naval Architecture. In a 30-minute presentation, Ivan Čeh, mag. inf. et math. explained the proposed topic of the dissertation and presented the expected original scientific contribution. All members of the Committee and some of those present took part in the discussion after the presentation (which lasted about 50 minutes).

B. Evaluation of the Dissertation Topic
(original scientific contribution and evaluation of viability)

Open-source software is released under a license that permits the inspection, use, modification and redistribution of its source code without compensation. Considering the specificities of its development process, including a large number of geographically and organizationally distributed developers with various motives for participation and greater dynamics of joining and leaving projects, the topic of open-source software development dynamics and the effect of participants on the dynamics has been intensively researched. Various research methods were used, including surveys, secondary data, interviews, experiments and simulations. Some of the advantages of the simulation method are simple data collection, simple parameter variation and high explanatory power of the modelled phenomena. Agent-based modelling is a simulation method widely used since the end of the 20th century. Each agent-based model contains the following three elements: autonomous objects called agents, an environment in which these agents are placed, and relations and interactions affecting their behaviour. Compared to other similar simulation methods, agent-based models provide high freedom in defining individual agents' behaviour which, for example, does not have to be described by equation and can include complex conditional execution with complex rules, logical operations, heterogeneity and randomness. Different agent-based models of open-source software development and some similar processes with a large number of participants, including crowdsourcing and social innovation, are already developed, but some phenomena related to the dynamics of open-source software development have not yet been described in existing models, including the phenomena of a "project takeoff" and knowledge loss due to developers leaving the project.

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Research in this doctoral dissertation will include modelling of the conceptual agent-based model of open-source software development, implementation of an associated computerized prototype for simulation, and calibration and validation of the conceptual model and computerized prototype. Empirical data which will be used include existing open-source software development literature and publicly available data, including code repositories and databases with real projects and open-source software repositories data. The purpose of the model is understanding, phenomena description and prediction of observed system's behaviour. Agents have to be defined precisely as basic components of the simulation model, and hypotheses related to internal mechanisms which lead to specific behaviour should be described. Based on that, an agent-based model will be developed, and its computerized prototype will be calibrated, validated and compared to real-world open-source software development data. Special emphasis will be on determining that the theories and assumptions used in the model are correct, that a model correctly represents the entities from the problem space, and that the model's output behaviour has sufficient accuracy for the intended model purpose.

The expected scientific contribution is the following:
- Theoretical agent-based model of open-source software development dynamics consisting of a model of participants, environment and their interaction network.
- Computational prototype based on the theoretical agent-based model, which enables studying of open-source software development dynamics and influence of the participants and environment characteristics on dynamics.
- Framework for analysis of computational prototype of the agent-based model by calibration, validation and comparison with real-world open-source software development data.

The selected Commission for the evaluation of the topic of the doctoral thesis considers that the proposed topic is innovative and scientifically interesting and that the proposed plan represents a solid foundation for achieving the research goals. Furthermore, the Commission assesses that the research is financially and organizationally feasible and that the expected original scientific contribution is achievable.

Opinion and recommendation:

It is proposed to the Faculty Council to accept the topic of the doctoral dissertation with a changed title and more precisely written points of scientific contribution.

Recommendation on change or revision of dissertation title:

Agentni model dinamike razvoja programske potpore otvorenog koda

Agent-based Model of Open-source Software Development Dynamics

Proposal for change of mentor and/or appointment of another mentor *(specify title, first and last name, institution):*

Dissertation defence planned for (*specify year and semester):*

Summer semester 2022/2023

Separate opinion *(only if any of the members of the Committee for evaluation of dissertation topic and mentor appointment proposal has a separate opinion)*

Signature

(First name and last name of committee member)

ADDITIONAL COMMENTS *(as needed):*

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The committee appointed for topic evaluation and mentor appointment proposal	First and last name, title, institution, country:	Signature:
	1.(*Committee chair*) Klemo Vladimir, Assistant Professor	
	2. Goran Delač, Assistant Professor	
	3. Mario Štorga, Professor	
	4. Marin Šilić, Assistant Professor	
	5. Blaž Rodič, Assistant Professor	

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