

# Expressiveness of subclasses of Weighted automata and Weighted logics

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Weighted Automata are a natural extension of finite automata for defining quantitative properties over different structures (i.e. the number of times that a pattern occurs in a word, etc). This formalism was first proposed in the late 70's as a useful machinery for solving long standing open problems in automata theory (i.e. star height problem). Even though Weighted Automata are an interesting model in its own right, no connection was made between the model and logic, until very recently when a logic (called Weighted Logic) was proposed in order to capture the expressiveness of Weighted automata. Weighted Logic seems a natural extension of boolean logic to any semiring, however, weird restrictions have to be imposed into the logic syntax in order to capture the expressiveness of Weighted Automata. Furthermore, apart from the connection made between automata and logic in the weighted world, it is not clear what is the insight gained by introducing this logic.

In this talk, I will give an informal introduction of Weighted Automata and Weighted Logics. Moreover, I will present our early results on connecting both formalisms. These results link different subclasses of Weighted Automata with sub-fragments of Weighted Logic and give a better understanding of the expressiveness of Weighted Automata.