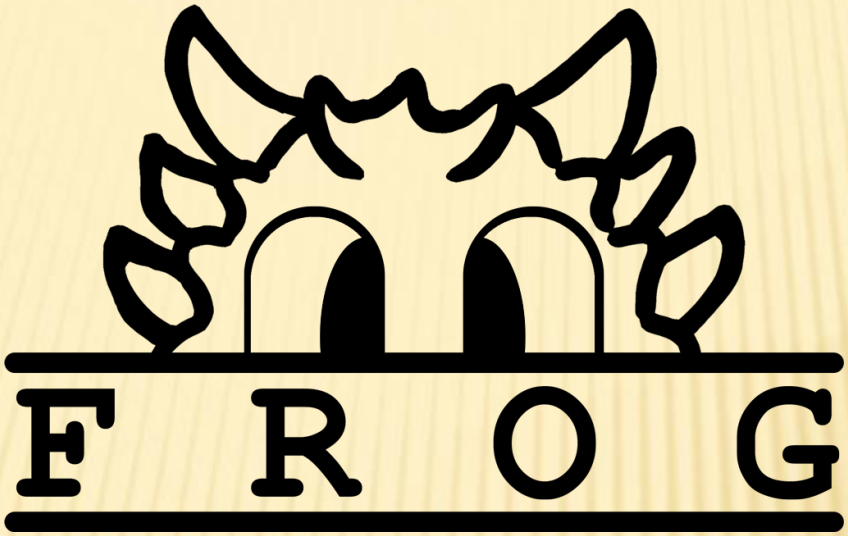


Team Better Recognize presents…

FROG RECOGNIZER OF GESTURES

Phillip Stromberg, Josh Alvord, Alex Grosso, José Marquez, Sneha Popley, Ford Wesner

WHAT IS FROG?

- 3D Acceleration-based gesture recognizer
- Framework that supports input from multiple, heterogeneous mobile devices
- Gesture training, recognition, evaluation, and demo modes
- Research-oriented graphical user interface
- Gesture recognition through
  - Filtering
  - K-Means Cluster Analysis
  - Hidden Markov Models(HMM)
  - Bayes Classifier

WHY FROG?

- User interaction moving away from traditional mouse and keyboard
- Rise in popularity of gesture recognition
- Accessibility of accelerometers on mobile devices

PROJECT SCHEDULE

- Iteration 2
  - Communication
  - Graphical displays
  - Preliminary training
- Iteration 3
  - Completed recognition and training
  - Core of FROG now ready
- Iteration 4
  - Code complete
  - Demo mode shows how much fun FROG can be

At every iteration there is complete revision and updating of documentation as well as strenuous unit and overall testing.

THE PLUG-INS

- Sun SPOT is the first plug-in developed for FROG
  - Already sending accelerometer data wirelessly
  - Can do filtering onboard before transmission
- HCI Lab is currently working on additional plug-ins
  - Specification has been delivered to them
  - Google Android and Windows Mobile development in progress…

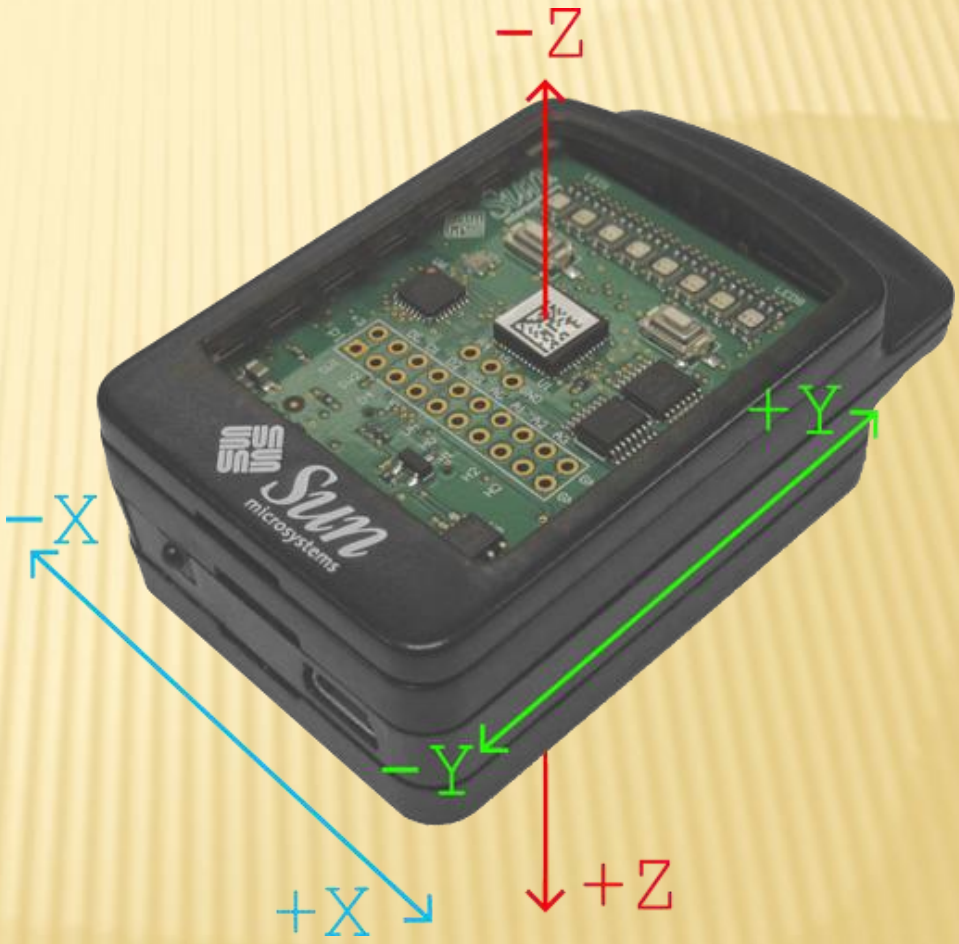

HCI Lab

Working now

Coming soon…?

WHAT IS A SUNSPOT?

- Sun Small Programmable Object Technology: The wireless motes developed by Sun
- Contains a 180MHz 32-bit processor, 512K RAM
- Variety of sensors including a three-axis accelerometer
- Communication using a low-power IEEE 802.15.4 radio

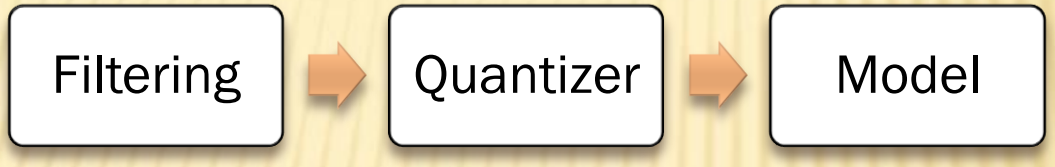


THE MODES

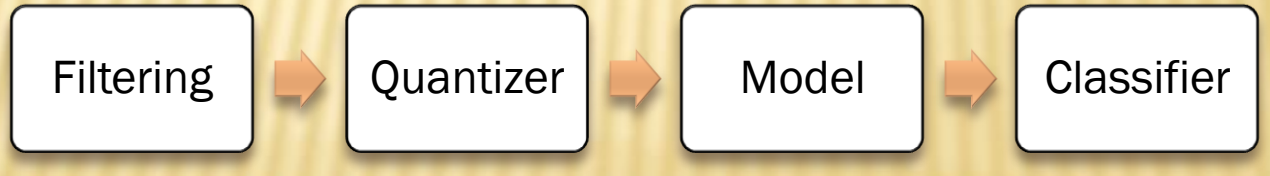
- Training
  - One user may train and save gestures
- Recognition
  - Up to four users may load gesture libraries for recognition validation
- Evaluation
  - One user may load gesture libraries for evaluation of system performance
- Demo
  - Up to four users may participate in the demo game, uses trained gestures as input

THE PIPELINES

Training:



Recognition:



ALGORITHMS

- Filters
  - Idle state
  - Directorial Equivalence
- K-means and K-means++
- Hidden Markov Model

INTERFACE

- Textual feedback
  - Raw & filtered data, clustering & modeling results
  - Can be saved to file
- 2D/3D graphing of accelerometer data
- 3D graphing of K-means position
- Adjustable filtering thresholds

FUTURE USE

- Efficient enough to use as input for a video game or multimedia presentation
- Could be used in public environment
  - Gesture controlled information kiosks
  - Games in movie theatres and malls
  - Controllable by nearly any modern phone