Chapter 8. 1960s' Infrastructure

The Quest for Artificial Intelligence, Nilsson, N. J., 2009.

Lecture Notes on Artificial Intelligence, Spring 2012

Summarized by Rhee, Je-Keun

Biointelligence Laboratory
School of Computer Science and Engineering
Seoul National Univertisy

http://bi.snu.ac.kr

Contents

Overview of Chapter 8

- The technical developments during 1960s were aided by several systems support and societal factors.
- New computer languages made it much easier to build AI systems.
- Researchers from mathematics, from cognitive science, from linguistics, and from what soon would be called “computer science” came together in meetings and in newly formed laboratories to attack the problem of mechanizing intelligent behavior.
- In addition, government agencies and companies, concluding that they had an important stake in this new enterprise, provided needed research support.

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8.1 Programming Languages

Programming Languages

- The most elementary kind of symbolic expression is a list of symbols, such as (7, B, 5).
- IPL
  - Developed by Newell, Shaw, and Simon (1954)
  - Used to program several early AI programs
- LISP
  - Implemented by John McCarthy (1958)
  - Based on recursive function theory
  - Programs for manipulating lists were themselves represented as lists.
  - Such programs could be elements of other lists and could have subprograms embedded in them.

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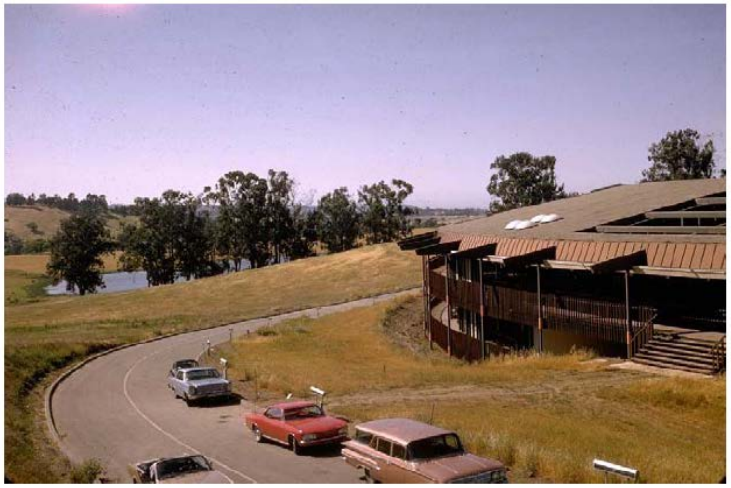
8.2 Early AI Laboratories

The Leaders of Research in AI

- Carnegie Tech
  - Newell and Herb Simon
  - Complex information procession (CIP)
- MIT
  - John McCarthy and Minsky
  - MIT Artificial Intelligence Project
- Stanford
  - McCarthy and Lester Earnest
  - Set up the Stanford AI Laboratory (SAIL)

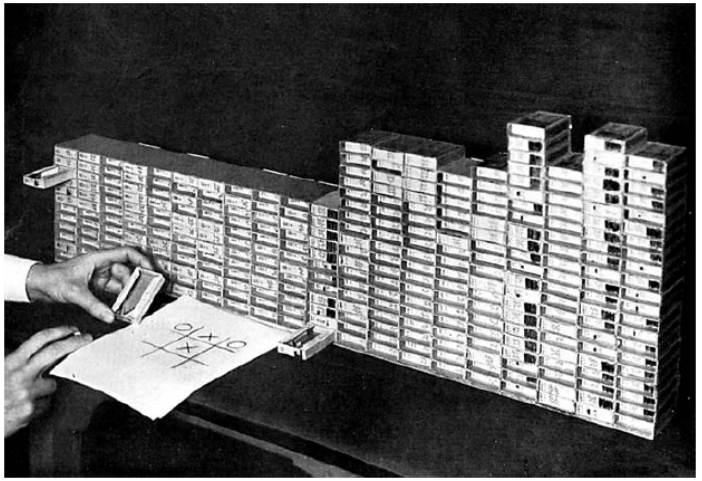


Site of SAIL from 1966 to 1980

The Leaders of Research in AI

- University of Edinburgh (Scotland)
  - AI center emerged by Donald Michie who had worked with Alan Turing and I. J. Good.
  - He put together a “contraption of matchboxes and glass beads” that could learn to play tic-tac-toe (MENACE, Matchbox Educable Noughts and Crosses Engine).

Donald Michie



MENACE

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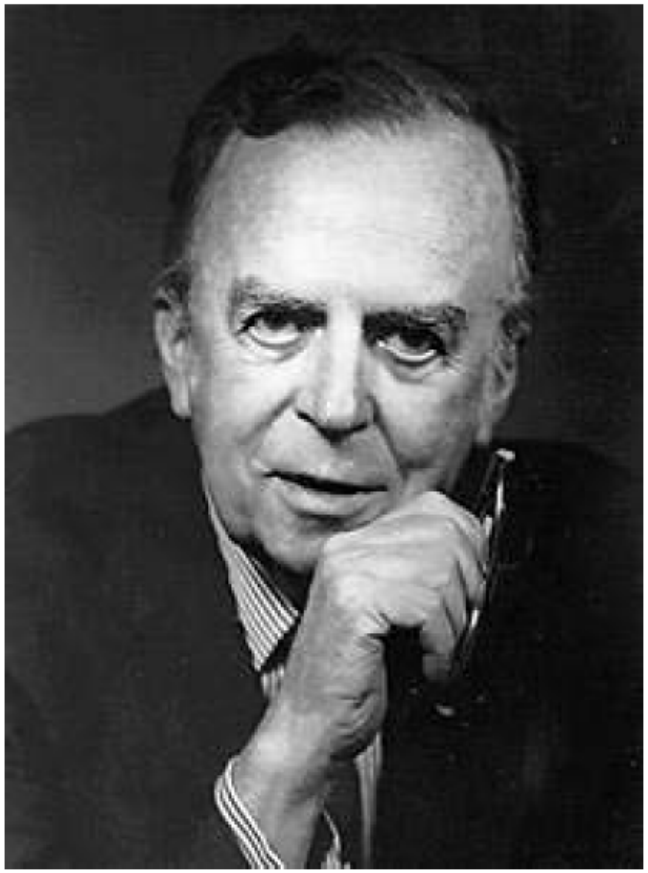
8.3 Research Support

Major Source of Funding during the Late 1950s and Early 1960s

- Office of Naval Research (ONR)
  - Formed shortly after the end of the Second World War.
  - The mission was “to plan, foster, and encourage scientific research in recognition of its paramount importance as related to the maintenance of future naval power and the preservation of national security”.
  - Its Information System Branch was set up in the mid-1950s under the direction of Marchall Yovits.
  - It supported AI work at several institutions and sponsored conferences and workshops.

Major Source of Funding during the Late 1950s and Early 1960s

- Advanced Reach Projects Agency (ARPA)
  - The mission was to provide significant amounts of research funds to attack problem area important to U.S. defense.
  - Its Information Procession Techniques Office (IPTO) was set up in 1962 under the direction of J. C. R. (Lick) Licklider).
  - Later, ARPA was renamed DARPA (for Defense Advanced Research Projects Agency)



J. C. R. Licklider

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8.4 All Dressed Up and Places to Go

All Dressed Up and Places to Go

- Herb Simon's prediction (1957)
  - Within ten years, a digital computer will be the world's chess champion, compose music, prove a mathematical theorem, and embody a psychological theory.
- Marvin Minsky's declaration (1968)
  - In 30 years we should have machines whose intelligence is comparable to man's'

- While still having a long way to go, what had already been accomplished was an impressive start.
- The technical assets, along with the organizational and financial ones, provided a solid base for the next stage of AI's development.