# Checkoff Checklist

6.111 — Fall 2015 — Project Proposal

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## 1 System Checklist

This document will first cover how different levels of development will look like for the system as a whole, and then delve into what technical components are needed in each module to achieve those goals. The core of the project is implementing our own facial recognition system in hardware using efficient feature representations as well as some hardware adjusted software approaches to object recognition via linear classifiers.

**Commitment:** Accurate recognition of face (>50% accuracy), signaled by LED

**Goal:** Accurate recognition of face (>75% accuracy), with LBP displayed on screen

**Stretch Goal:** Accurate recognition of face (>80% accuracy), candidate windows highlighted on screen.

## 2 Module Checklists

### 2.1 Image Preprocessing (Juan)

**Commitment:** Crop to 130 px wide 152px tall, Y to LBP conversion (shrinks by two pixels in each direction due to edge effects), Store LBP to ZBT1

**Goal:** Store full image in ZBT

**Stretch Goal:** Store full image in ZBT

### 2.2 Feature Extraction (Andrés)

**Commitment:** 1 histogram 256 features per image

**Goal:** 16 histograms 4096 features per image

**Stretch Goal:** 240 histograms 61440 features per image

### 2.3 Classification (Andrés)

**Commitment:** takes dot product using divisions

**Goal:** takes dot product as num denum pair, 16 bit rational number, optimizing divisions

**Stretch Goal:** 32 bit rational number precision on num denum pair

### 2.4 Adaboost (Juan)

**Commitment:** 1 subproblem optimization (Bayesian inference)

**Goal:** 17 subproblems (>75% accuracy)

**Stretch Goal:** 240 subproblems (>80% accuracy)

### 2.5 Controller FSM (Andrés and Juan)

**Commitment:** controls ZBT0 ZBT1 interface, LED blinks on detection

**Goal:** LBP values displayed on screen

**Stretch Goal:** LBP values displayed and window highlighting each face

### 2.6 Candidate Window Generation (Andrés and Juan)

**Stretch Goal:** Window Generation

**Super Stretch Goal:** Rosenfeld Algorithm

**Mr. Fantastic Goal:** size invariance