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To: *Masaryk University in Brno, Faculty of Informatics
Dean's office, R&D department
602 00 Brno, Botanická 68a*

Subject: *Review of Parag Kulkarni's habilitation thesis*

I was asked to review the habilitation thesis entitled "Knowledge Management and New Paradigm of Advanced Machine Learning", which was submitted by Parag Kulkarni, Ph.D., D.Sc. to Masaryk University in Brno, Faculty of Informatics.

The thesis is written in English on 191 pages. The thesis consists of two parts. Part I – Preface gives the introduction on 16 pages to the area of Dr. P. Kulkarni's interest. Part II of the thesis is a collection of nine publications in its original form. There are three conference papers (#1, #3, #8), five journal papers (#2, #4, #5, #6, #9) and one U.S patent application (#7). All nine presented publications have multiple authors. The applicant is the first author only of publications #3 and #4. The applicant provided an estimate of his contribution in % to individual publications (page 3).

The applicant research interest is rather diverse. He himself mentions Machine Learning, Knowledge Management and Intelligent systems in his thesis as main topics. The distinct point of applicants approach is in a multidisciplinary combination of management, engineering and service techniques.

As it is rather difficult to check holistic claims, I decided to look on individual contributions. A short and rather shallow conference paper #1 provides a survey of semi-supervised learning methods. The five pages long journal paper #2 deals with subspace clustering. It proposes ICS algorithm. The conference paper #3 uses differential measurement to load balancing in distributed computational systems. The journal paper #4 proposes other algorithms for load balancing and provides appropriate mathematical grounding to them.

The journal paper #5 applied machine learning techniques to intrusion detection in computer networks. The journal paper #6 is a survey dealing with context based decision making in the domain of emotions recognition (human faces, gestures, etc.).

The contribution #7 is a granted patent named Business method using the automated processing of paper and unstructured electronic documents. This part is the

longest in the habilitation thesis as it has 36 pages. The approach builds a context map from original unstructured information in a plane text.

The conference paper #8 deals with collaborative and holistic learning for distributed information sources and agents utilizing this information. A semi-constraint influence diagram is built to express interdependencies within the complex system. The last paper #9 in the collection, which is a journal paper, suggests a classification method based on parametric partitioning of a solution space.

The Associate Professor (docent in Czech) is a teaching rank, which allows its holder to teach and research individually and, maybe lead, a group. I understand that my reviewer's task is to assess if the applicant is suitable for this position: if seen from the aperture of the habilitation thesis. Let me make several observations about the applicant with this respect.

1. The research experience of the applicant is proved by presented papers. Most of provided contributions passed through a peer review process. Some of the papers are really short and simple, e.g. #1. However, it does not undermine the research experience.
2. The applicant's research interests are rather broad. He approaches problems from a multidisciplinary standpoint. He also changes research topics quite often. The natural consequence is that it is rather difficult to find a deep contribution in one or two of the topics.
3. The applicant has an industrial experience, which is of advantage for the university career.

*In summary: Dr. Parag Kulkarni proved in his habilitation thesis that he is an experienced researcher with research interests in attractive parts of computer science, both scientifically and practically. From the habilitation thesis text perspective, **my conclusion is that he is eligible for Associate Professor (docent) rank**, of course, if he scores well in other areas taken into consideration in the habilitation procedure.*

Sincerely

Václav Hlaváč



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