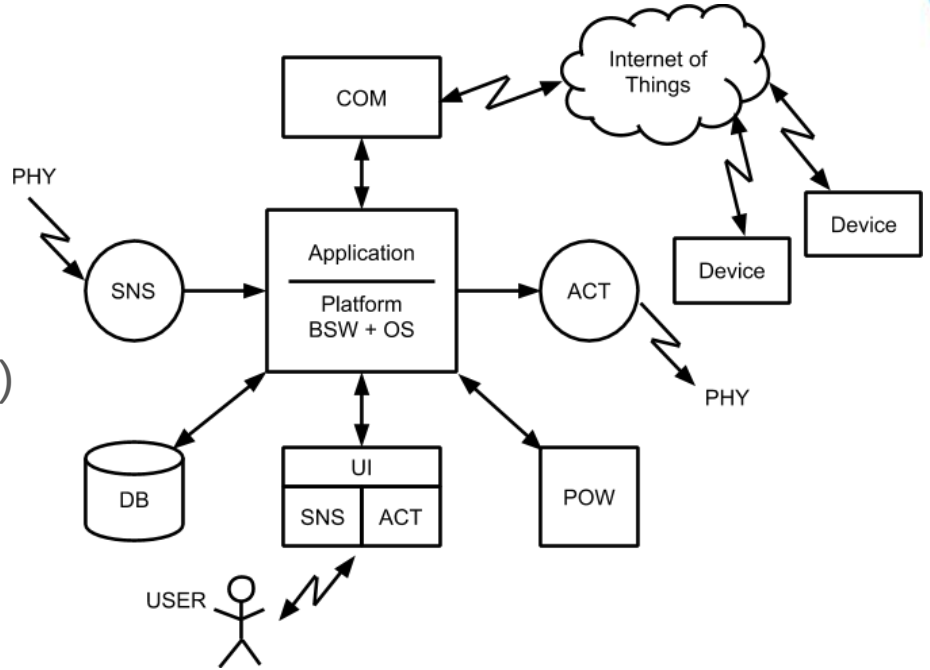
Senzori

Andrei Bragarenco

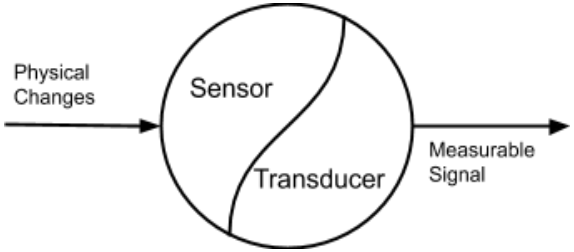
Tipuri de interacțiuni

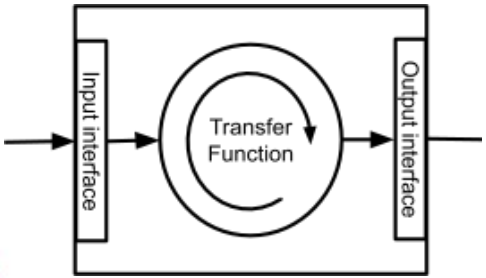
- Interacțiuni cu Utilizatorul
- **Interacțiuni cu Mediul**
- Interacțiuni cu Dispozitive (IoT)



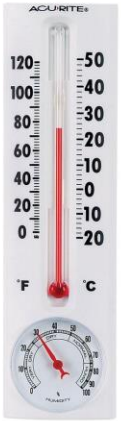
Senzor

Transformă mărime fizică din mediu într-un semnal intern al sistemului

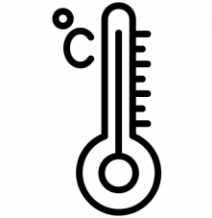


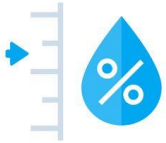


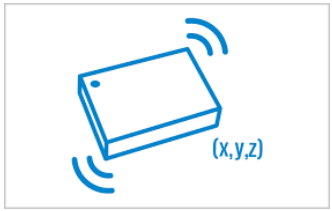
- Senzor – simte schimbare din mediu și transforma în mărime măsurabila
- Traductor – mărime măsurabila in semnal electric

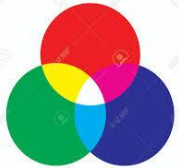


Clasificare - Natura parametrului

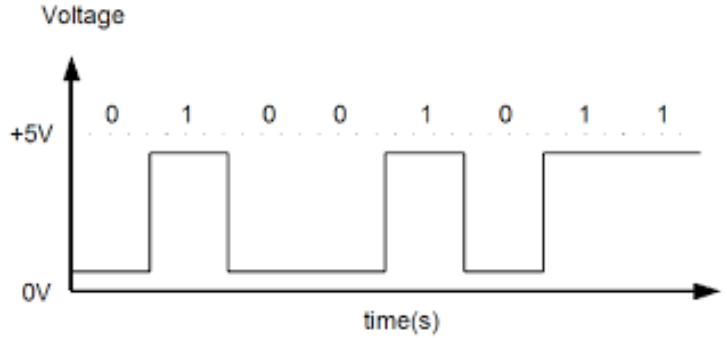


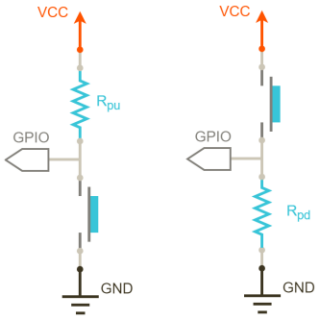




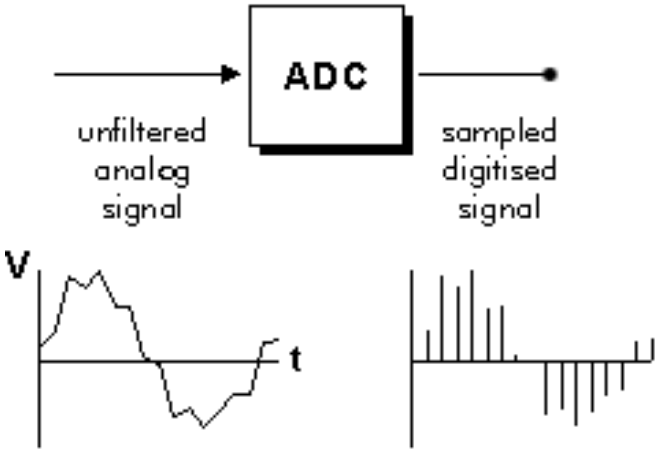


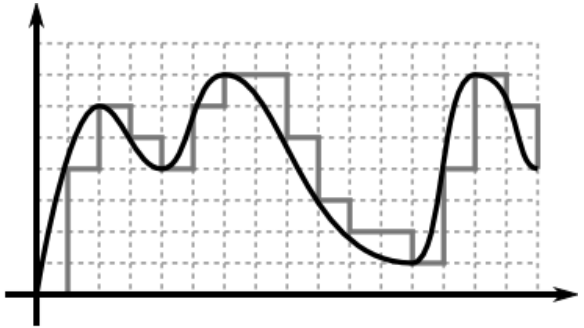
Clasificare Interfață - Binară

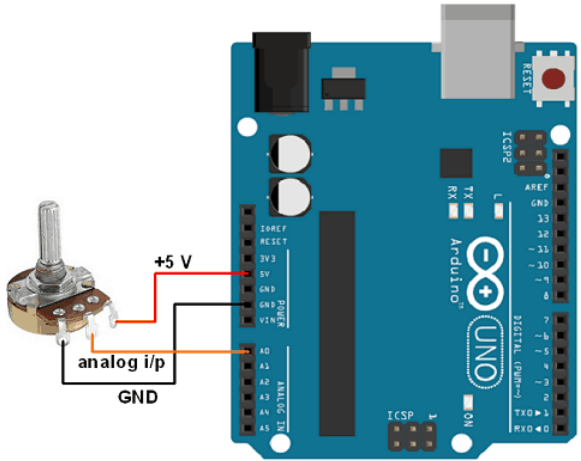




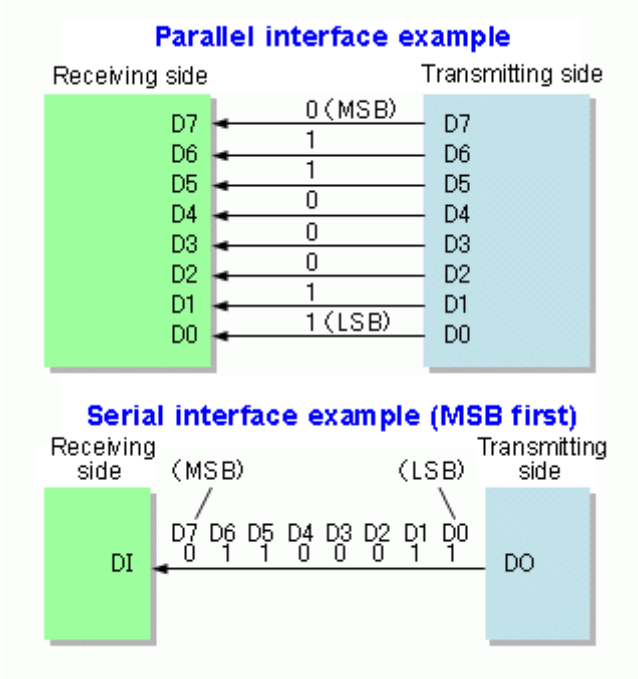
Clasificare Interfață - Analogică



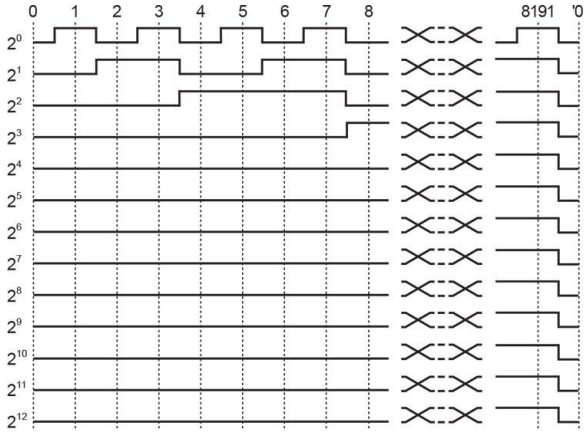




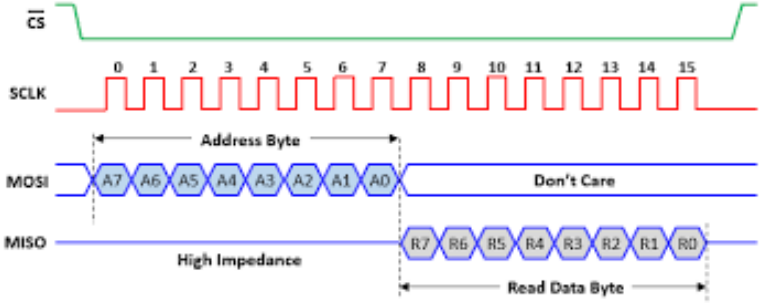
Clasificare Interfață - Digitală



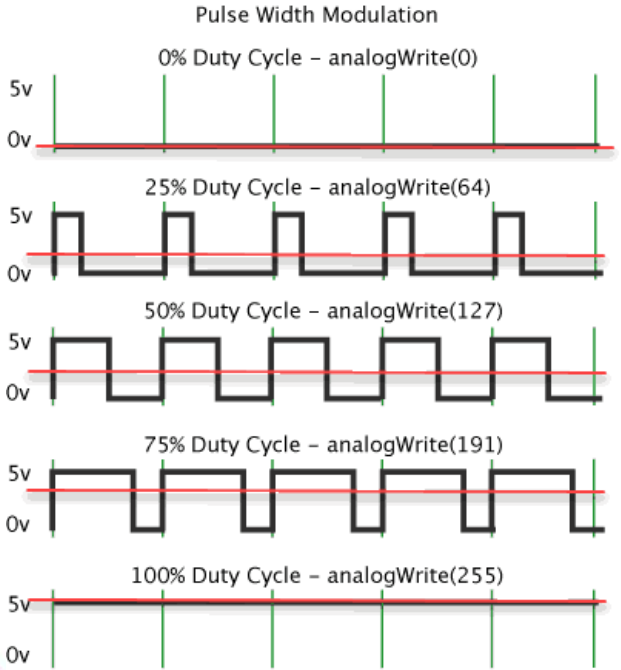
PATA, LPT, PORTA, BORTB, LCD

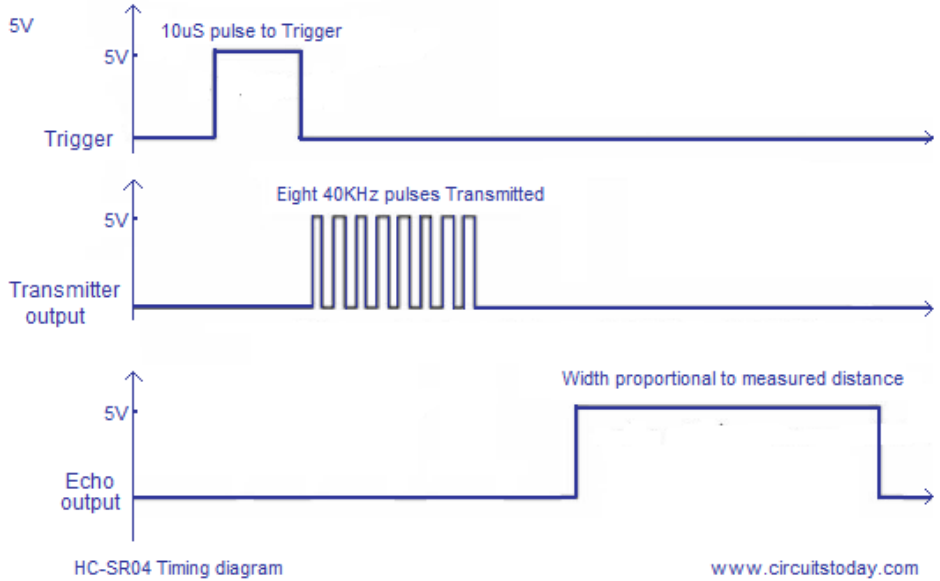


USB. SATA. I2C. SPI

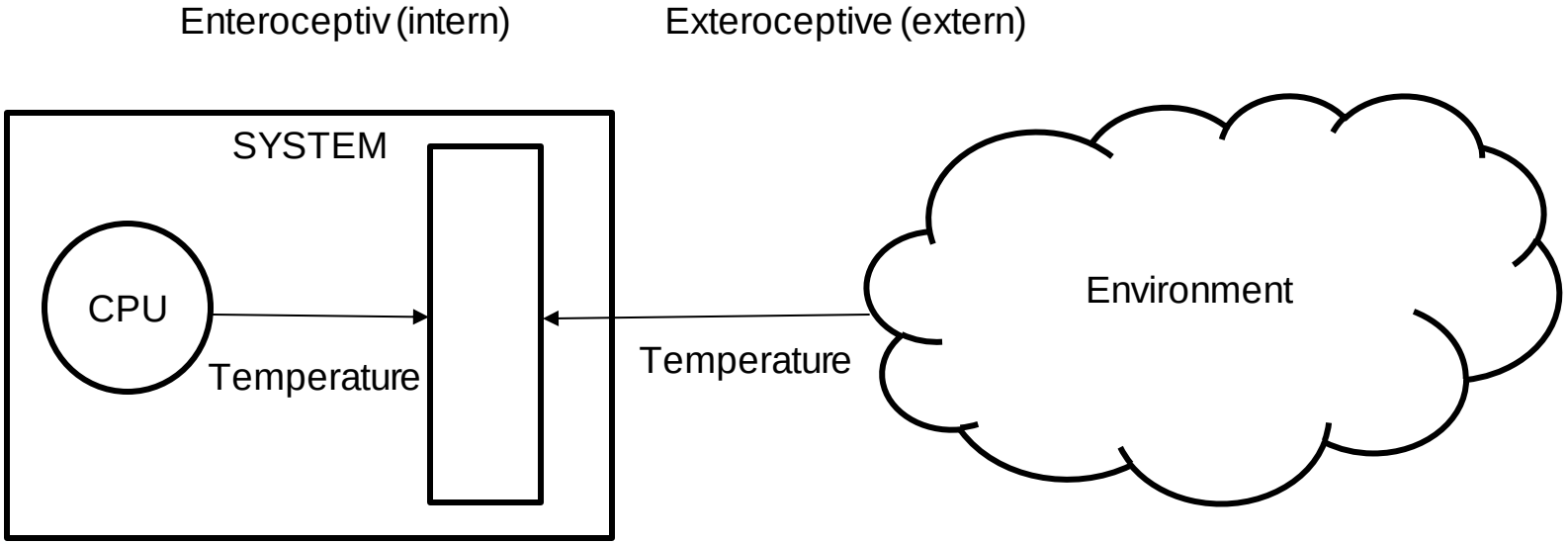


Clasificare Interfață - Temporizata

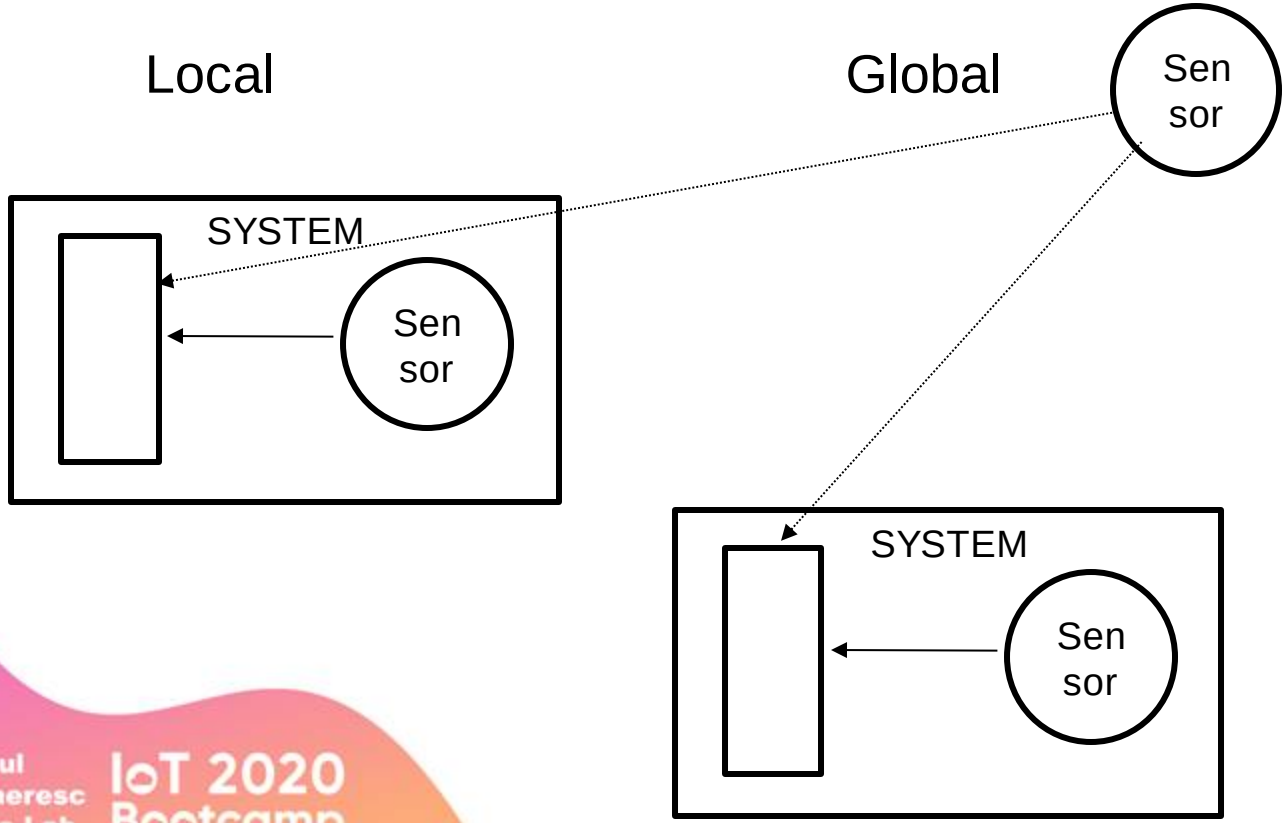




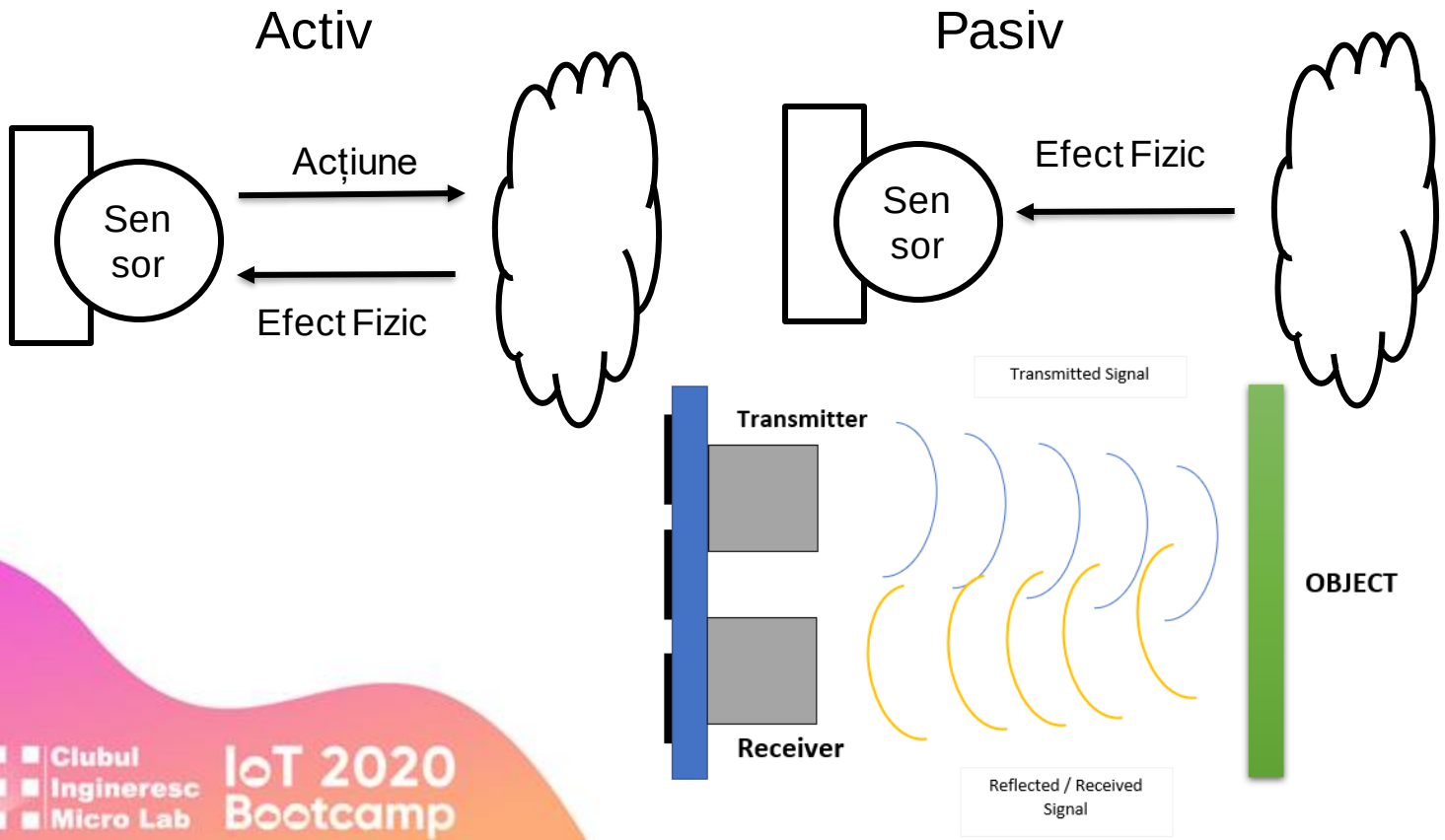
Clasificare - Sursa semnal



Clasificare - Poziționare



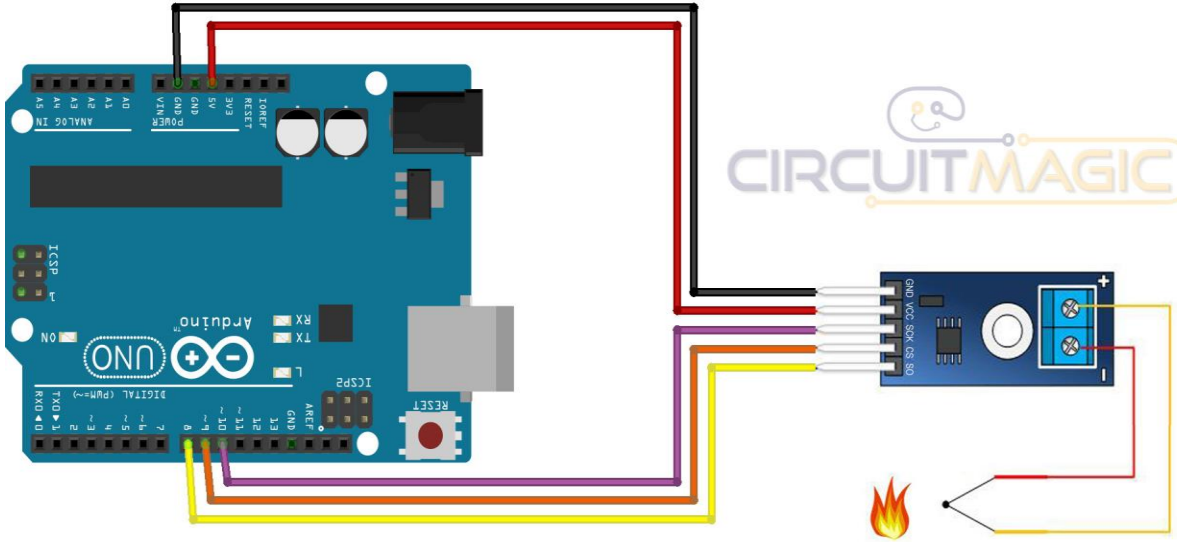
Clasificare - Acționare



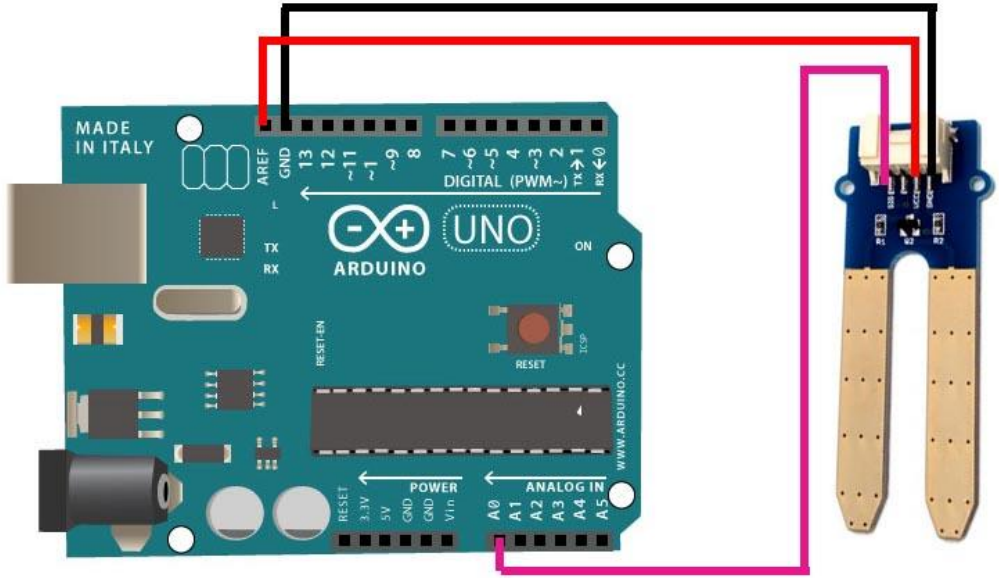
Clasificare - Acționare

	Local	Global
Internal	**Passive** battery sensor, chip-temperature sensor, shaft encoders, accelerometer, gyroscope, inclinometer, compass **Active** –	**Passive** – **Active** –
External	**Passive** on-board camera **Active** sonar sensor, infrared distance sensor, laser scanner	**Passive** overhead camera, satellite GPS **Active** sonar (or other) global positioning system

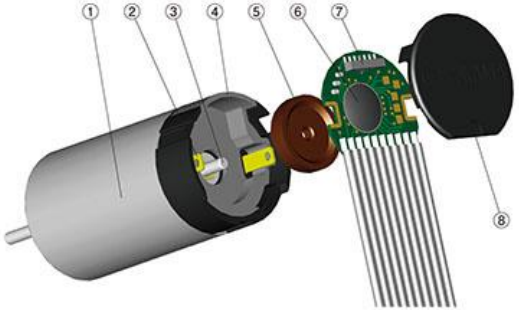
Achiziție - Temperatura

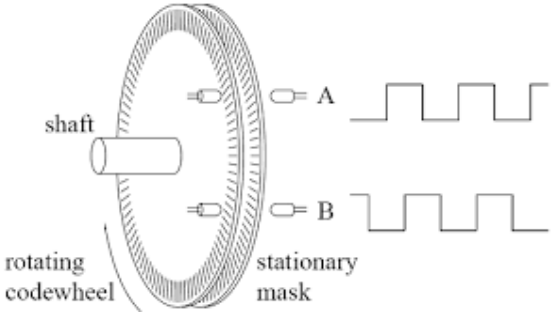


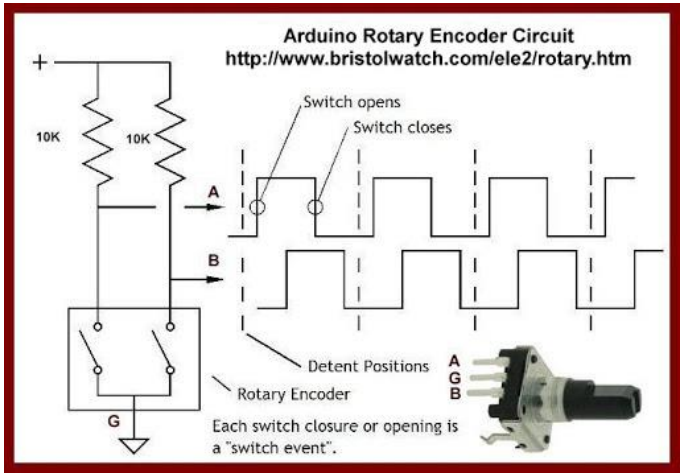
Achiziție - Umiditate



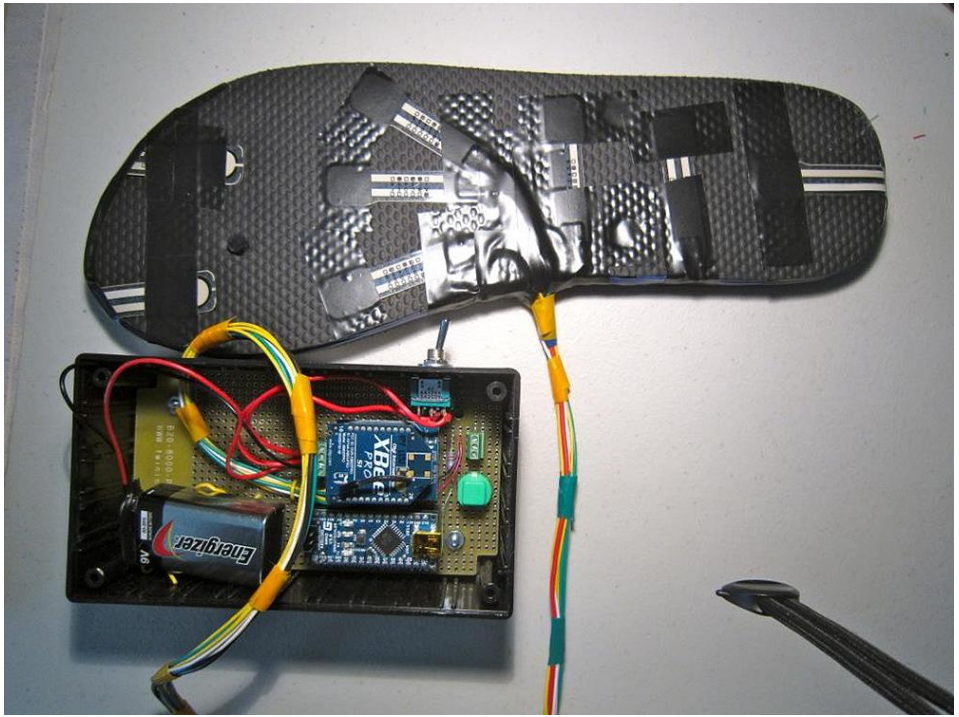
Achiziție - Rotații



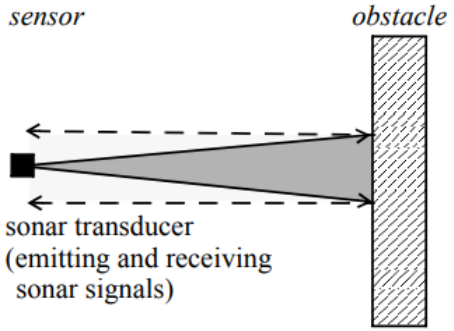


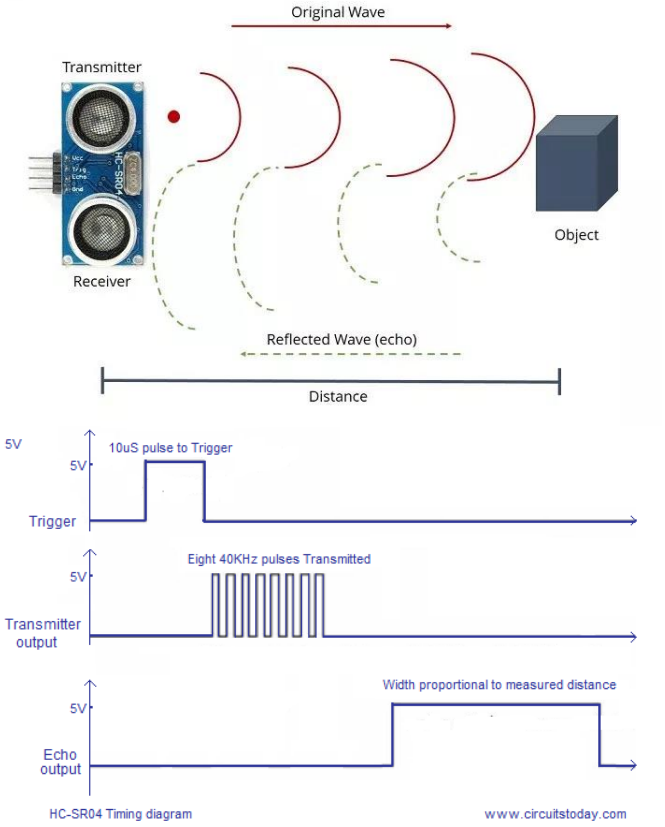


Achiziție - Presiune

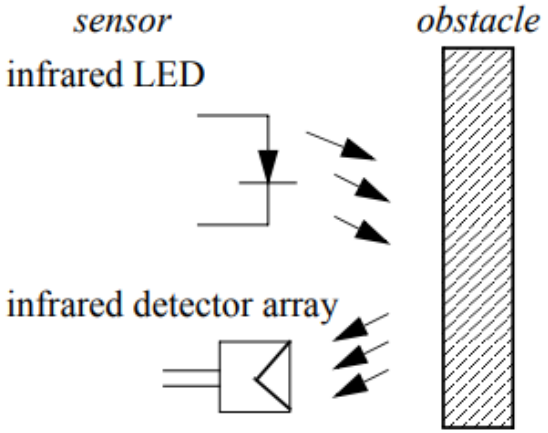


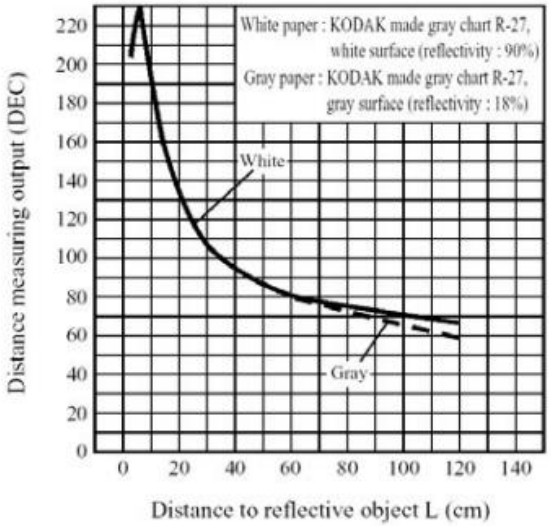
Achiziție - Ultrasonic Distance



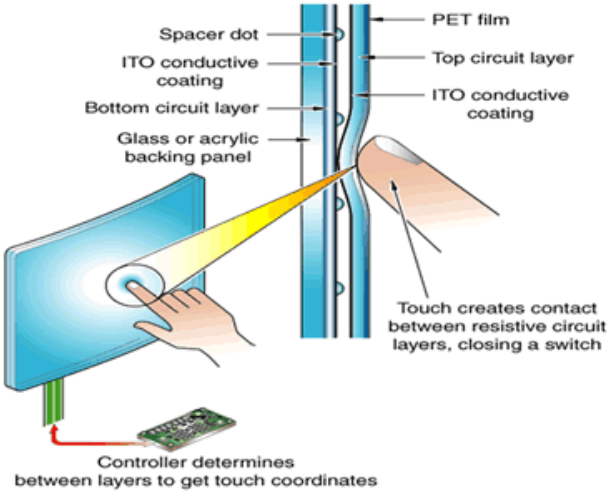


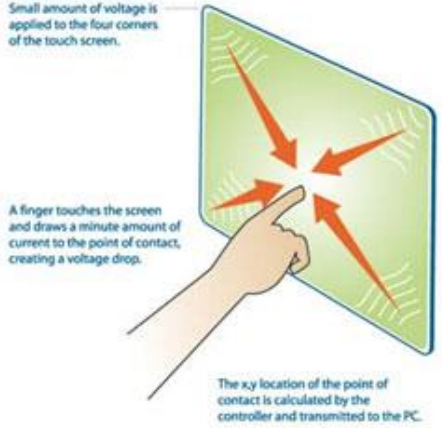
Achiziție - Laser distance

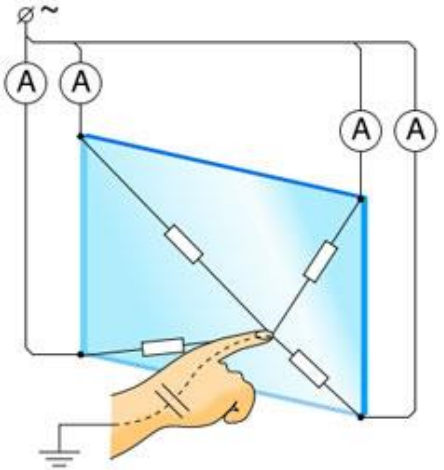




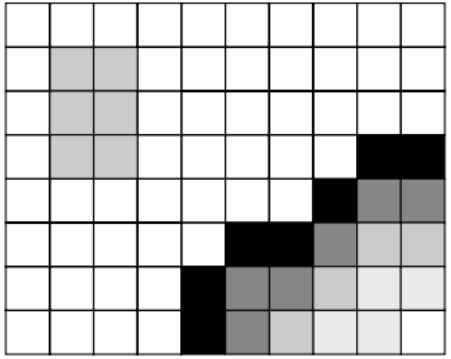
Rezistive touch sensor

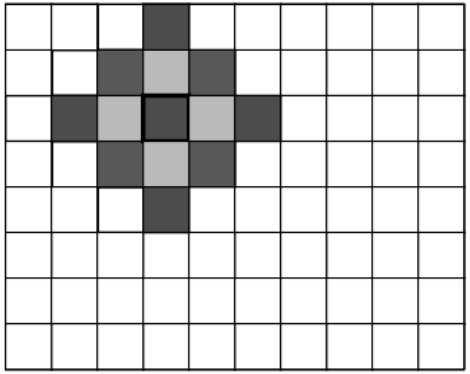




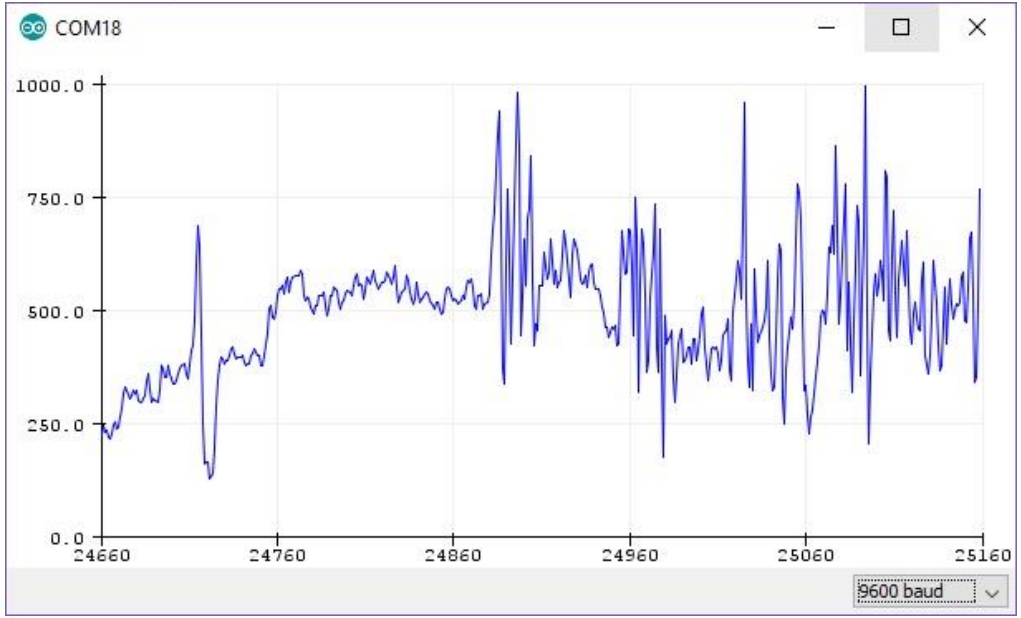


Detecție Mișcare





Achiziție Semnal



AnalogInOutSerial | Arduino 1.8.12 (Windows Store 1.8.33.0)

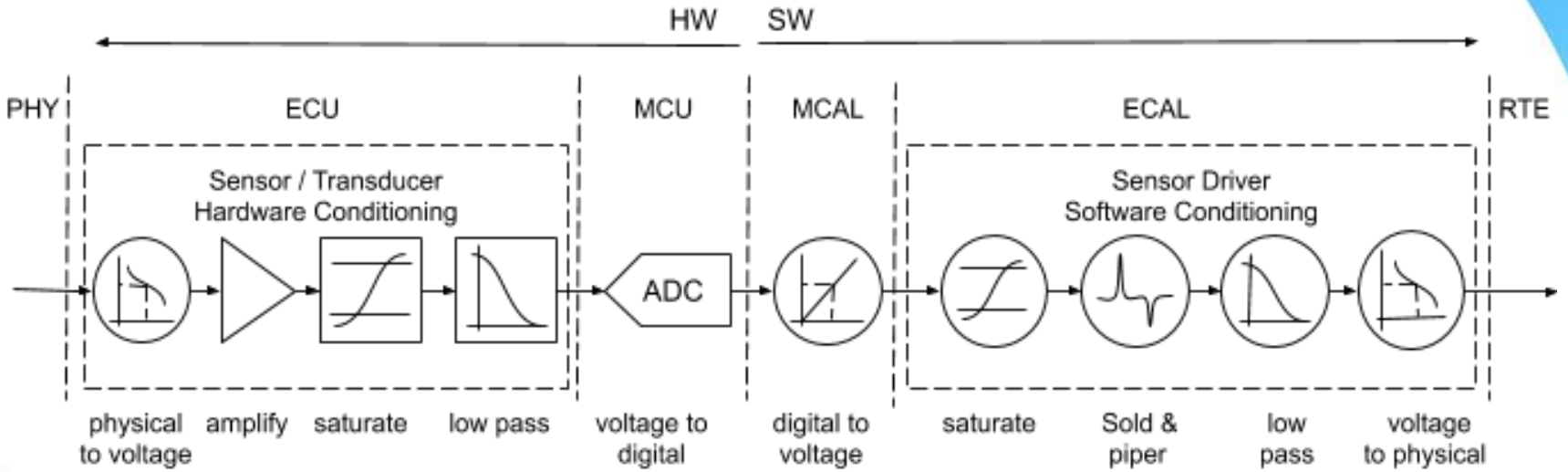
File Edit Sketch Tools Help

AnalogInOutSerial

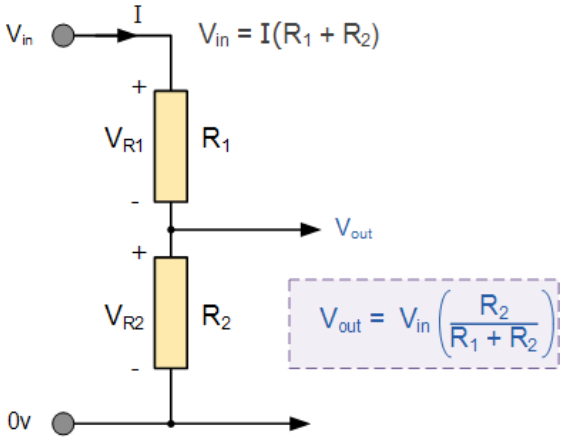
```
void setup() {
  // initialize serial communications at 9600 bps:
  Serial.begin(9600);
}

void loop() {
  // read the analog in value:
  sensorValue = analogRead(analogInPin);
  // map it to the range of the analog out:
  outputValue = map(sensorValue, 0, 1023, 0, 255);
  // change the analog out value:
  analogWrite(analogOutPin, outputValue);

  // print the results to the Serial Monitor:
  Serial.print("sensor = ");
  Serial.print(sensorValue);
  Serial.print("\t output = ");
  Serial.println(outputValue);

  // wait 2 milliseconds before the next loop for the anal
  // converter to settle after the last reading:
  delay(2);
}
```

1 Arduino Uno on COM5

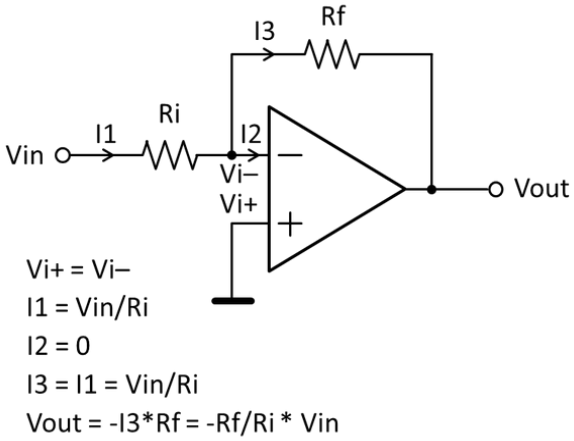
Achiziție Semnal



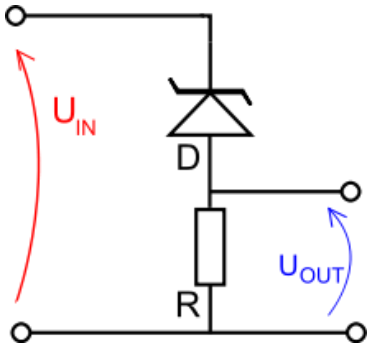
Condiționare HW - Amplificare/Atenuare/Saturare



Atenuare (împărțire)

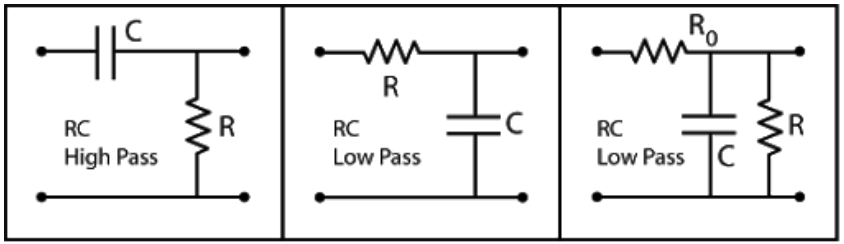


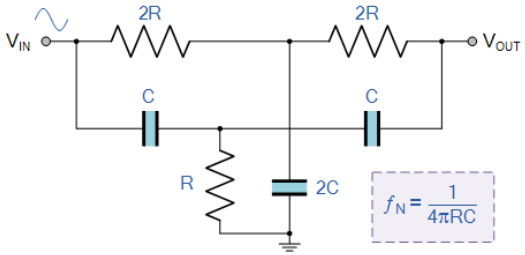
Amplificare (înmulțire)

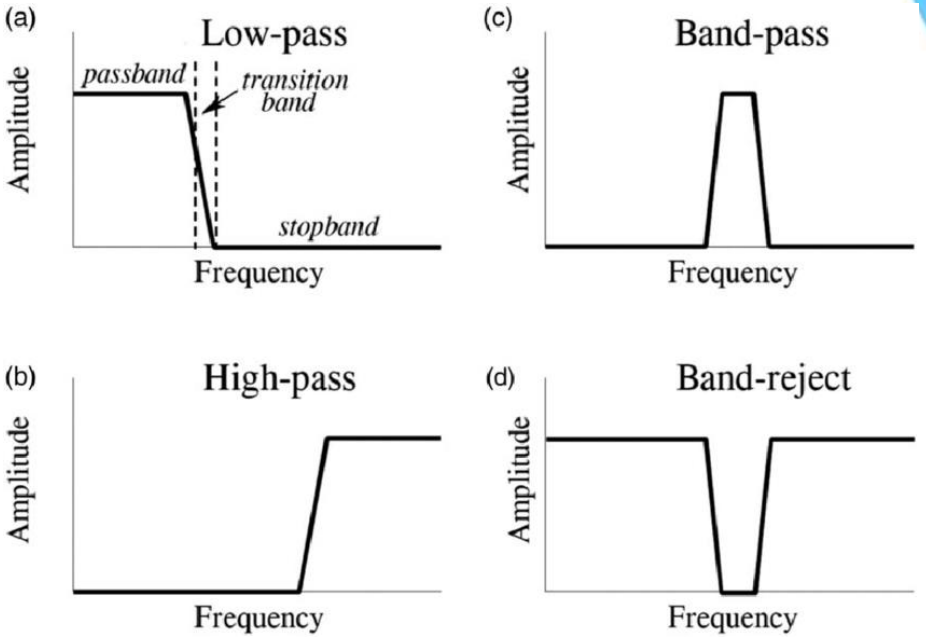


Saturare (taiere)

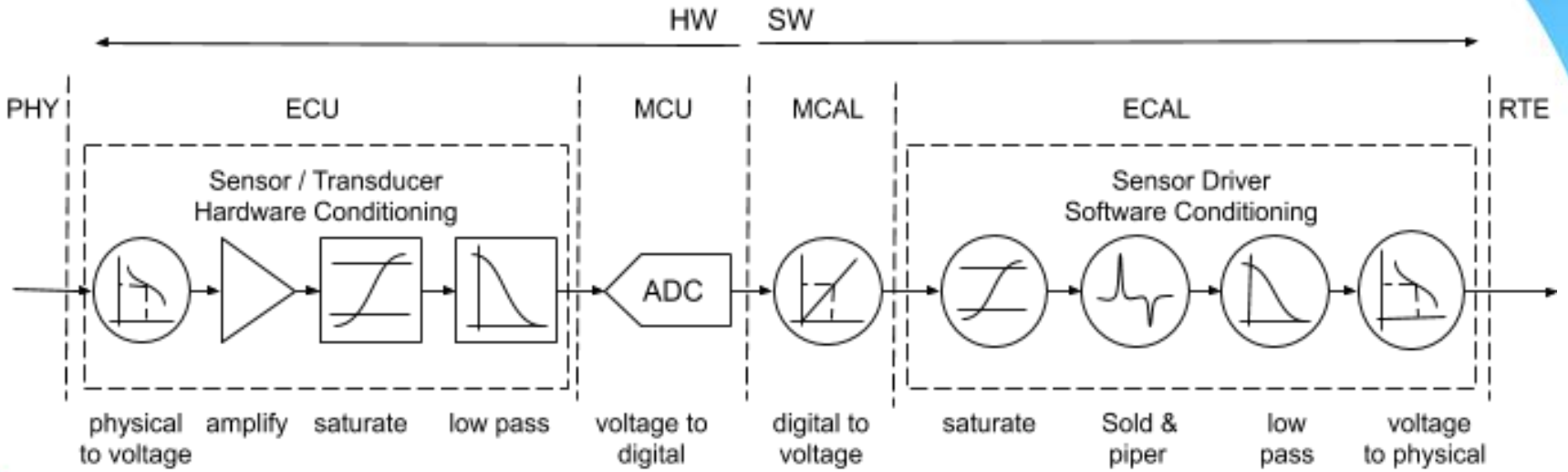
Condiționare Hardware - Filtrare



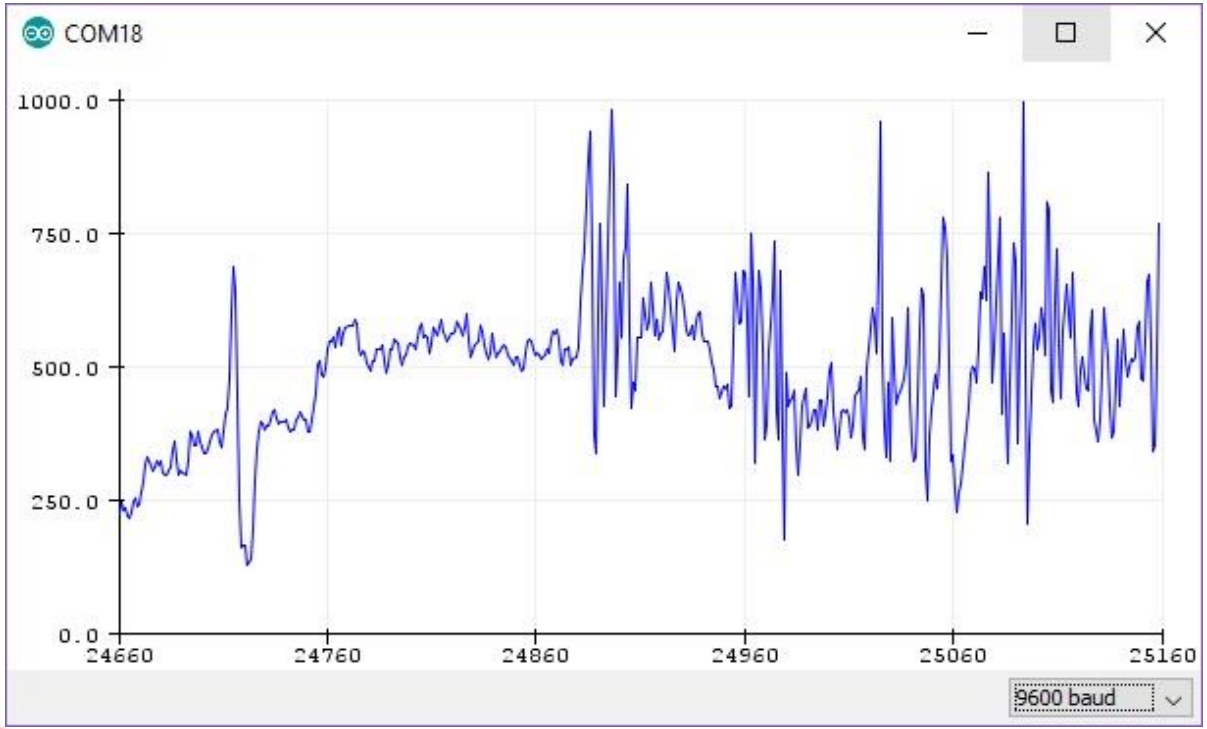




Achiziție Semnal

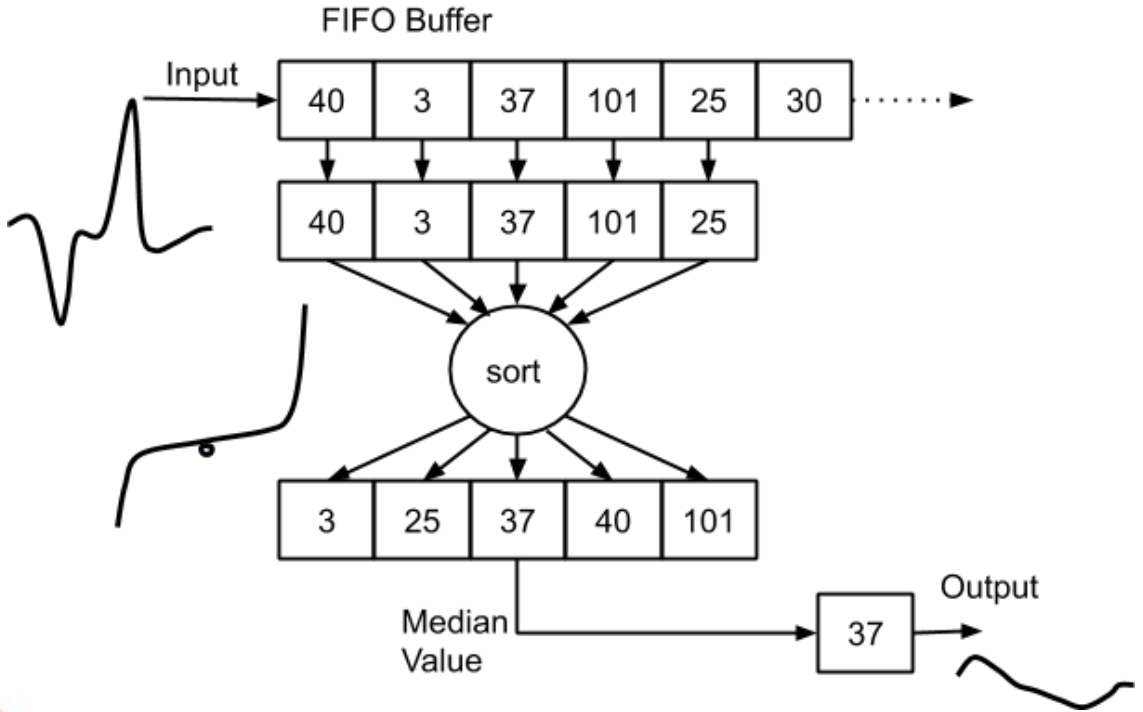


Achiziție Semnal



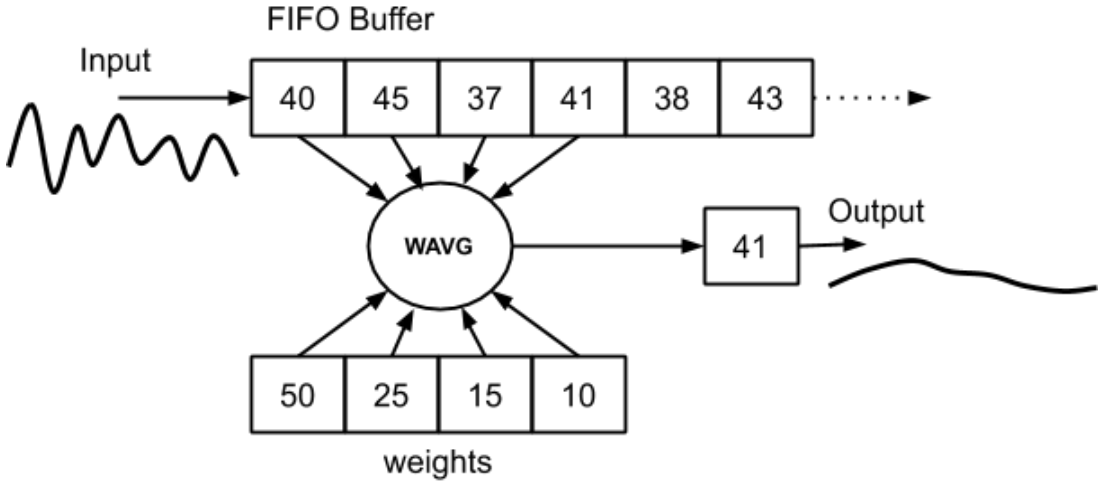
Condiționare SW - Sare si piper

- Statistic
- Median
- Sare si piper
- Impulsionar



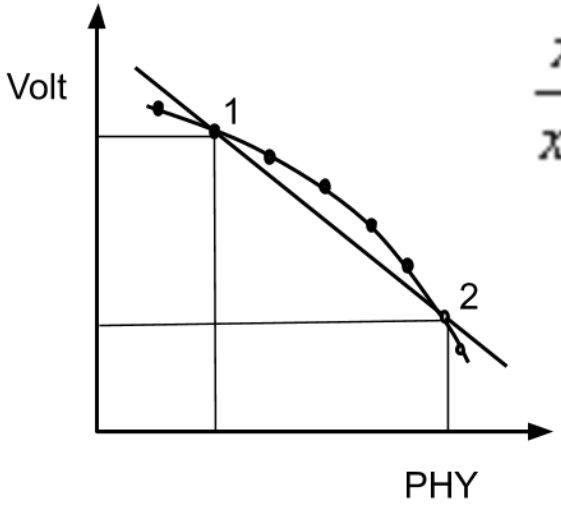
Condiționare SW – Mediere ponderat

- Trece jos
- Netezire
- Zgomot alb
- Gausian
- Mediere

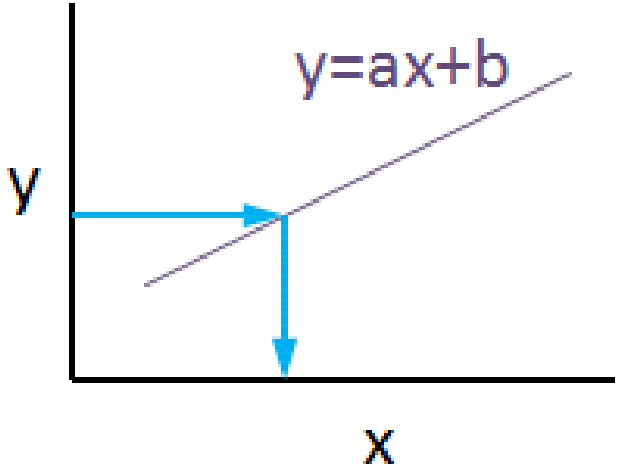


$$M(X) = \frac{x_1 n_1 + x_2 n_2 + \ldots + n_k a_k}{n_1 + n_2 + \ldots + n_k} = \frac{\sum_{i=1}^{k} x_i n_i}{\sum_{i=1}^{k} n_i}$$

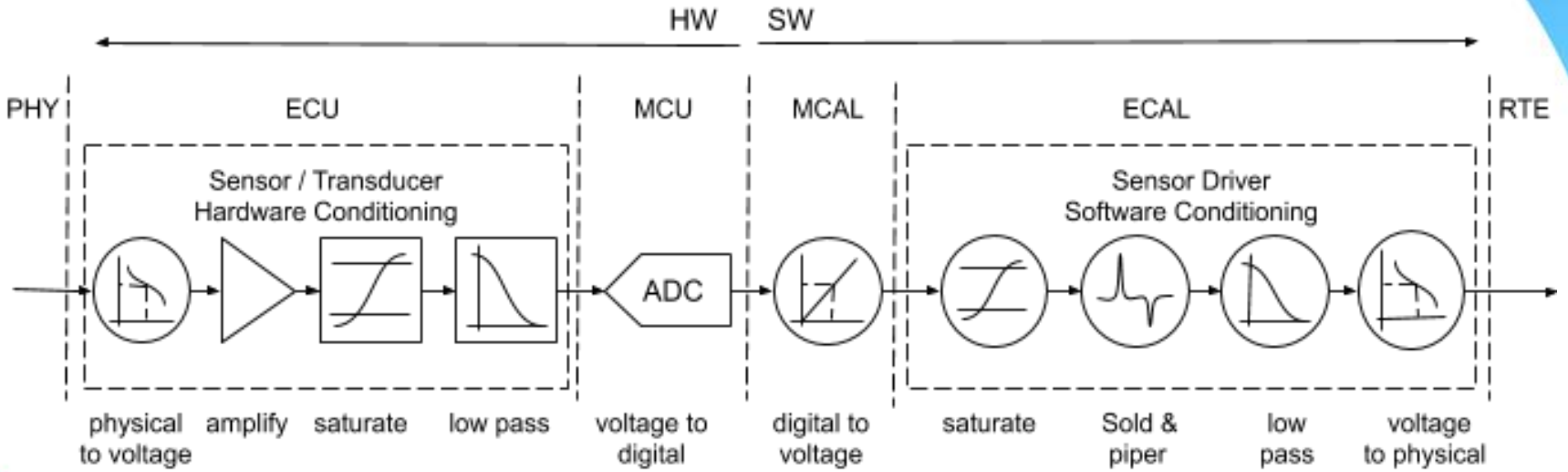
Condiționare SW – Conversie (ne)lineara



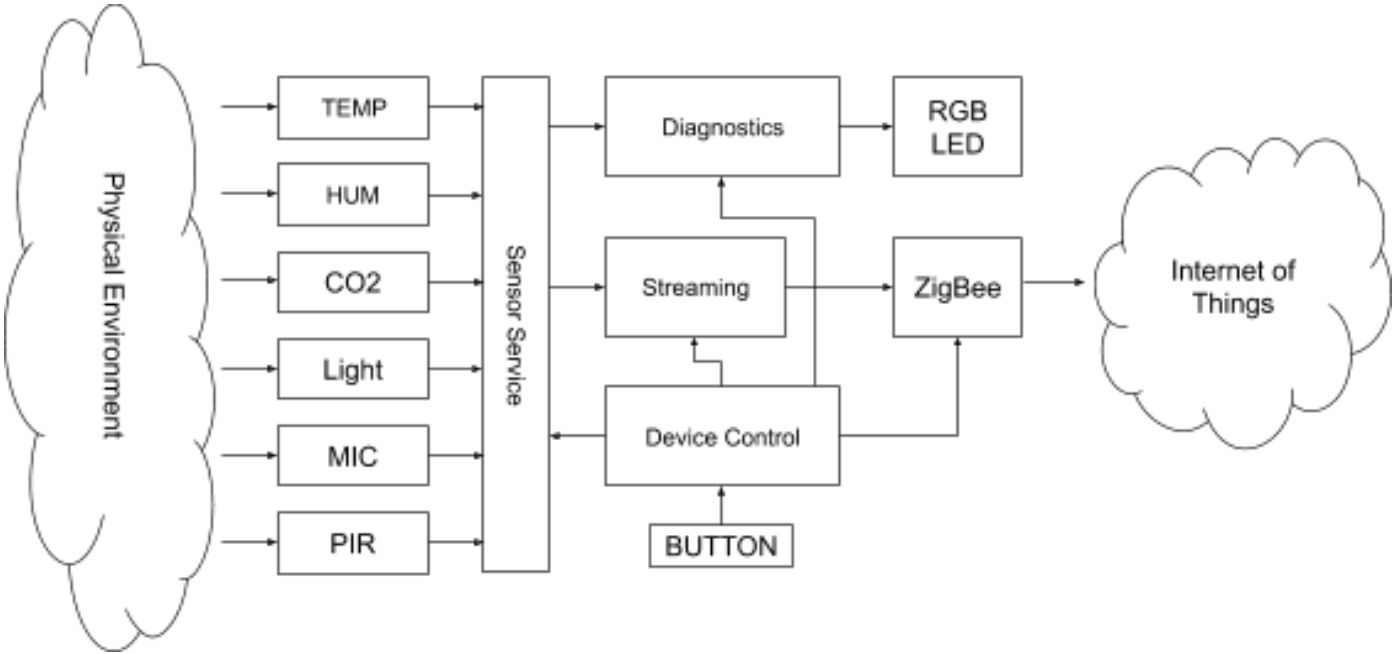
$$\frac{x - x_1}{x_2 - x_1} = \frac{y - y_1}{y_2 - y_1}$$



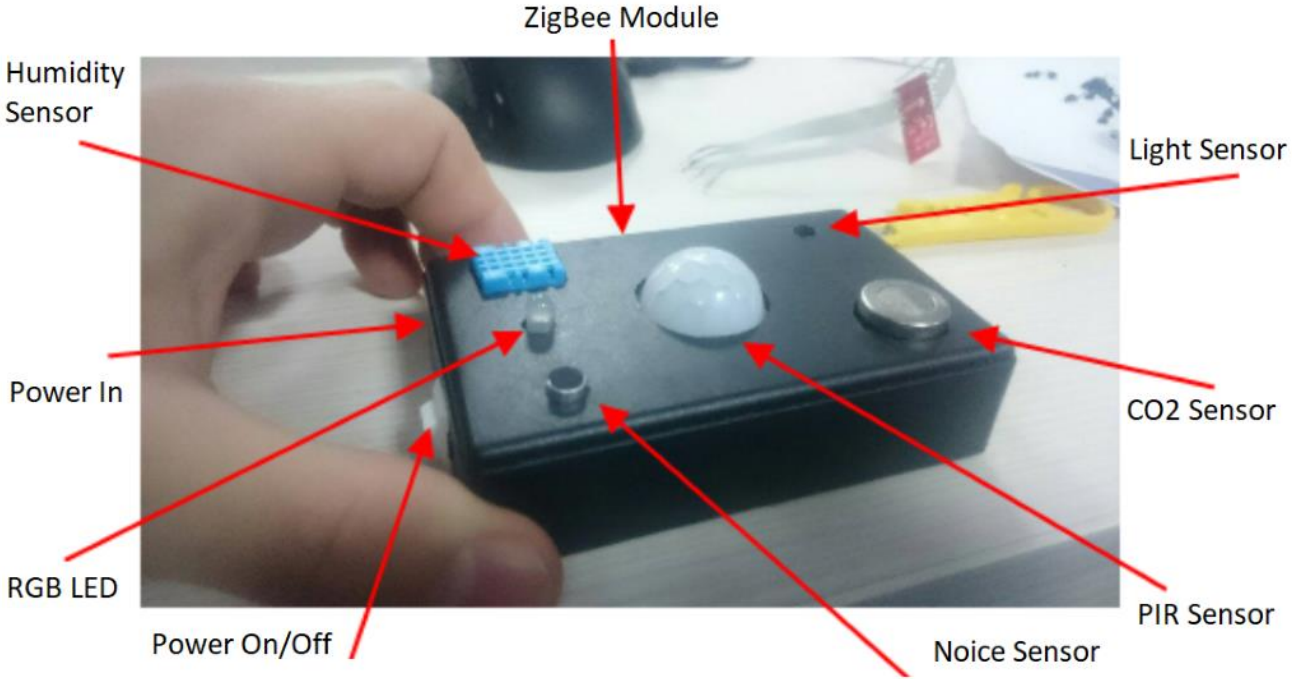
Achiziție Semnal



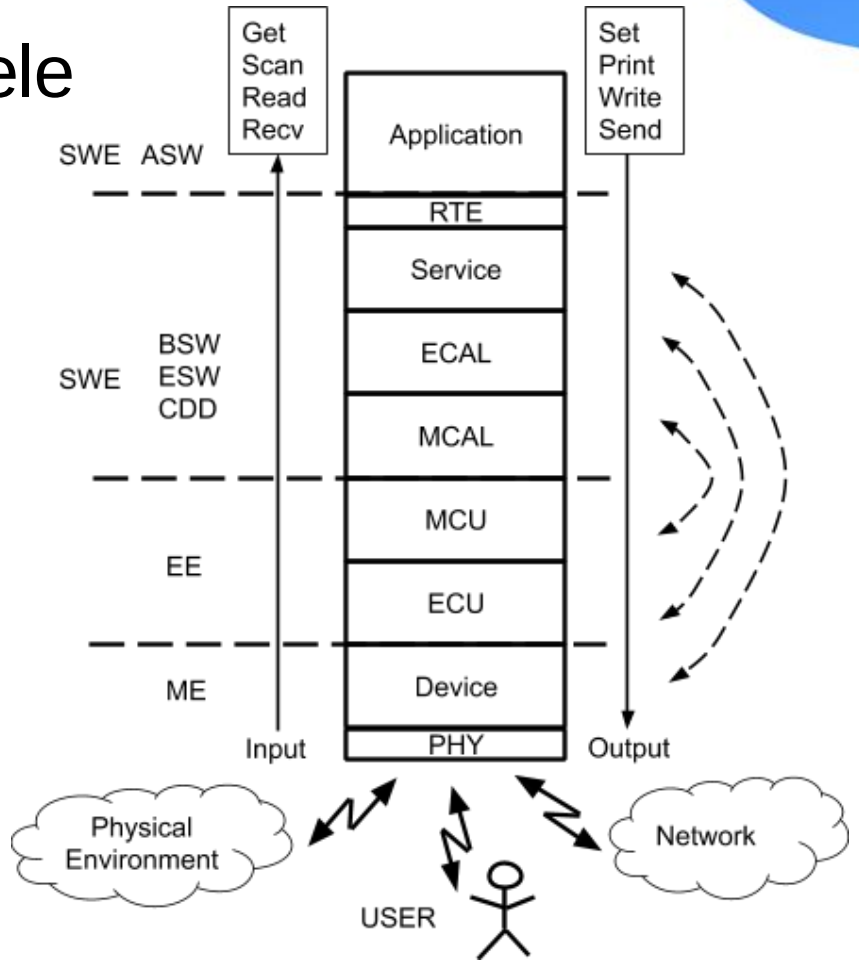
Achiziție Semnal



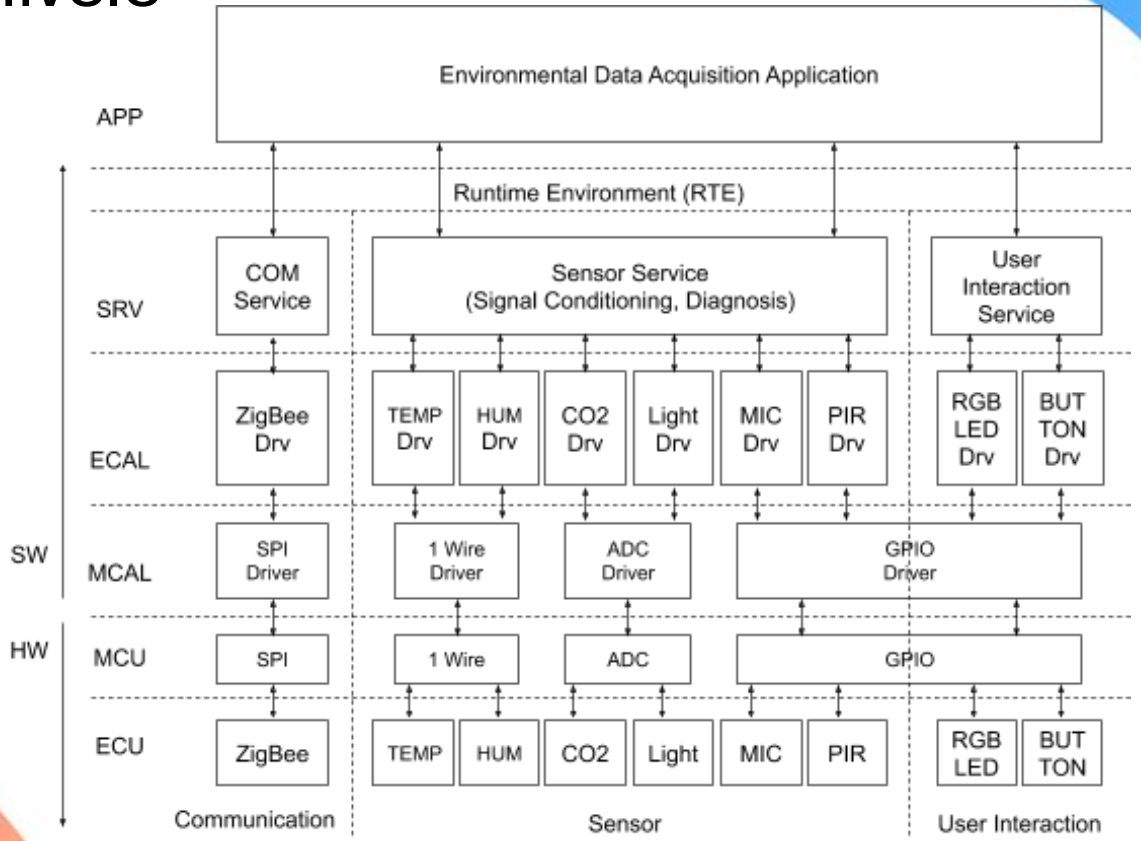
Achiziție Semnal



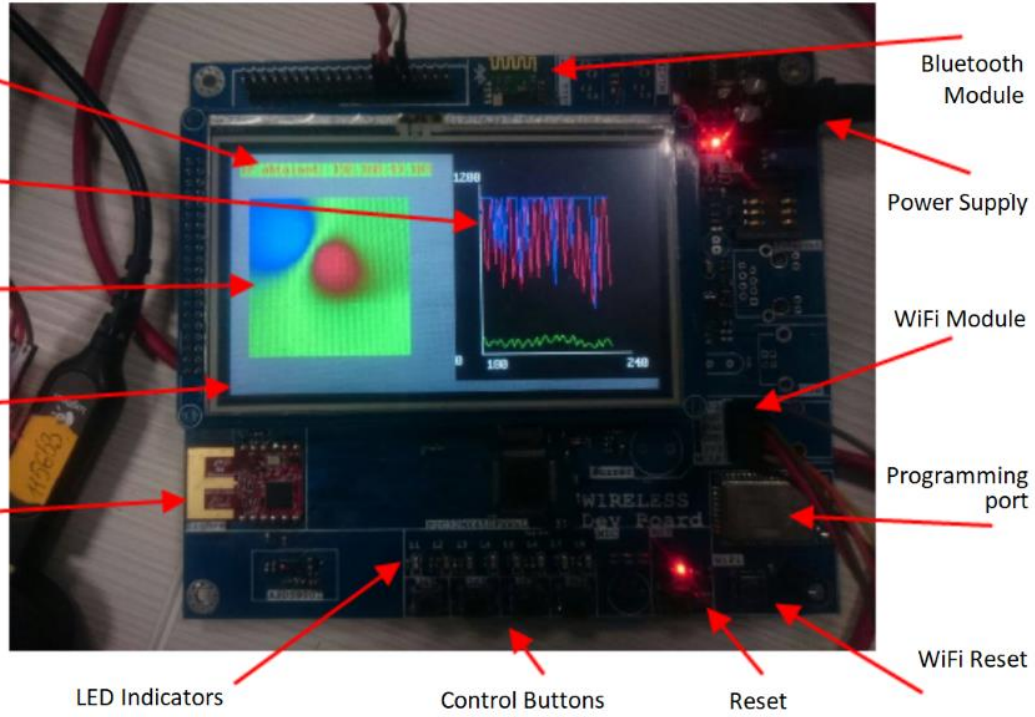
Arhitectura pe nivele



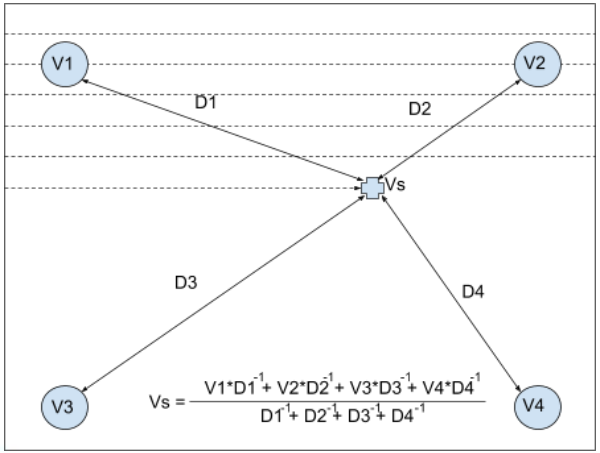
Arhitectura pe nivele

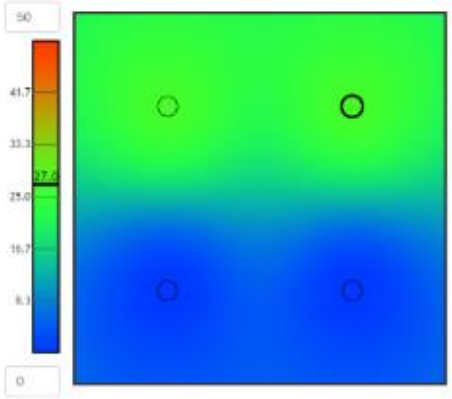


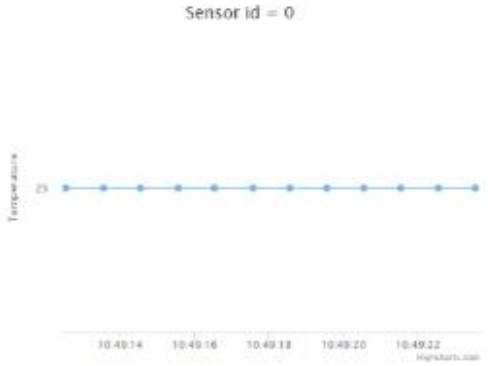
Achiziție Semnal



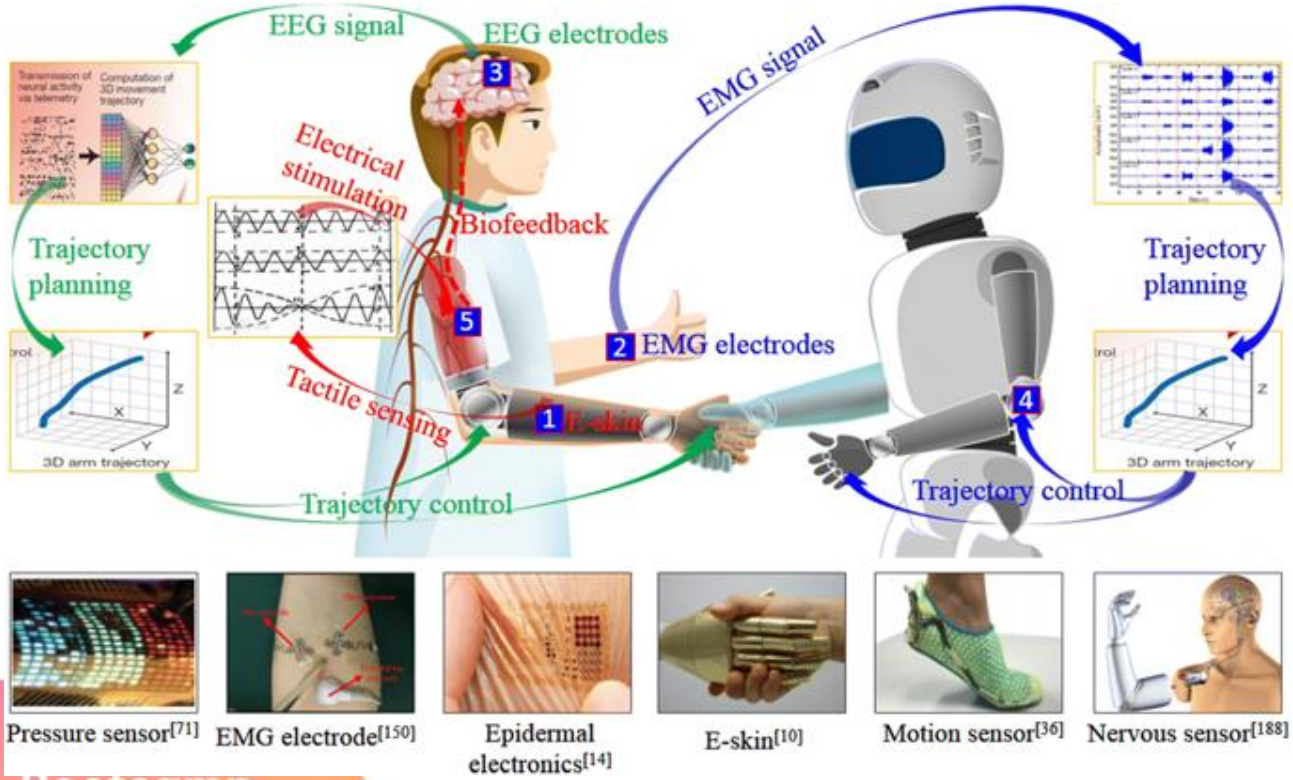
Senzori Virtuali







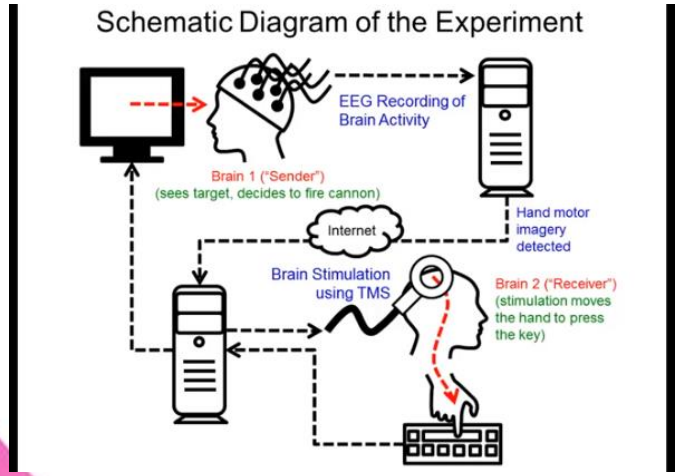
EMG Human Machine Interface



EEG – Human Machine Interface

Researchers create first ever human-to-human interface, use it to play a game

https://www.youtube.com/watch?v=rNRDc714W5I



https://www.slashgear.com/researchers-create-first-ever-human-to-human-interface-use-it-to-play-a-game-27295122/

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