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January 11th, 2010**To whom it may concern**

This letter is to recommend the thesis “*Towards Continuous Activity Monitoring with Temporal Constraints*”, by Jonas Ullberg, for the SAIS award for best Master's thesis in the area of AI. The work performed by Jonas Ullberg was carried out in the context of the International Master's Program in “Robotics and Intelligent Systems” at Örebro University. Jonas defended his thesis on June 17th, 2009, and was awarded the highest mark of VG (along with the ECTS grade A). The thesis focuses on constraint-based abductive reasoning for activity recognition, and was carried out within the smart home facility at the Center for Applied Autonomous Sensor Systems (AASS) as part of the research in the Mobile Robotics Lab. The aim of the work was to develop a model-based approach to identify daily human activities based on heterogeneous sensor readings in a home environment. The specific requirements of this thesis were to develop a system that could operate robustly over long temporal horizons (in the order of weeks of continuous activity monitoring). The paradigmatic application example is sleep disorder diagnosis, where sleep experts require a complete picture of the patient's daily habits over a long period of time in order to assess the need for further specialized tests.

The results of this thesis have a strong scientific merit, that reaches far beyond what is usually expected of a MSc degree project. Jonas Ullberg has developed an original technique to solve the target problem, which overcomes key difficulties of current methods for activity recognition, providing a novel framework based on temporal constraint propagation which is provably correct and scales well over long temporal horizons. Among the novel contributions of the thesis are an algorithm for fast inference of activities based on temporal constraint propagation and provably consistent activity recognition. The research value of the work by Jonas Ullberg is testified by the fact that this work has been accepted for presentation at the ICAPS workshop on “Planning and Plan Execution for Real-World Systems” (Thessaloniki, Greece, September 19-23, 2009), an annual international scientific venue focusing on the integration AI planning and plan execution techniques.

Having been in charge of the day-to-day supervision of Jonas Ullberg during his MSc work, I can testify to his ability to draw state-of-the-art techniques from different scientific communities within the area of AI, as well as his strong ability to use these techniques to obtain an integrated functioning prototype. During the course of his work, he has demonstrated the capability to initiate investigation independently, and has learned how to transform theoretical results into well-engineered solutions. Jonas, who has recently been employed by our lab as a PhD student, has proved to be a particularly apt developer and has a genuine curiosity in exploring how far AI techniques can be leveraged to obtain systems that satisfy real-world requirements. For the reasons above, I believe that Jonas Ullberg's thesis is an ideal candidate for the SAIS award.

Sincerely,


Federico Pecora, PhD