Wearable Cognitive Assistance
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A Unique Moment in Time

Example Gabriel Applications

Pool
- Helps a novice pool player aim correctly
- Visual feedback as the user turns cue stick
- Calculations use fractional aiming system
- CV: Color, line, contour, and shape detection

Workout
- Helps user sketch better
- Builds on third-party app
- Preserves back-end logic
- New Glass-based front-end for any surface and instrument

Lego
- Helps novices prepare sandwiches
- Non-perishable plastic ingredients
- CV: Faster RCNN + transfer learning
- Runs on both Google Glass and Microsoft Hololens

Sandwich
- Guides a user in assembling an IKEA kit (table lamp)
- Uses short video segments for instruction
- Combined with active real-time guidance
- CV: DNN with transfer learning

Face
- Guides a user in assembling 2D Lego models
- CV steps: color and pattern detection edge detection color normalization and assignment

Ribloc
- Medical training application
- Instructs trauma surgeon in use of RibLoc
- Eliminates training visit by technician
- CV: DNN-based, small parts, easy to err
- Video created by VIZRTECH (http://viztech.com)

Common themes
- State-of-the-art Computer Vision and Machine Learning
  - Color/edge/line detection, optical flow, volumetric template matching, CNN, transfer learning, etc.
- Structural similarity across apps
  - Phase 1: extract symbolic representation (stateless)
  - Phase 2: generate guidance (stateful)

Experimental Measurements of End-to-End Latency