ECE 4565 Network Application Design
Team 19
Alexander Orlov - amo25@vt.edu
Mark Owen - omark12@vt.edu
Maura Hartmann - maurah7@vt.edu

Assignment 1 Report

DESIGN

The system implemented in Assignment 1 consisted of a client/server model applied on two Rasberry Pis. The general idea of the assignment was to have a Q&A communication intended for WolframAlpha between the RPIs having both the question and answer be expressed out loud through IBM Watson's text-to-speech translator.

The client RPI reads a QR code through a camera attachment and the OpenCV library decodes the question. The question is encrypted through a Python cryptography library and with tuples a question payload is created. The client RPI's question payload consists of an Encryption/Decryption key, the encrypted question text, as well as an MD5 hash of the encrypted question text. The question payload is then sent to the server RPI by way of a socket interface through pickling and waits for the answer payload. The server RPI receives the question payload and then parses it, verifies the checksum, and decrypts the question. Through API calls the question is sent to IBM Watson and WolframAlpha which then plays the question audio and searches for an answer. Once an answer is found on WolframAlpha an answer payload is constructed. The server RPI's answer payload consists of the encrypted answer text and a MD5 of the encrypted answer text. The answer payload is then sent back to the client RPI, just like the question payload socket interface transmitting process, and displays the answer on a monitor. The answer is sent to IBM Watson to generate the answer audio which is then played.

OUTCOMES

Ultimately, our system was able to perform all the functionality requirements as described above. However, during our design process we discovered that our camera was no longer working. Once we were able to obtain a new camera, we used the given three QR example codes to test performance. In Q1 the question was "What is the hardest material?" and the answer was "Diamond". In Q2 the question was "What was the high temp in Blacksburg, VA on February 19, 1998?" Answer: "48º". Finally, in Q3 the question was "How much wood would a woodchuck chuck if a woodchuck could chuck wood?" Answer: "A woodchuck would chuck all the wood he could chuck if a woodchuck could chuck wood..." Demonstrating that we fully implemented our client/server design on the RPIs.