**Indoor Human Tracking system**

The current GPS signal structure and signal power levels are barely sufficient for indoor applications. Indoor positioning is impossible with traditional GPS receivers. A tactical-grade IMU is used to provide accurate heading information.

**Objective:**

The objective of this project is to track a person inside a concrete building where traditional GPS systems fail miserably.

**Hardware used:**

1. **IMU (Inertial Measurement Unit)** works by detecting linear acceleration using one or more accelerometers and rotational rate using one or more gyroscopes. It also includes magnetometer which is used for heading reference.
2. **Accelerometer** is used to record 3 translational degrees of freedom (x,y,z coordinates).
3. **Gyroscope** is used to record 3 rotational degrees of freedom.

**Algorithms used:**

1. **Noise removal algorithm** to remove the noise produced from sensors while recording.
2. **Numerical Analysis (Simpson’s rule)** to find the position of human from acceleration recorded by accelerometers and gyroscopes.
3. **Curve fitting (N-R method)** to smoothen the gait produced by plotting the coordinates in 3D system.
4. **Artificial Intelligence Neural Networks** to track a walking human.

**Applications:**

1. To rescue people in a building at the time of fire breakdown.
2. To track a person climbing a hill or a mountain.