vibrasole

The insole that keeps you on your toes.

DESIGNED BY NIROSHAN AMARASIRIWARDENA

unintentional falls

LEADING CAUSE OF NON-FATAL INJURY

$20 billion

SPENT ON FALL RELATED INJURIES YEARLY

THE STATISTICS

SENIORS CITIZENS FALL EVERY YEAR

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Problems resulting from falls:

- **Forced into assisted living/nursing homes**
- **Expensive treatments**
- **Greater chance of complications**
- **Loss of confidence and comfort**

stochastic resonance (SR)

EXISTING RESEARCH

THE SOLUTION

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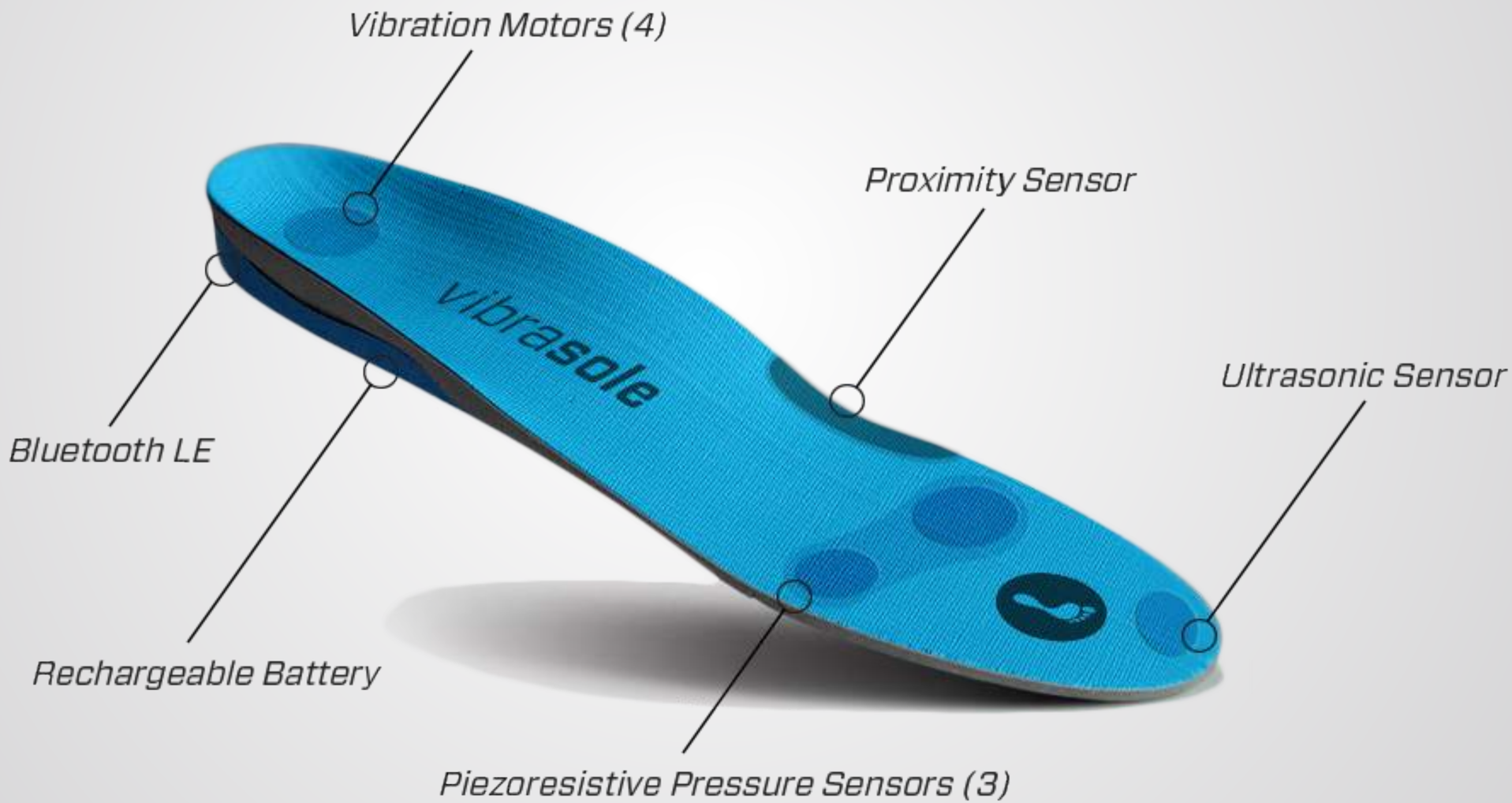

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EXISTING TECHNOLOGIES

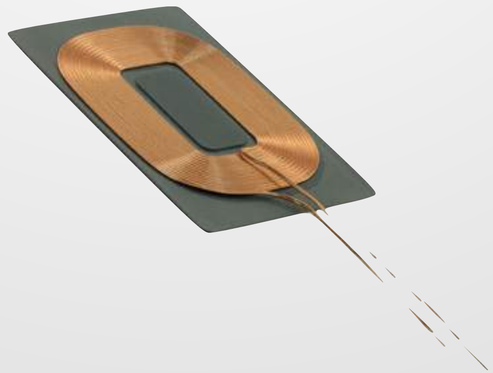
VIBRATION MOTOR

ULTRASONIC SENSOR

PROXIMITY SENSOR

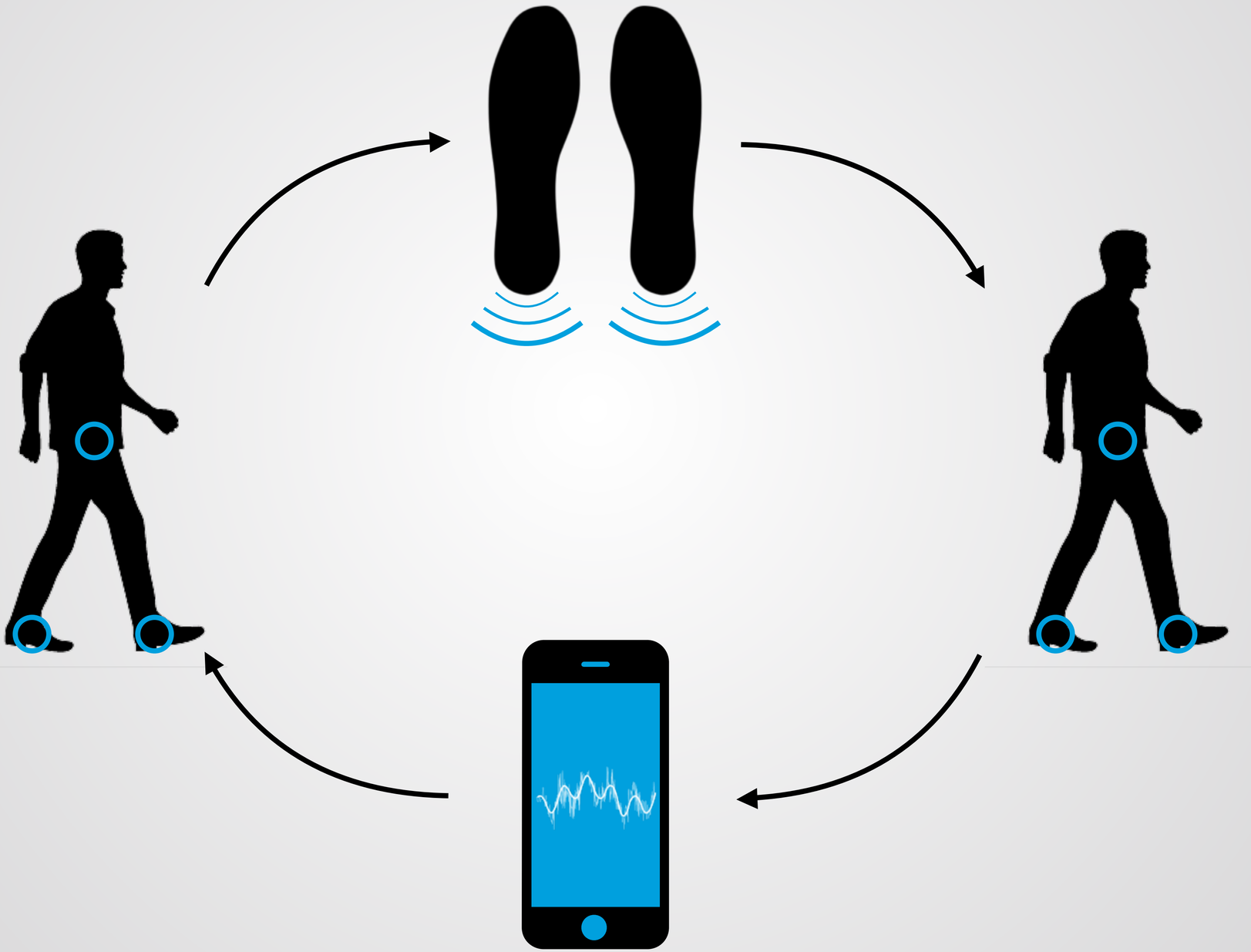
PIEZORESISTIVE PRESSURE SENSOR

INDUCTIVE CHARGING

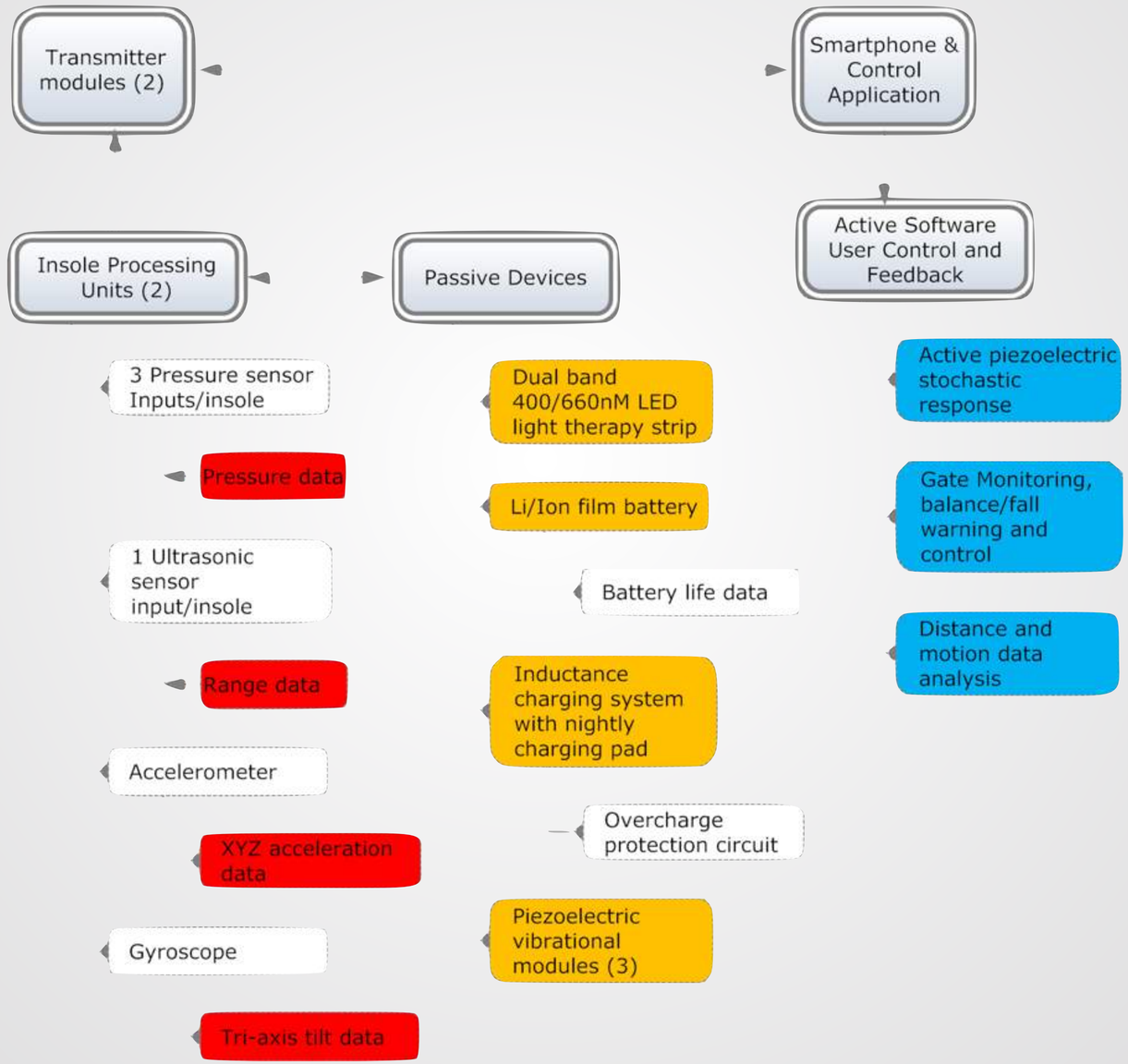


BLUETOOTH LE

SYSTEM SCHEMATIC



FEEDBACK SYSTEM



SENSOR PATTERNS

	Proximity Sensor	Pressure Sensor	Accelerometer	Gyroscope
Sitting	minimal	low	minimal	horizontal
Standing	minimal	heel - medium ball - medium pinky - medium toe - low	minimal	vertical
Laying Down	n/a	negligible	minimal	horizontal
Walking/ Running	varying	heel - medium ball - medium pinky - medium toe - low	minimal	vertical
Climbing Up	varying to higher degree	foot raise - vary foot pivot - vary	undulate/spike	vertical
Climbing Down	varying to higher degree	foot lower - vary foot pivot - vary	undulate/spike	vertical
Leaning Forwards	minimal	heel - medium ball - medium pinky - medium toe - high	minimal	angled
Leaning Backwards	minimal	heel - high ball - medium pinky - medium toe - mininmal	minimal	angled
Falling	n/a	transition max/negligible	spike	transition vertical/ horizontal

FEEDBACK

SUPPORTIVE FEEDBACK

- Balance/gait
- Standing/walking
- Low constant vibrations
- Directly correlate pressure → vibration

ATTENTIVE FEEDBACK

- Avoid obstacles
- Walking upstairs/downstairs
- Quick/pulsating vibrations
- Inversely correlate pressure → vibration

FEATURES

- **Improve & monitor balance and gait**
  - Vibrational motor support (through SR)
  - Proximity & pressure sensors
  - Ultrasonic sensors to avoid objects
  - Smartphone (accelerometer/gyroscope)

- **Low energy & easy to charge**
  - Connects through Bluetooth LE
  - Inductive charging

- **Pricing / IP**
  - $149
  - Interaction between sensors/smartphone/feedback

PROTOTYPE