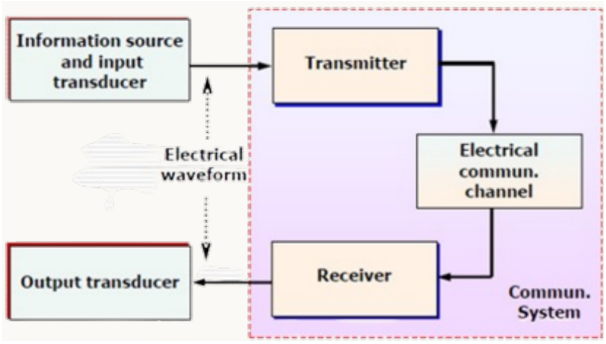
Communication System

0xSaad / Saad Almalki

December 1, 2025

1 Model of a Communication System



- **1-Information Source** : Message produced by a source may not electrical in nature such as voice , Input tranducer converts message to electrical time varying quantity called message signals , Output transducer converts electricak waveform to appropriate form at destination.
- **2-Transmitter** : Data generated by source can not transmitted directly , Signal processing operation performed by transmitter.
- **3-The communication channel** : Provides electrical connection between distant source and destination , Noise is always random and has great effect on the signals , The channel may be wired or wireless.
- **4-Receiver** : The receiver extracts the input signal from the degraded version coming from the channel.

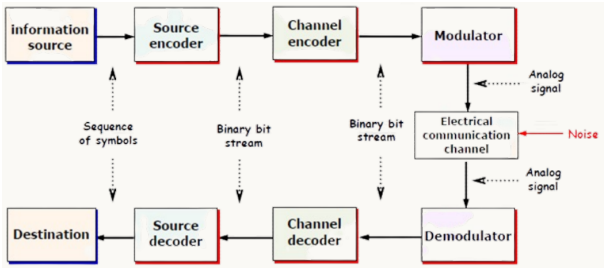
2 Classification of Communication Systems

- **1-Analog Systems** : Designed to transmit analog data using analog modulation , Can be wired or wireless , TV-AM-FM are examples.
- **2-Digital Systems** : Designed to transmit digital data using digital or analog modulation , data maybe binary or binary coded of analog data , It terms as Data communications systems.

3 Criteria of Communication Systems

- **1-Data Delivery** : Data should be delivered to correct destination.
- **2-Data Integrity** : Data should be delivered without no errors , no addition , no loss.
- **3-Timeliness of data transfer** : Data should be delivered without violating the delay constraints specific for each service.

4 Elements of Digital communication System



1- Information source Based on its output, it may be analog or digital.

2- Source encoder/decoder - It converts input to a binary sequence of 0s and 1s. - The source decoder converts this back to a symbol sequence.

3- Channel encoder/decoder - Channel encoder adds extra bits to output of the source encoder to detect or correct errors at the channel decoder. - Channel encoder/decoder can realize high transmission

4- Modulator/demodulator **Modulator** : accepts a bit stream and converts it to an electrical waveform suitable for transmission over channel.

Demodulator : extracts the message from the information

5 Why modulation ?

- **1- Overcoming some equipment limitations**
- **2- Removing interference**
- **3- Reducing noise**
- **4- Allowing efficient capacity utilization**
- **5- Matching signal to channel**

Created by: Saad Almalki