An Application of Bluetooth Technology

Akash Kalimili

Bluetooth

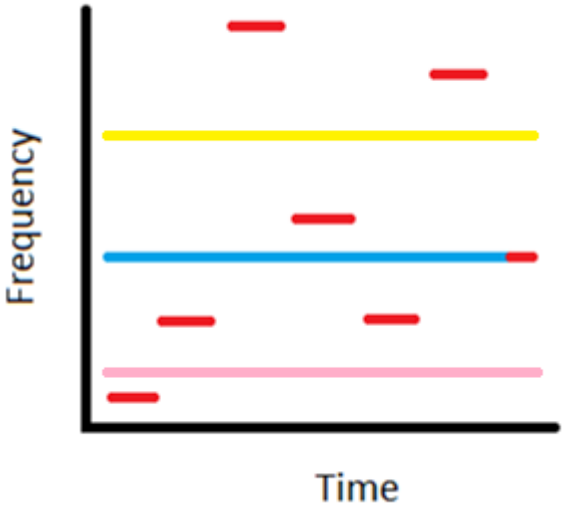
- Wireless Standard
  - Data exchange over short distance
- Data transmission through low-power radio waves
  - 2.402 GHz to 2.480 GHz
- Master/Slave Model

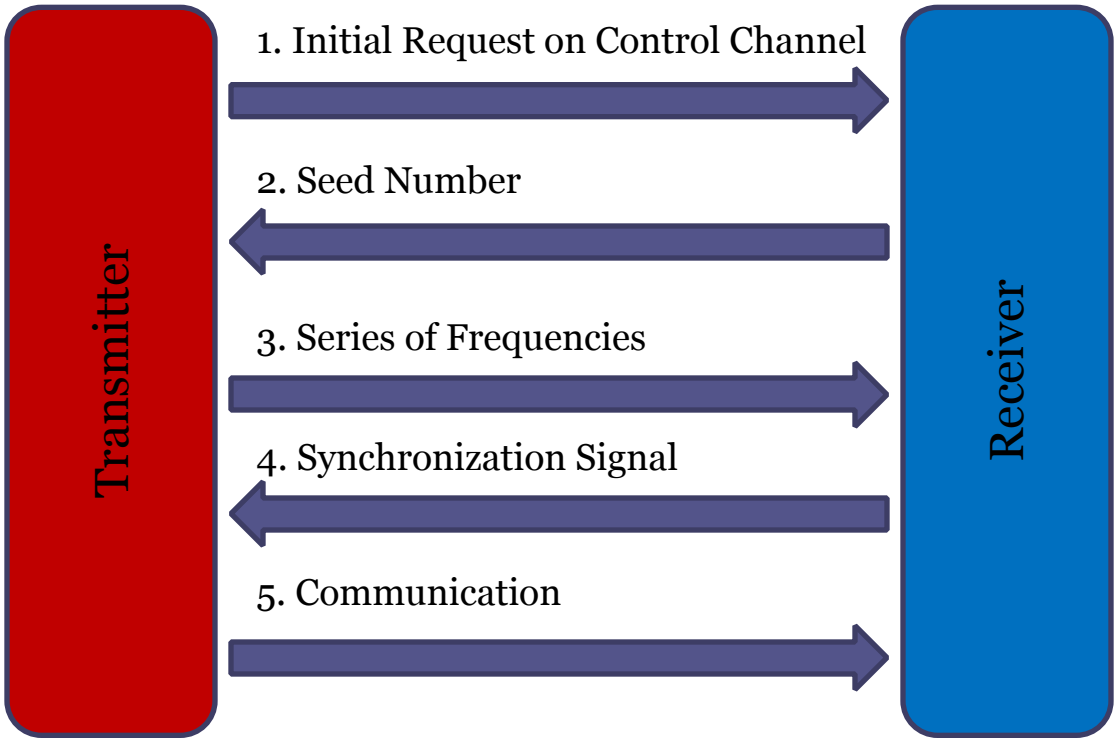
Transmitter

Receiver

Frequency Hopping

- Avoiding Interference
- 1600 hops/sec



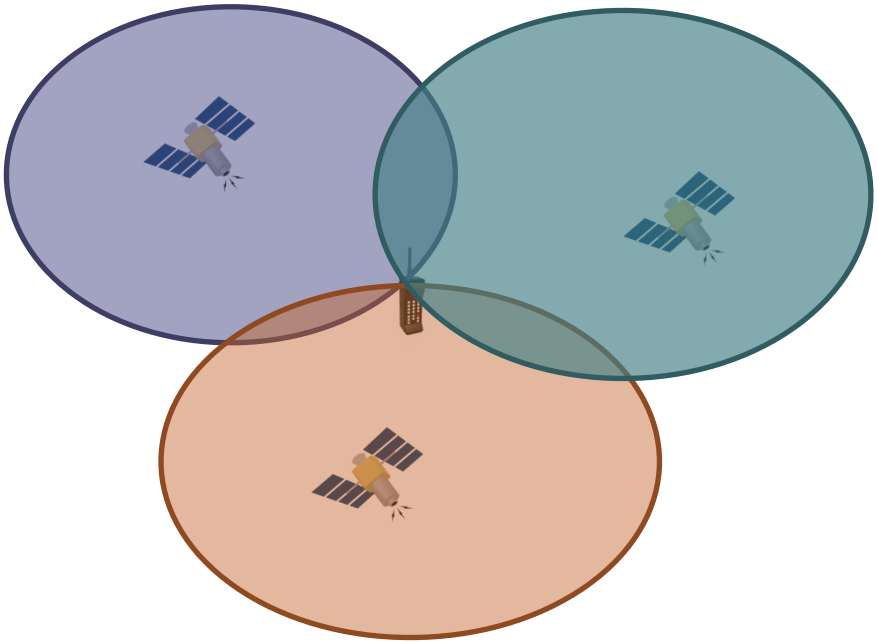


Inertial Navigational System

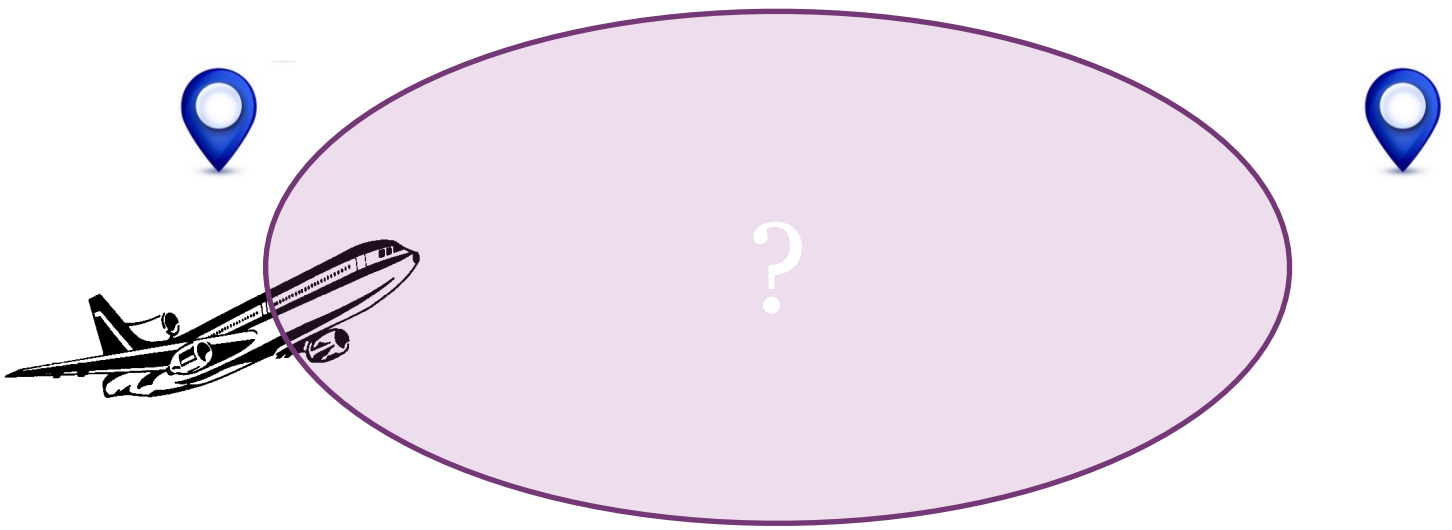
- Self-Navigation Technique
- Sensors
  - Accelerometers
  - Gyroscopes
- Computes Position and Velocity

Background

- GPS
  - Invented in the 1900's
  - Satellite based Navigation System
  - Trilateration

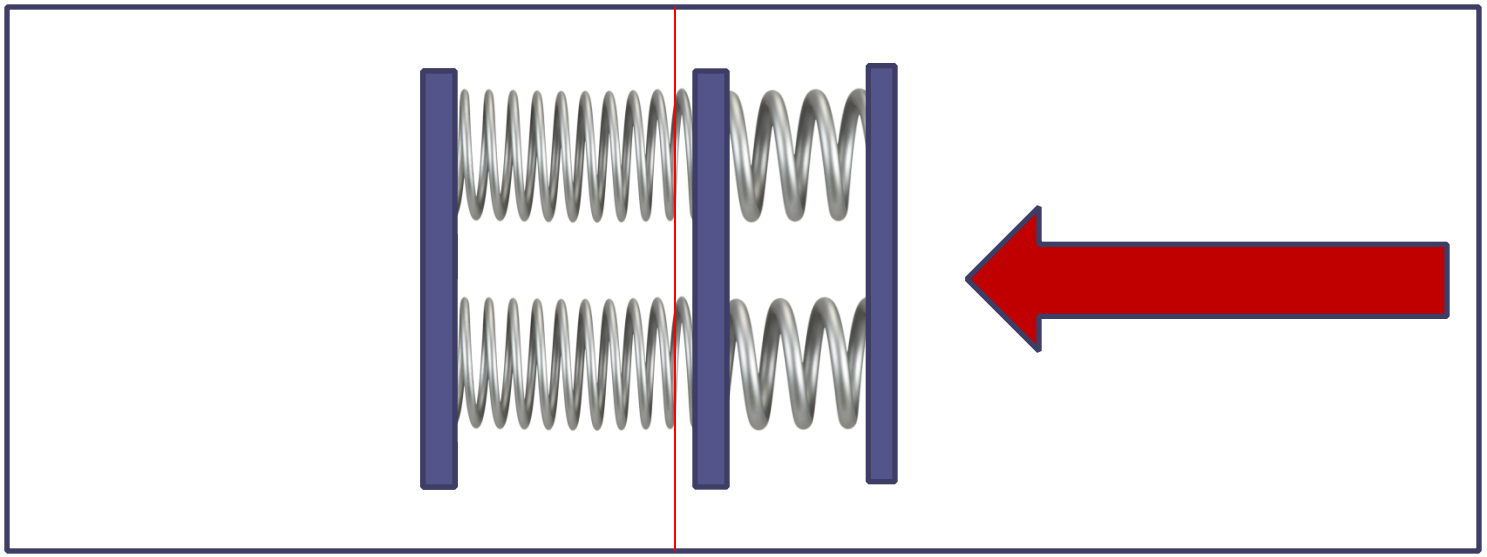


Background Cont.

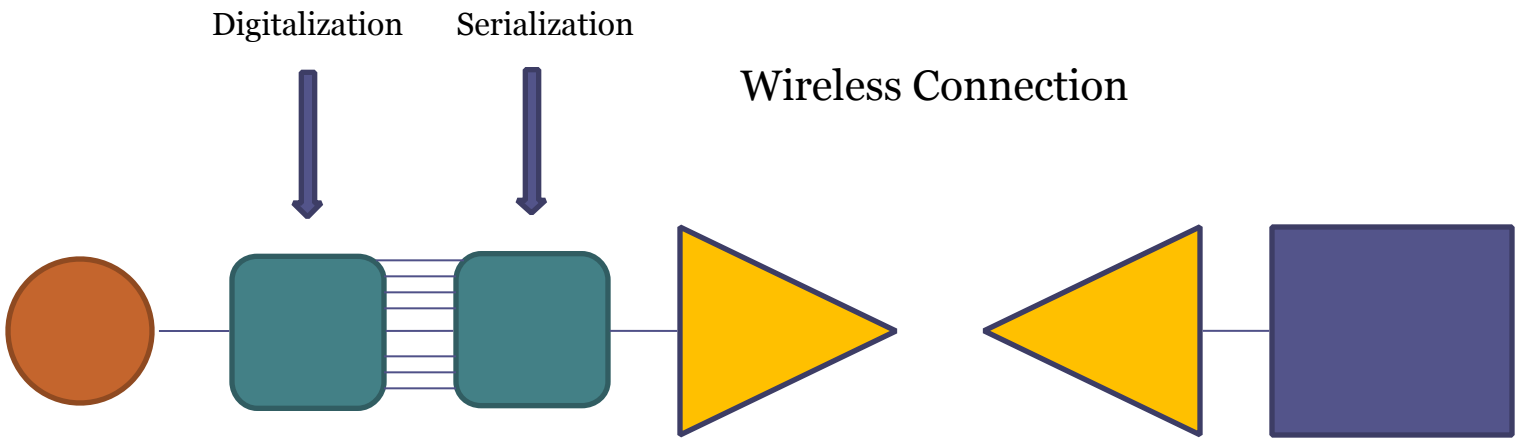


Accelerometer

- Analog Signal Output
- Capacitive Accelerometer
  - Acceleration causes change in capacitance

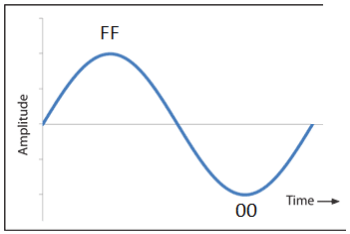


Block Diagram



Algorithm

$$\int_a^b f(x)\,dx \approx (b-a)\left[\frac{f(a)+f(b)}{2}\right].$$

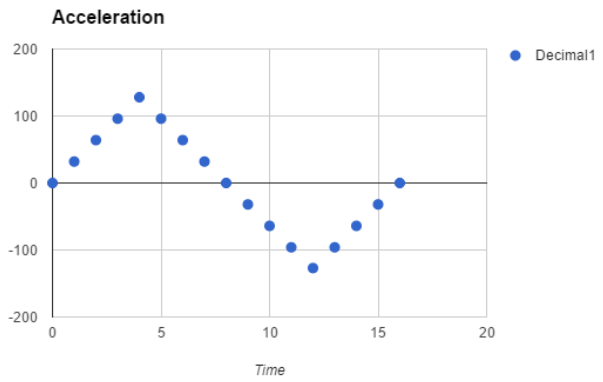


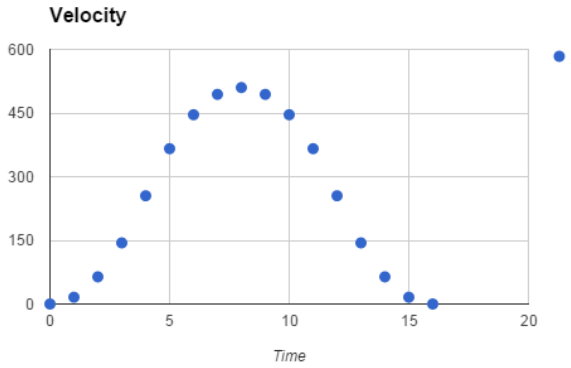
Register A - 7F = Register B

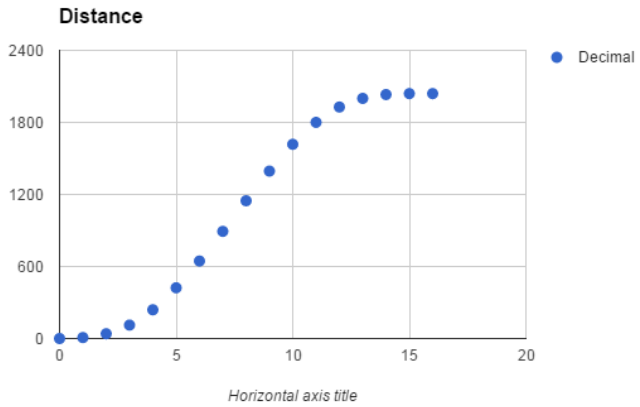
Register B_f = Register B_0 + Register B

Register C = Register B_f x ΔT

Sample Data with Algorithm Calculation







Conclusion

- Gesture Recognition and Application
- Drone tracking w/o Satellite
- Person Tracking
- Data Measurement Applications
- Sensor Substitutions