

Title:	Augmenting Human Intellect: A Conceptual Framework
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Abstract:	<p>By "augmenting human intellect" we mean increasing the capability of a man to approach a complex problem situation, to gain comprehension to suit his particular needs, and to derive solutions to problems. Increased capability in this respect is taken to mean a mixture of the following: more-rapid comprehension, better comprehension, the possibility of gaining a useful degree of comprehension in a situation that previously was too complex, speedier solutions, better solutions, and the possibility of finding solutions to problems that before seemed insoluble. And by "complex situations" we include the professional problems of diplomats, executives, social scientists, life scientists, physical scientists, attorneys, designers - whether the problem situation exists for twenty minutes or twenty years. We do not speak of isolated clever tricks that help in particular situations. We refer to a way of life in an integrated domain where hunches, cut-and-try, intangibles, and the human "feel for a situation" usefully co-exist with powerful concepts, streamlined terminology and notation, sophisticated methods, and high-powered electronic aids.</p>

Introduction

Engelbart – invented the **mouse, window** and **word processor** p. 93

- Helped establish the Internet
- First demonstrated videoconferencing and **mixed text and graphic displays**
- He committed his career to “**augmenting the human intellect**”
- “The **imagery** carried on to extensions of the **symbology** and **methodology** that we humans could employ to do our **heavy thinking**.”

H-LAM / T system – Human using **Language, Artifacts, Methodology** in which he is trained p. 93

1. **Artifacts** – **physical objects** designed to provide for human comfort, for the manipulation of things or materials, and for the **manipulation of symbols**.
2. **Language** – the way in which the individual parcels out the **picture of his world** into the concepts that his mind uses to model that world, and the **symbols** that he attaches to those concepts and uses in consciously **manipulating the concepts** (thinking)
3. **Methodology** – the methods, procedures, strategies, etc. with which an individual organizes his **goal-centered** (problem-solving) **activity**
4. **Training** – the conditioning needed by the human being to bring his skills in using Means 1,2, and 3 to the point where they are operationally effective

Engelbart – filed an historic report in 1962 called FLASH-3 p. 94

“Metaphorically, I see the **augmented organization** or **institution** of the future as changing, not as an organism merely to be a bigger and faster snail, but to achieve such **new levels of sensory capability, speed, power** and **coordination** as to become a **new species** – a cat” - Engelbart

Augmenting human intellect – we mean increasing the capability of a man to approach a **complex problem situation**:

- To gain **comprehension** to suit his particular needs
- To derive **solutions to problems** p. 95

Life in an integrated domain:

- Powerful concepts
- Streamlined terminology and notation
- Sophisticated methods
- High-powered electronic aids

Extensions of means developed and used in the past to help man apply his native sensory, mental and motor capabilities p. 95

System oriented approach – considering the whole as a **set of interacting components** rather than by considering the components in isolation p. 95

There are dozens of disciplines in engineering, mathematics, and the social, life and physical sciences that can contribute to improvements to the **system of intellectual augmentation** means pp. 95-96

We see the quickest gains emerging from the development of a **prototype system** aimed at increasing human effectiveness in the **task of computer programming** p. 96

The author predicts a future working relationship between **human problem-solver** and **computer “clerk”**; every person who does his thinking with **symbolized concepts** (whether in the form of the English language, pictographs, formal logic or mathematics) should be able to benefit significantly p. 98

Objective of study – to develop a **conceptual framework** within which could grow a coordinated research and development program whose goals would be to:

- find factors that limit the effectiveness of the **individual’s basic information handling capabilities** in meeting the various needs of society for problem solving in its most general

In this work, we propose the conceptual framework for augmenting AI in communities or "social networks" of AIs. For construction of such social networks, we employ several ideas in addition to the classical machine learning. The first of them is separation of the problem areas between small local (neural) experts, their competitive and collaborative learning, and conflict resolution. Development and learning of special network manager that evaluates the level of expertise of the local experts for a problem and distributes the incoming task flow between them. Using an "ultimate auditor" to assimilate qualitative changes in the environment and correct collective errors; it may be human inspection, a feedback from real life, or another system of interference into the self-labeling process.