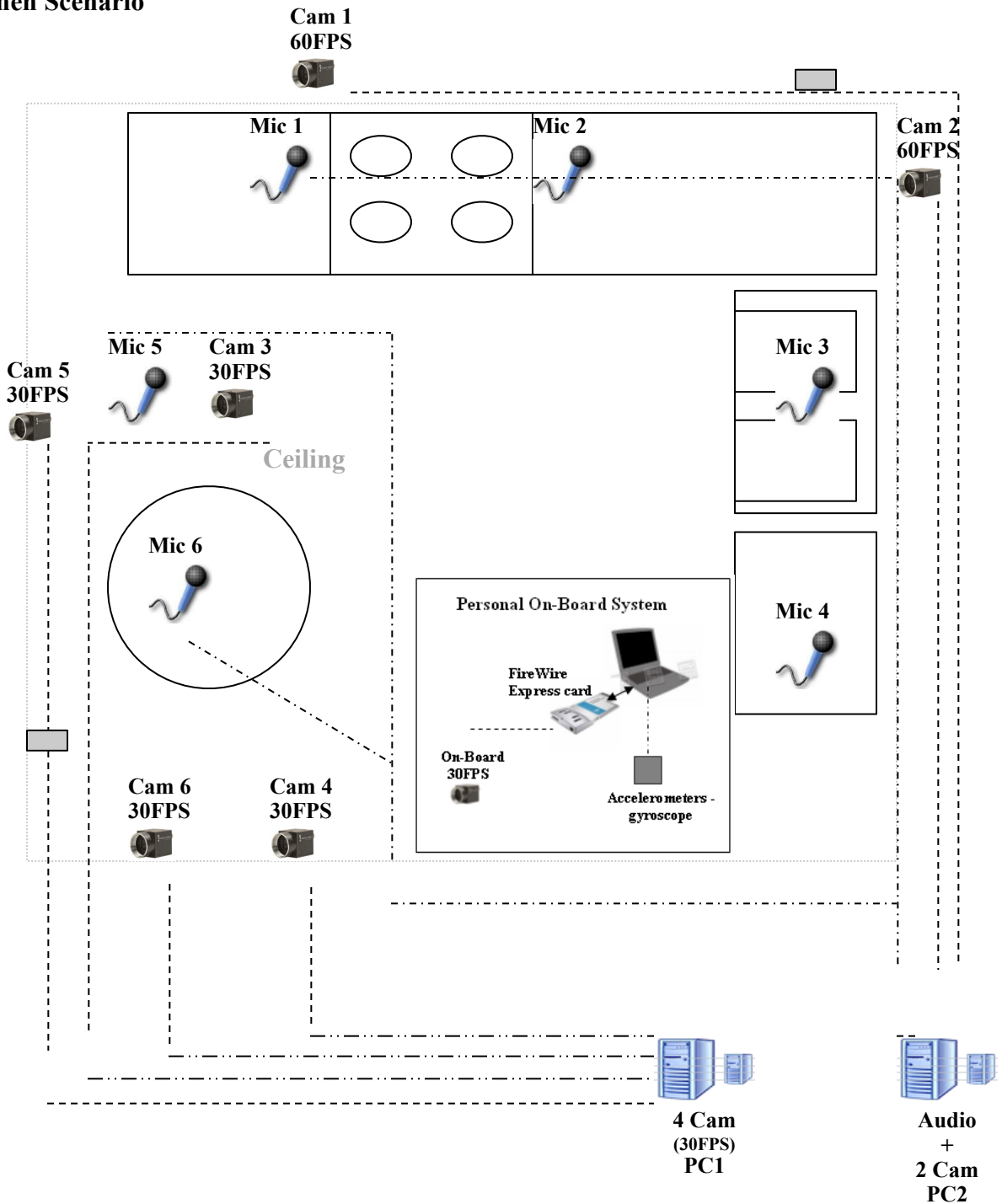


# Multimodal Data Collection

## Kitchen Scenario



## Legend

----- FireWire B

- FireWire A (Point Grey software synchronization)
- Microphone cable
- Repeater

**Modalities:**

- Video:
  - 6 Flea2 Cameras.
    - Four cameras of 1024x768 pixels (30FPS).
    - Two cameras of 640x480 pixels (60FPS).
- Audio:
  - 5 microphones
  - Watch microphone
- Accelerometers and Gyroscopes
  - 5 accelerometers
  - 5 gyroscope

This dataset contains multimodal recordings (audio, video, accelerometers and gyroscopes) from the execution of five recipes (brownies, salad, pizza, sandwich, eggs) in a kitchen scenario.

For each of the five recipes folders (e.g. brownies), there are three subfolders (video, audio, and accelerometers/gyroscopes). Also, each folder contains a video that merges images coming from 6 cameras showing the execution of the recipe.

To download the data and for any questions contact Xavi: [x.martin@yahoo.com](mailto:x.martin@yahoo.com)

## Projects:

- 1- Automatic synchronization of two or more multimodal data sets (e.g. audio/video). Before starting the recipe, the user presses a device that produces sound and light. This signal can be used to synchronize audio, video and accelerometer data. Some references for audio-video synchronization:

<http://publications.csail.mit.edu/abstracts/abstracts07/siracusa/siracusa.html>

[http://groups.csail.mit.edu/vision/vip/papers/fisher\\_eccv02.pdf](http://groups.csail.mit.edu/vision/vip/papers/fisher_eccv02.pdf)

- 2- Use semi-supervised algorithms to fully label the database. For instance, label few points in the body of the subject, and use semi-supervised techniques to label/track the rest of the frames:

<http://people.csail.mit.edu/rahimi/papers/rahimi-recht-semisup-conference.pdf>

- 3- For any data collection is time consuming to look for outliers (which certainly are). Develop algorithms for anomaly or outlier detection.
- 4- Activity recognition from weakly label data:
  - a. Activity recognition across view point. Given a video sequence of a particular recipe (e.g. brownies) learn a set of statistics invariant to the camera viewpoint (7 views of the scene).
  - b. Learn temporal features that are useful to discriminate among different activities.

## Video instructions:

1. Download K-Lite Codec Pack from Free-Codecs

Link: [http://www.free-codecs.com/download/K\\_Lite\\_Codec\\_Pack.htm](http://www.free-codecs.com/download/K_Lite_Codec_Pack.htm)

2. Follow the steps to install it choosing the x264 codec in the codec installation options

3. Play the files with any media player

-----  
Starting frames  
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- brownies	Start: 1
- eggs	Start: 1
- pizza	Start: 1
- salad	Start: 1
- sandwich	Start: 1

How to play these videos with Matlab  
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1. Download DxAvi Toolbox from Matlab Central File Exchange

Link: <http://www.mathworks.com/matlabcentral/fileexchange/loadFile.do?objectId=15864&objectType=File>

2. Unzip in a new folder.

3. Copy in the same folder the 'playAviFile.m' file.

4. Set this folder as the current Matlab path.

5. Execute `playAviFile()`; in Matlab.

**Audio instructions:**

Use `wavread` to read audio from Matlab.

Within the audio folder there are two subfolders, one containing the synchronized audio (synchronized folder) useful as truth. The other contains the audio from the beginning of the recording session (not synchronized).

**Accelerometers/gyroscopes:**

The `SensorRate.txt` file contains several columns:

`Serialnum`: the serial number of the accelerometer - a unique identifier, we should include a mapping from `serialnum` -> position on the body (we did record this information)

`StabMagField`: the x,y,z components of a stabilized signal from the magnetometer

`StabAccel`: x,y,z stabilized acceleration

`StabAngRate`: x,y,z angular velocities (measured in rad/s).

`StabQ_?`: The stabilized quaternion for absolute orientation

`Ticks`: Ticks on the sensor board, basically a sequencing number

`TimeStamp`: Time stamp from the computer recording the data

For any questions contact:

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