Semantic Communications: An Introduction

Group Presentation

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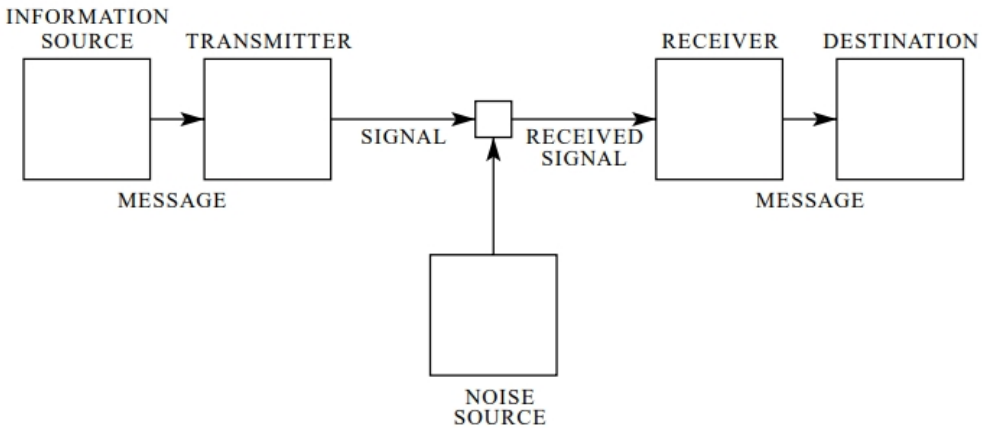
Shannon's Information Theory



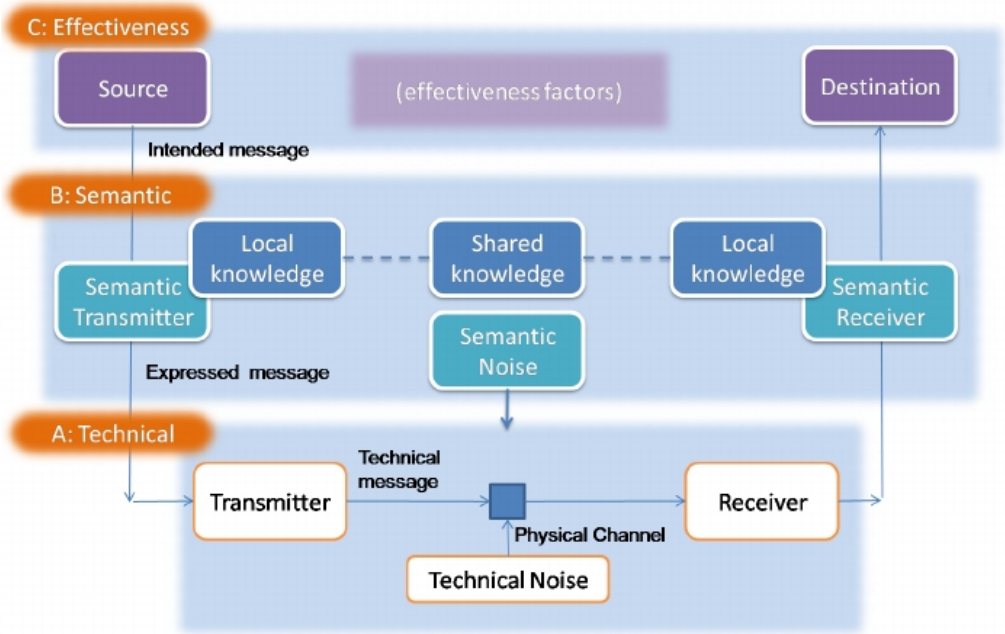
Schematic diagram of an engineering/technical communication system [1]

A Mathematical Theory of Communication [1] — C. E. Shannon

The fundamental problem of communication is that of reproducing at one point either exactly or approximately a message selected at another point. Frequently the messages have *meaning;* that is they refer to or are correlated according to some system with certain physical or conceptual entities. These semantic aspects of communication are irrelevant to the engineering problem.

Did Shannon intentionally excluded semantics from information theory?

Three Levels of Communications



A 3-level communication model [2]

Three Levels of Communications [3] — W. Weaver

- Level A. How accurately can the symbols of communication be transmitted? (The technical problem.)
- Level B. How precisely do the transmitted symbols convey the desired meaning? (The semantic problem.)
- Level C. How effectively does the received meaning affect conduct in the desired way? (The effectiveness problem.)


C. E. Shannon, "A mathematical theory of communication," *Bell System Technical Journal*, vol. 27, pp. 379–423, 7 1948. [Online]. Available: https://ieeexplore.ieee.org/document/6773024


J. Bao, P. Basu, M. Dean, C. Partridge, A. Swami, W. Leland, and J. A. Hendler, "Towards a theory of semantic communication," 2011, pp. 110–117.


W. Weaver, "Recent contributions to the mathematical theory of communication," *ETC: A Review of General Semantics*, vol. 10, pp. 261–281, 1953.