**

UNIVERSITÀ DI PISA

SCUOLA SUPERIORE SANT’ANNA

**National Ph.D. in Artificial Intelligence**

*XXXVII cycle*

**This is the Title of Thesis:**

**This is the Continuation of the Title**

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| **Candidate** Name and Surname | **Supervisors** Prof. Name and Surname Prof. Name and Surname |

Thesis submitted in partial fulfillment of the requirements for the degree of

Doctor of Philosophy in Artificial Intelligence

*Dedication*

# Summary

A one-page summary of the objectives and contributions of the thesis.

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# Acknowledgements

A one-page acks to the people you want to mention.

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# Chapter 1 Introduction

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Author of the quote

The organization of the introduction into sections reported in this template is only avsuggestion. The only mandatory requirement is to have a subsection with Publications.

## 1.1 Motivations and Challenges

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## 1.2 Research Questions

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## 1.3 Contributions

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## 1.4 Publications

We list below the journal and conference papers that form the basis of this thesis published

by the time of writing:

* …
* …

We also include a list of papers under submission at the time of writing:

* …
* …

We will highlight when a chapter or (sub)section of a chapter is based on a published

work.

# Chapter 2 Title of the Chapter

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## 2.1. Title of the Section

Historically, AI emerged in the field of computer science with the aim of emulating the functioning of the human brain to solve problems or achieve specific objectives.[[1]](#footnote-2)

The phrase “artificial intelligence” is attributed, among others, to John McCarthy and Marvin Minsky, who first used it in 1955 in what is commonly known as “the Dartmouth Proposal”.[[2]](#footnote-3) In the following years, the first definitions of artificial intelligence emerged, all united by a technological aspiration to imitate human intelligence. Among the various definitions, it is worth mentioning McCarthy’s 1960 description as “a system which is to evolve intelligence of human order”[[3]](#footnote-4). Whereas Minsky defines it as “the science of making machines do things that would require intelligence if done by men”.[[4]](#footnote-5)

## 2.2. Title of the Section

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# Chapter 3 Conclusions

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## 3.1 Contributions

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## 3.2 Limitations

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## 3.3 Open Research Directions

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1. SJ Russell, 1., P Norvig, & E. Davis, (2010). ‘Artificial intelligence: a modern approach’, 3rd ed. Upper Saddle River, NJ, Prentice Hall. [↑](#footnote-ref-2)
2. J McCarthy, ML Minsky et al., A proposal for the Dartmouth Summer Research Project on Artificial Intelligence, 31 August 1955, 27 AI Magazine, 2006, 4. [↑](#footnote-ref-3)
3. J McCarthy, ‘Programs with Common Sense’, (1959), presented at Symposium on The Mechanization of Thought Processes, National Physical Laboratories, 1960, available at: <http://jmc.stanford.edu/articles/mcc59/mcc59.pdf>, accessed 15 October 2024. More specifically, at p. 3 the author identifies the features of such a system: “1. All behaviors must be representable in the system. Therefore, the system should either be able to construct arbitrary automata or to program in some general purpose programming language. 2. Interesting changes in behavior must be expressible in a simple way. 3. All aspects of behavior except the most routine must be improvable. In particular, the improving mechanism should be improvable. 4. The machine must have or evolve concepts of partial success because on difficult problems decisive successes or failures come too infrequently. 5. The system must be able to create subroutines which can be included in procedures as units. The learning of subroutines is complicated by the fact that the effect of a subroutine is not usually good or bad in itself. Therefore, the mechanism that selects subroutines should have concepts of interesting or powerful subroutine whose application may be good under suitable conditions.” All of this is based on the assumption, at p. 4, that “[i]n order for a program to be capable of learning something it must first be capable of being told it”. [↑](#footnote-ref-4)
4. ML Minsky, Preface, in 'Semantic Information Processing', edited by M. Minsky, Cambridge, (MA), MIT Press, 1968. [↑](#footnote-ref-5)