Standalone Intelligent Sensor (SIS)

Project and Document Overview

Read Me First!

1. What's This All About?

The Standalone Intelligent Sensor (SIS) is an inexpensive build-it-yourself system that processes information from a variety of passive wireless sensors to create a timestamped log containing meaningful information and inferences about a person's in-home activities. The SIS log can be securely accessed over the Internet, providing caregivers and concerned relatives a picture of how competently an elderly person living alone is performing the routine activities of daily life.

The initial release of SIS uses wireless proximity infrared (PIR) motion sensors and wireless door separation sensors to log movements of a person around and in/out of their home. Judicious placement of the PIR sensors provides a compact picture of a person's activities via the natural association of those activities with areas of the home; e.g. bedroom for sleeping and dressing, bathroom for personal hygiene, kitchen for food preparation and living room for relaxation and socialization.

The SIS consists of up to 20 inexpensive wireless sensors and a small hub device containing wireless receivers, an advanced microcontroller, and WiFi connectivity. The current release of SIS requires WiFi for connection to the Internet; however, a 3G wireless version is anticipated in the near future. SIS also contains client software that can communicate with the in-home hub over the Internet, via a free cloud service from *particle.io*. The client software is written in Javascript and can be hosted on any device that supports a Javascript enabled web browser (desktop, laptop, tablet, smart phone, etc.). Communication between the SIS Hub, the cloud and a client is authenticated and encrypted to ensure privacy and security of the data.

SIS achieves low cost by performing all sensor data processing internally on the SIS Hub's advanced 32 bit microcontroller. Cloud processing of the sensor data is not required. A free cloud service is used to connect the SIS Hub and authenticate clients via the Internet. An SIS Hub can be built for around $50 in parts and the sensors cost between $3 (for a door separation sensor) and $8 (for a PIR sensor). Total system cost (assuming an existing WiFi access point in the home) will be between $100 and $200, depending upon the number and types of sensors required for a particular home environment. There are no monthly recurring charges, other than an assumed existing WiFi capability.

<u>SIS is not a product</u>; the user must use the information provided to construct, install, configure, and test the SIS for their specific environment.

2. Open Source.

SIS is released under an “open source, non-commercial” license (Creative Commons). The software, hardware designs, parts lists, instructions and manuals are provided free of charge to non-commercial users. We encourage people to use the SIS as it is documented herein and to provide us with feedback about your results, difficulties and ideas for improvement. As an open source project, we encourage people to make changes and improvements to the SIS design, subject to the “Terms_Of_Use_License_and_ Disclaimer” document:

https://github.com/TeamPracticalProjects/SISProject/blob/master/SISDocs/Terms_of_Use_License_and_Disclaimer.pdf

We are also open to people using SIS technology in a commercial business. If you are interested in this, please contact us to discuss the terms of an appropriate commercial license:

SISProject@shrimpware.com

3. Documentation Tree.

We have attempted to provide users with a complete set of documentation that describes what SIS is, how to build your own SIS, how to plan and install and SIS, and how to use the SIS Client app to manage and query an SIS. Since SIS is an open source project, we have also provided complete source code and hardware (Eagle) files. Users may use this documentation as the starting point for making modifications to and improvements on the SIS technology that we have provided.

All SIS documentation and files are released on GitHub, under:

https://github.com/TeamPracticalProjects/SISProject

The figure below is the documentation tree for all of the files in the SIS release. All documents (other than source code and Eagle CAD files) are in .pdf format.

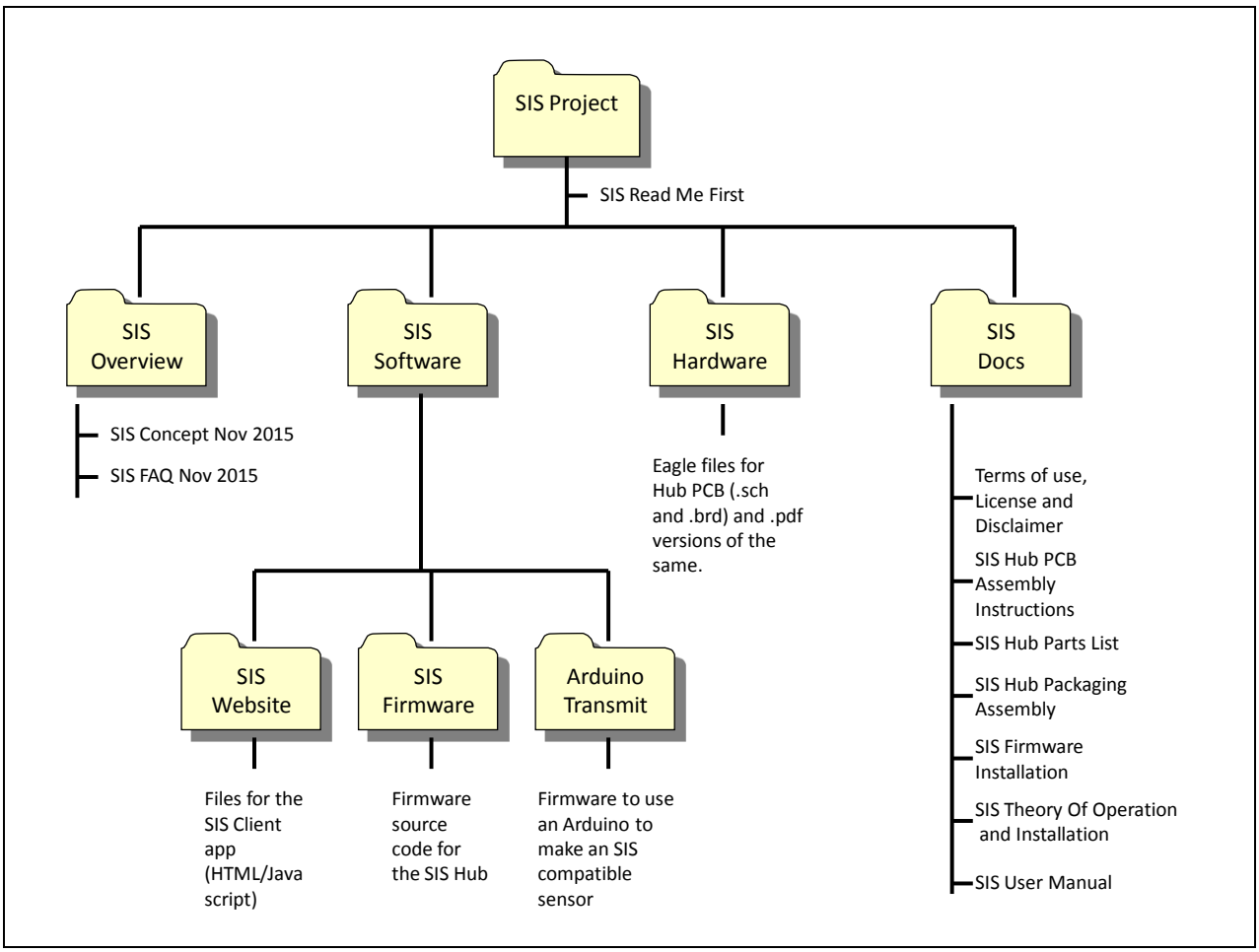
We have arranged the SIS documentation into 4 repositories under the SIS project:

- SIS Overview: this repository contains documents that provide the reader with an overview of the SIS project. This repository contains a Concept document and a Frequently Asked Questions (FAQ) document. These documents are intended to help an interested user make a determination about building and installing an SIS to meet their individual needs.
- SIS Software: this repository contains the source code for all of the SIS software. The “website” subdirectory contains files for the SIS Client app, which is a Javascript enabled website. The “Firmware” repository contains the source code for the SIS Hub, which receives, decodes and processes data from all SIS sensors. The “Arduino Transmitter Software” repository contains Arduino source code for making an SIS compatible

transmitter using an Arduino Uno and a cheap 315MHz or 433MHz transmitter module. Users can use this software to design their own, SIS compatible, wireless sensors[1].

- SIS Hardware: this repository contains the Eagle CAD files for the SIS Hub printed circuit board (.sch and .brd files). .pdf versions of these files are also provided for those users who wish to view this design information but do have the Eagle CAD software.
- SIS Docs: this repository contains all of the documents necessary to purchase parts, assemble, install, and use an SIS for the intended application of monitoring the activities of a person living alone.

Note that any and all use of this documentation is subject to the "Terms of use, License and Disclaimer" document that you can find in the SIS Docs repository.



SIS Documentation Tree.

You can access and view all of these documents directly on the website:

[1] The Arduino Transmitter software does not contain code for low power, battery operation of an Arduino.

https://github.com/TeamPracticalProjects/SISProject

You can also click on whichever of the repositories you are interested in and click the "Download ZIP" button on GitHub to download a zip archive of all of the files in that repository to your computer.

4. Further Information.

Complete information about SIS can be found in:

https://github.com/TeamPracticalProjects/SISProject

We have tried to document SIS well enough for a novice, non-technical user to be able to build, install and use the SIS for their own purposes. We are not a commercial organization and we cannot commit to providing individual technical support. However, we are interested in people using and even improving SIS and we welcome you to ask questions, provide us with feedback, or suggest improvements via e-mail at:

SISProject@shrimpware.com

We hope that you enjoy SIS.

Sincerely,

Jim Schrempp and Bob Glicksman, developers of SIS

December 2015