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## Development of care decision-making model

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*Abstract:* DIHEML research project ("Development of method for interpretation of health expressions based on machine learning to support various care events and persons", DIHEML) develops measuring of the health condition and quality of life to assist in developing artificial intelligence to support public sector healthcare and wellbeing by addressing the personal needs of the patient. With the valuable support from various collaborators DIHEML research project collects human answers. DIHEML research project aims to develop, test and validate a diverse set of alternative approaches of machine learning to develop new models that can fruitfully support modeling healthcare processes and the decision making about the patient's care, especially addressing the patient's personal needs and preferences.

*Keywords:* personalized care; decision making; machine learning; artificial intelligence; patient; disabled; health; learning

Motivated by his previous research, since 2017 Lauri Lahti has actively developed and initiated a new DIHEML research project at Aalto University ("Development of method for interpretation of health expressions based on machine learning to support various care events and persons", DIHEML, in Finnish "Koneoppimista hyödyntävän menetelmän kehittäminen terveyttä koskevien ilmaisujen tulkitsemiseksi tukemaan erilaisia hoitotilanteita ja henkilöitä"; see Lahti (2017) and Lahti (2018)). DIHEML research project develops measuring of the health condition and quality of life to assist in developing artificial intelligence to support public sector healthcare and wellbeing by addressing the personal needs of the patient. This new research approach gets motivation from the previous research such as Bradley & Lang (1999), Warriner et al. (2013), Mauss & Robinson (2009) and Berna et al. (2011). One motivating earlier work is also the publication Lahti, Tenhunen & Nieminen (2018).

DIHEML research project aims at identifying from human thinking and communication such patterns that are important to be carefully addressed in respect to 1) evaluating the person's need of getting care, 2) the person's learning about health-related information, and 3) supporting the person's advantageous health behavior. Anyone who is at least 16 years old is freely welcome to participate voluntarily in the data acquisition of DIHEML research project by answering the online questionnaire at the following web address:

<https://ilmaisu.cs.aalto.fi/tutkimus/osallistu/avain-XE4WKP-MK37UNYFP9>

Besides patient and disabled people's organizations, DIHEML research project collects human answers also from various other health and wellness organizations, and educational institutions as well as organizations of healthcare professionals. An essential aim of DIHEML research project is to develop, test and validate a diverse set of alternative approaches of machine learning to develop new models that can fruitfully support modeling healthcare processes and the decision making about the patient's care, especially addressing the patient's personal needs and preferences. DIHEML research project refers to this general aim of its research as "development of care decision-making model", in Finnish "hoidon päätöksenteon mallin kehittäminen".

Aalto University Research Ethics Committee has given a supporting ethical statement for DIHEML research project on 18 June 2019. DIHEML research project addresses the General Data Protection Regulation of the European Union in handling the research data. While taking appropriate

and sufficient anonymization actions, DIHEML research project also aims to produce and publish results, models and data openly as much as possible to be used by anyone for non-commercial purposes.

DIHEML research project is carried out with the valuable support from various collaborators. DIHEML research project thanks all the people who have kindly participated in answering to the online questionnaire of the research. Special thanks to the people associated with various Finnish patient and disabled people's organizations, other health and wellness organizations, and educational institutions as well as organizations of healthcare professionals.

DIHEML research project has already published several results, see Lahti (2017), Lahti (2018), Lahti (2020) and Lahti (submitted 2020).

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