
















# A Many-Valued Empirical Machine for Thyroid Dysfunction Assessment

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**Abstract.** *Thyroid Dysfunction* is a clinical condition that affects thyroid behaviour and is reported to be the most common in all endocrine disorders. It is a multiple factorial pathology condition due to the high incidence of hypothyroidism and hyperthyroidism, which is becoming a serious health problem requiring a detailed study for early diagnosis and monitoring. Understanding the prevalence and risk factors of thyroid disease can be very useful to identify patients for screening and/or follow-up and to minimize their collateral effects. Thus, this paper describes the development of a decision support system that aims to help physicians in the decision-making process regarding thyroid dysfunction assessment. The proposed problem-solving method is based on a symbolic/sub-symbolic line of logical formalisms that have been articulated as an *Artificial Neural Network* approach to data processing, complemented by an unusual approach to *Knowledge Representation and Argumentation* that takes into account the data elements entropic states. The model performs well in the thyroid dysfunction assessment with an accuracy ranging between 93.2% and 96.9%.

**Keywords:** Thyroid dysfunction · Knowledge Representation and Reasoning · Artificial Neural Networks · Entropy · Logic Programming · Many-Valued Empirical Machine