Google

Project Tango

Indoor Localization and Mapping

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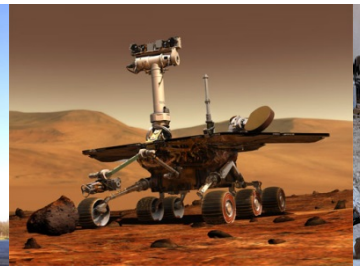
Project Tango Indoor Localization and Mapping

Motivation

- Humans and robots navigate **outdoors** using:
  - ✓(i) Global Positioning System (GPS)
  - ✓(ii) Maps (e.g., Google maps)

- Not available in (i) **buildings** (ii) **space**
- **GPS-denied navigation required for:**

Human Navigation

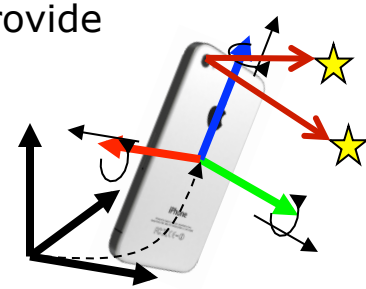


Planetary Exploration

First Responders

Technology:

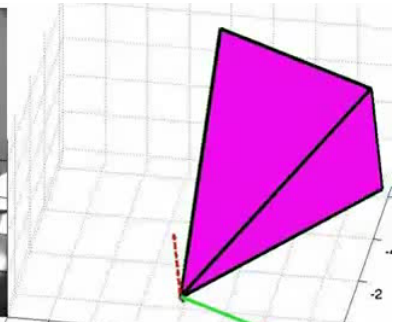
- **Vision-aided Inertial Navigation**
  - Inertial Measurements provide *noisy* motion estimates.
  - Corrected (*aided*) using *camera* observations



- **Efficient**
  - Low cost/power/weight sensors
  - Real-time algorithms
  - Runs on existing cell phones
- **Versatile**
  - Same device for humans, robots, vehicles
  - No prior area/vehicle information required

Achievements

- **Real-time precise localization on:**
  - Cell-phones (Samsung S4)
  - Quad-rotors
- **High-precision:** 0.5-1.5% of distance travelled



Research Goals

- ***Large-scale*** mapping using ***multiple*** mobile devices
- **Resource-aware measurement selection and processing**

Thank you