





Design Brief

Our team aims to create an alarming system for the care givers of the wheelchair users. It detects and records fall-down accidents of the wheelchair that may be risky for the users during outdoor activities, which enables their care givers to receive the notification and location, thus react to the situation in time.

Functions	Sensors/Input	Pros	Cons
Location detection	GPS	<ul style="list-style-type: none">- High speed, high sensitivity- Low energy consumption- Built-in data logging ability	<ul style="list-style-type: none">- High cost (around 40 Euros)
Fall down detection	IMU	<ul style="list-style-type: none">- A fusion of accelerometer, magnetometer and gyroscope- High speed ARM Cortex-M0 based processor	<ul style="list-style-type: none">- High cost (around 30 Euros)
	SparkFun triple axis accelerometer	<ul style="list-style-type: none">- Low-power- high-g accelerometer- I2C and SPI interface options- Shock and collision detection- Impact recognition and logging	
	MPU-6050 3-axis gyro and accelerometer	<ul style="list-style-type: none">- Cheap- I2C output- Accelerometer and gyroscope	
	vibration sensor	<ul style="list-style-type: none">- Large dynamic measuring range- Adjustable sensitivity- High sensitivity, even with strong shocks- Cheap	<ul style="list-style-type: none">- Also influenced by road condition
Actuate the device	General Force-Sensitive Resistor	<ul style="list-style-type: none">- Simple to use	

Functions	Actuators/Output	Pros	Cons
Inform device status	Buzzer	<ul style="list-style-type: none">- Cheap- Sound effect	
	LED	<ul style="list-style-type: none">- Cheap- Visual effect	
Record accidents	Camera	<ul style="list-style-type: none">- Easy to incorporate- Real-time supervising	<ul style="list-style-type: none">- Expensive- Power consuming- Data storage- Privacy issue
Sending messages	Arduino + Telefonica GSM/GPRS Shield	<ul style="list-style-type: none">- Easy to program	<ul style="list-style-type: none">- Expensive- Bulky
	Android/ios Push notification	<ul style="list-style-type: none">- Cheap	<ul style="list-style-type: none">- Hard to program

