Many current home automation systems on the market today claim to be "Smart," but in reality are only glorified remote controls. Jarvis is being developed to make an intelligent home automation system that can control many aspects of the home. Although development of Jarvis started in 2009, many of the useful features were missing. This project was to extend Jarvis by adding home control and a natural voice-activated user-interface system.

Key Objectives:
1. Identify who is speaking to Jarvis, and what they are saying.
2. Interact with existing Z-wave Home automation devices.
3. Track a user only within the home.
4. Jarvis must be secure.

For speech recognition, we chose to use the CMU Pocket Sphinx application. It’s not the most accurate, but it’s fast enough.

For speaker identification, we used an existing Java library called Recognito.

Client devices were built using a Raspberry Pi, with a speaker and a USB microphone. When a user begins to speak, the client looks for the "Jarvis" hot-word and, when detected, streams the user’s speech to the server for recognition.

User tracking works by measuring the strength of a Bluetooth signal from the user’s phone to nearby clients. Shown as circles in the figure above. After knowing the signal strength, Jarvis can triangulate where the user is at (the red dot), and which room they are in, as represented as boxes above.

As security is one of our major concerns, we’ve opted to have the Jarvis server installed inside users homes. This way, all person data will stay within the home, and not be sent to a company hosted server farm. This also gives the user the option to allow access to Jarvis from outside of the home, for extended access.

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