



EE123 Final Project

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Approach | Modified AFSK1200

- Changed frequencies of 1200 and 2200 to 1200 and 2400
- Increased baud rate to 1600 from 1200 for reliable transmission
 - Could push it to 1800 but faced some packet loss
- Begin packet contained meta data on how to reconstruct image
- Planned: Stuff more data into AX.25 packet by replacing digipeater addresses with more data (since the field is not required for this project)

Approach | JPEG-SRC

- Downsample original image by 2 to compensate for the Haar filter padding
- Convert from RGB to YCBCR because chrominance and luma retain more information within the luma and the chrominance can be compressed further
- Threshold the haar filter data to zero out insignificant values to increase compression
- Normalize data between 0 and 255 to transmit data in bytes
- Quantize data to further compression
- Zlib to smush long strings of repeated data into a small amount of bytes
- Denormalize, convert YCBCR to RGB, and upsample/lowpass to recover image

What worked... and what didn't

- Successfully pushed modem's baud rate from 1200 to 1600
- We tried to push our modem's baud rate to 2400, but lost packets at 1800
 - This is the motivation for the fountain codes we developed but didn't have time to test
- Compression worked very well, was able to transmit images without packet loss (at 1600 baud)
- Generally a lot of interference throughout the project, which made it difficult to accurately debug
- Compression search/packages used gave us difficulty when porting to Pi

Test Image Results - CalBlue Logo | PSNR = inf

Original



Decompressed & Received



Test Image Results - Marconi | PSNR = 27.66

Original



Decompressed & Received



Test Image Results - Cr(e)aterLake | PSNR = 22.14

Original



Decompressed & Received

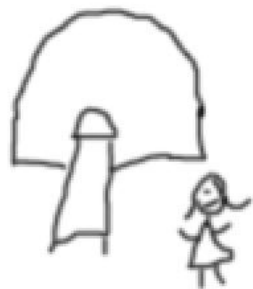


Test Image Results - ISee (The MRI) | PSNR = 24.18

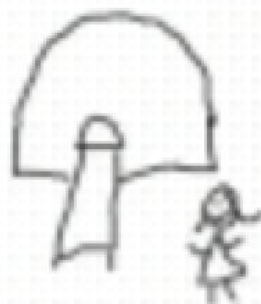
Original

Decompressed & Received

I see THE MRI

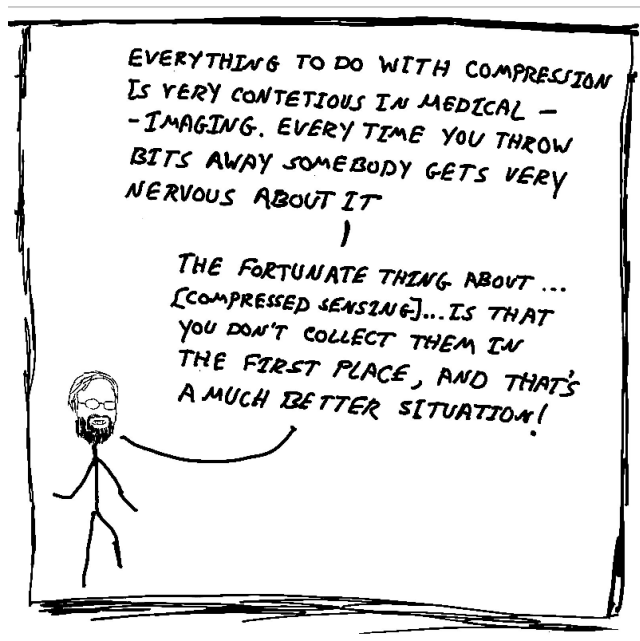


I see THE MRI



Test Image Results - Pauly (comic) | PSNR = 15.17

Original



Decompressed & Received

