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Research in a four camera marker-less tracking device

More precisely:

The potential applications for such a device

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Strengths of the device:

- more precise than other 'conventional' tracking devices:
  - GPS is only reliable within several feet
  - most geolocating devices have trouble measuring changes in altitude
  - EM trackers only work within a certain raduis

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Strengths of the device:

- versatility:
  The device requires no environmental cues such as markers or LEDs

There remain limits to the device's versatility

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Strengths of the device:

- creates a good environment for localised tasks such as easy gesture recognition or tracking an individual in relation to their environment.

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Weaknesses of the device:

- The device loses precision when rotated
- Rotation is ignored
- The device lacks a frame of reference
  eg. When turned on, the device assumes it's at coords (0, 0, 0) with no rotation
- Speed and distance traveled are inacurate
- Fails in some environments

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Device 'add-ons' and improvements:

- Better tracking of rotation
- Better tracking of speed
- Wireless capability
- Extras:
  - scene recognition
  - hardware eg. smaller cameras, infra red...

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Summary of strengths and weaknesses:

- Strengths:
  - precision
  - versatility
  - 'localised tracking'

- Weaknesses:
  - frame of reference
  - environment
  - rotation

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Potential application for the device:
Aid for the blind or vision impared

- Tracks the wearer's movement locally:
  - can alert the wearer of possible colisions not detected by a cane or in environments not suitable for canes or seeing eye dogs

  - knowledge of direction and speed can aid in navigation eg. tracking the sidewalk and give a warning if the wearer is moving close to the road

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Implementation of the device:

- Device mounted in the frame of a pair of glasses:
  - provides a visual cue for sighted people
  - head is relatively motionless compared to the rest of the body (rotation down a minimum)

- Auditory cues would be given through a speaker near the ear

- Glasses would also provide room for a battery to power the device

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Implementation of the device:

- The device could use pattern recognition to compute distances in a manner understandable to a blind person eg. instead of feet, in steps

- The device would not be cumbersome since it is being incorporated into a common accesory

- Finally, the device could be made to work with a smartphone. The device would then simply transmit data and the smartphone would do the computation.

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Future ideas for research:

- Increase the mobility of the device:
  - by adding a wireless feature

- by writing code for the device to interface with a mobile smartphone