Deaf Machine Theory

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Authors' contributions

The sole author designed, analyzed, interpreted and prepared the manuscript.

Original Research Article

ABSTRACT

In this paper, the author presents an abstract model of a computable machine that is passive to inputs. The model is conceptually a deaf machine that is basically an automaton that does not have any acceptance state. The Deaf machine may have one or more normal states and can even have infinite states (uncountable normal states). The Machine can not recognize any language either formal informal. The Proposed model is a finite state machine without the accept state and cannot recognize any language.

Keywords: Theory of computation;computer science;deaf machine;automata; FSM.

1. DEAF MACHINE IN COMPUTATION THEORY

The computational theory in computer science examines the possibility of solving problems efficiently through a computer and also examines what the computer can compute currently. Computational theory deals with the mathematical models of computing. The study of computation is aided by abstract mathematical models of computers called model of computation [2, 3]. One of these models is the deterministic finite automata DFA that works with finite state machine FSM. This model consists of five-tuples. The first tuple represents the set of states that is governed by rules of transition from one state to another according to input symbol with the movement being described by transition function. As an example, the transition function of moving the process from state x to the next state y, when the input symbol is 1 is given by δ (x, 1) = y. Let machine M beadDeterministic Finite Automaton described by the 5-tuple, $(Q, \Sigma, \delta, q_0, F)$, that consists of:

- a finite set of states (Q)
- a finite set of input symbols called the alphabet (Σ)
- a transition function $(\delta : Q \times \Sigma \rightarrow Q)$
- an initial or start state $(q_0 \in Q)$
- a set of accept states $(F \subseteq Q)$

For the machine M shown figure 1, If alphabet of the machine Σ= {0, 1}, then:

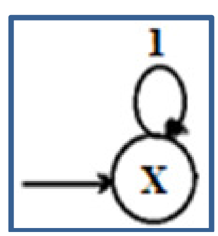

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Fig. 1. Machine M

M= ({x}, {1}, δ, x, {}) with δ:

	1
x	X

δ (x, 1) = x,

In this case, the transition function represents the movement from state x to x itself on input 1. For the deaf machine, the accept states set is allowed to be {} or ф (there is no accept states) [1, 2].This thing is the problem and the solution at the same time, the problem is the machine does not recognize any language neither empty string Ɛ nor the empty language [3]. The deaf machine functioning is analogous to the healthy human ears, that can hear but cannot recognize the human language unknown to the person. One example of the application of this model is the halt or break function in programming.

The similarity lies in the DFA machine that does not have any acceptance state but it generates a model that represents the deaf machine in computation theory [4, 5].

2. CONCLUSION

A model of a computable machine that is basically deaf to the inputs is presented in the paper. The proposed machine does not have any acceptance state. Basic idea proposed in the paper is the concept of finite state machine FSM without acceptance state. Neither accepts an empty string.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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