Cutting off power to your stove when it hears the frequency of your smoke alarm
**Smoke Alarm Sensing Shutoff Device**

Key Problem

- 108,900 cooking related fires in 2006
- Smoke detectors only alert, no response

- 4 Stage of Fire:
  - Incipient stage -- Little heat, develops slowly.
  - Smouldering stage – Smoke
  - Flame stage -- Visible flame
  - Heat stage -- Heat, flame, smoke and toxic gases

**STOVESAFE**
SMOKE ALARM SENSING SHUTOFF DEVICE

Key Concept
Smoke Detector Variability

Key Challenges

- Smoke alarm frequency is consistently 3.5kHz-4.5kHz

Distance does not effect frequency
TECHNICAL FEASIBILITY

Key Challenges

- Loud noise shuts off LED
  - Microphone
  - Micro-Controller
  - Arduino Circuit Board
- Audio signal can cut power
- Food smokes before burning,
  - Stove shutoff effective

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Every house is required to have a smoke detector.

64% of stoves shipped in US in 2008 were electric (5 million units).

Competition:

- No Action
- Complex, Expensive

Smoke Alarm
Activation Indicator

Not for stoves

Power Strip

Stove Guard

StoveSafe!
PRODUCT CONTRACT
Product, Customer, and Market

○ Product Description: Smoke Alarm Sensing Shutoff Device
○ Intended Customer: Residential Electric Stove Users
○ Market: Kitchen Safety/Fire Safety

<table>
<thead>
<tr>
<th>Customer Needs</th>
<th>Product Attributes</th>
<th>Engineering Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy to install by user</td>
<td>Time</td>
<td>&lt; 1 hour</td>
</tr>
<tr>
<td>Compact enough to fit behind stove</td>
<td>Thickness</td>
<td>&lt; 2.5”</td>
</tr>
<tr>
<td>Easy to learn how to use</td>
<td>Time</td>
<td>&lt; 5 min</td>
</tr>
<tr>
<td>Fast response to smoke alarm</td>
<td>Time</td>
<td>&lt; 5 sec</td>
</tr>
<tr>
<td>Few false positives (Accidental stove shut off)</td>
<td>%</td>
<td>&lt; 5%</td>
</tr>
<tr>
<td>Few failures (Does not respond to smoke alarm)</td>
<td>%</td>
<td>&lt; 1%</td>
</tr>
<tr>
<td>Cost</td>
<td>$</td>
<td>&lt; $100</td>
</tr>
</tbody>
</table>
STOVESAFE IS FEASIBLE, BUT...

Future Steps

- Future Challenges
  - Sensitivity
  - Reset

- Future Steps
  - Respond to frequency
  - Calibration
  - Components that handle higher currents