

Information Theory and Coding

Shannon's communication model

Cédric RICHARD
Université Côte d'Azur

INFORMATION THEORY

Models of communication

Models of communication are conceptual models used to explain the human communication process.

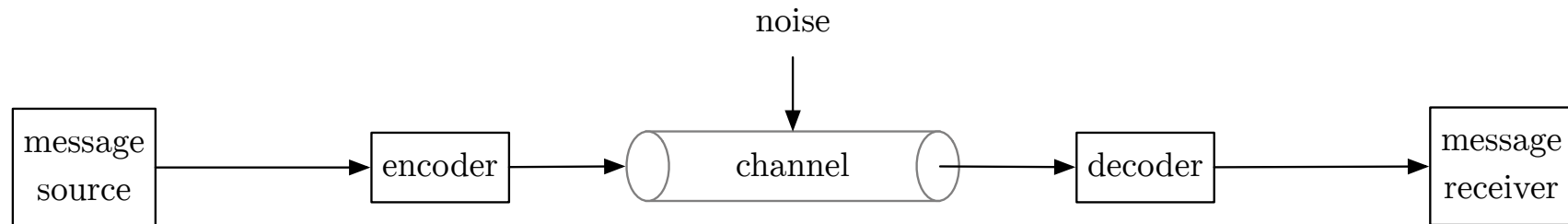
Following the basic concept, communication is the process of sending and receiving messages or transferring information from one part (sender) to another (receiver).

The Shannon-Weaver model was designed in 1949 to mirror the functioning of radio and telephone technology. It is referred to as the mother of all models.

This model has been expanded later by other scholars: Berlo (1960), ...

INFORMATION THEORY

Shannon's communication model



An information source, which produces a message

An encoder, which encodes the message into signals

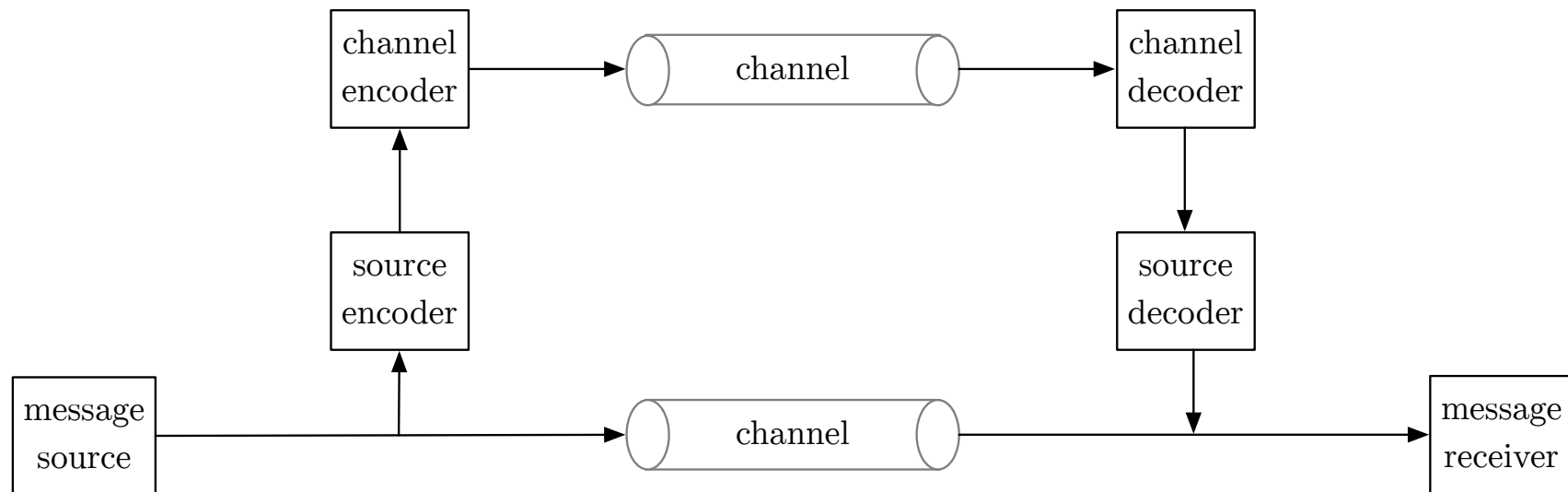
A channel, for which signals are adapted for transmission

A decoder, which reconstructs the encoded message

An information destination, where the message arrives

INFORMATION THEORY

Shannon's communication model



INFORMATION THEORY

Objectives

Information theory studies the quantification, storage, and communication of information.

It was originally proposed by Claude Shannon in 1948 to find fundamental limits on signal processing and communication operations such as data compression.

Applications of fundamental topics of information theory include lossless data compression, lossy data compression, and channel coding.

Information theory is used in information retrieval, intelligence gathering, gambling, statistics, and even in musical composition.

A key measure is entropy. It quantifies the amount of uncertainty involved in the value of a random variable or the outcome of a random process.