

might have adjustable resolution/frame rate
Data streaming - may use UDP. ~~not~~ ~~not~~ super high res
not low video streaming works these days

From Rural broadband
NSF proposal...

Activity: students build a reliable network over time

~~black & white~~
black & white
D.D. talked to some 4H people
realized wireless/mobile networks are hard to understand (ad-hoc, etc.)

Portable nodes to hand out to kids @ a school, have some w/ cameras, relay nodes

Also display (laptop + projector) that shows video
→ rearrange nodes to improve network speeds

Durable

ad-hoc

flexible visualizations
portable & rechargeable

Large scale
[not a small room]
↳ big gymnasium

→ can we decrease the

signal strength of our nodes

so that the results are actually
interesting (i.e. decrease
wifi strength)

→ Control power consumption

Multipath - you may have places where
your wifi is not as good

Be flexible:

possibly allow Local area map

for multiple
video feeds



Base station - maybe
ethernet/wifi adapter to

Outdoors - Geolocation

display
monitor...

via GPS would be easy

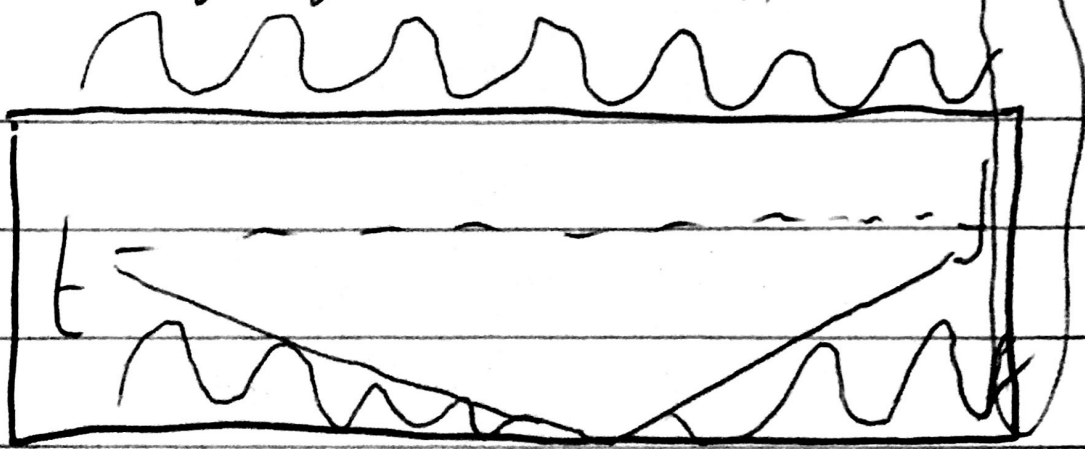
Indoor → get location via
WiFi

~~SA~~ Streaming a video
on a Raspberry Pi is
easy

Video: High bandwidth,
dropping packets will be
easy to notice

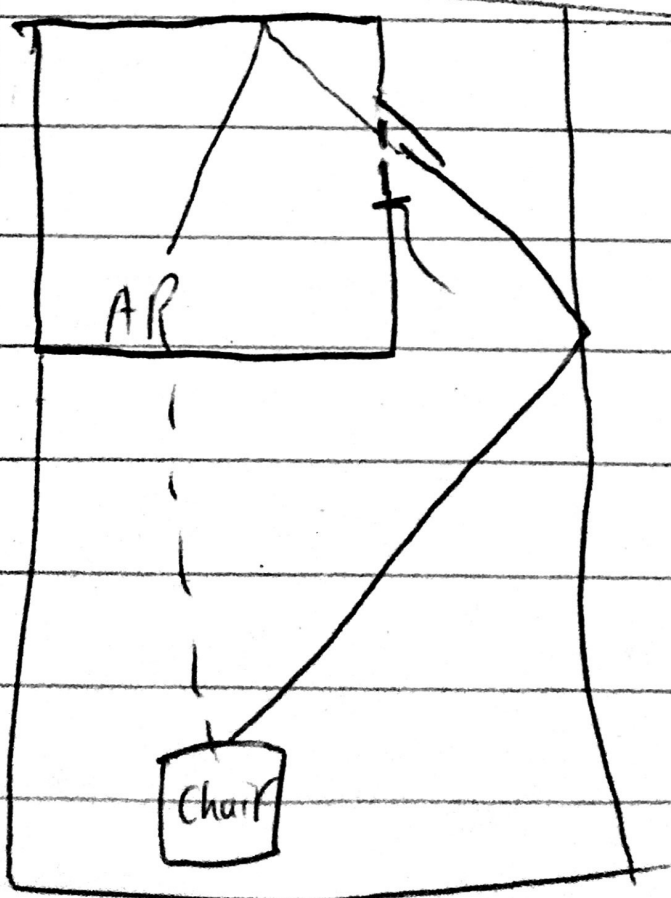
Track metrics: temperature, power
consumption, battery level, etc. → keep
working when video stops working

can have a phase difference,
causing signal to cancel itself



→ 2.4 GHz / 5.0 GHz don't
penetrate well (bounce off
walls)

→ Microwave ovens also @ 2.4 GHz



Door Open:
bounced wave
causes interference
Door closed:
no interference
in this direction

Monitor:

Base station: VM image/
Docker image you can run
on an "average" computer
→ Non-technical users...

→ Raspberry Pi webserver



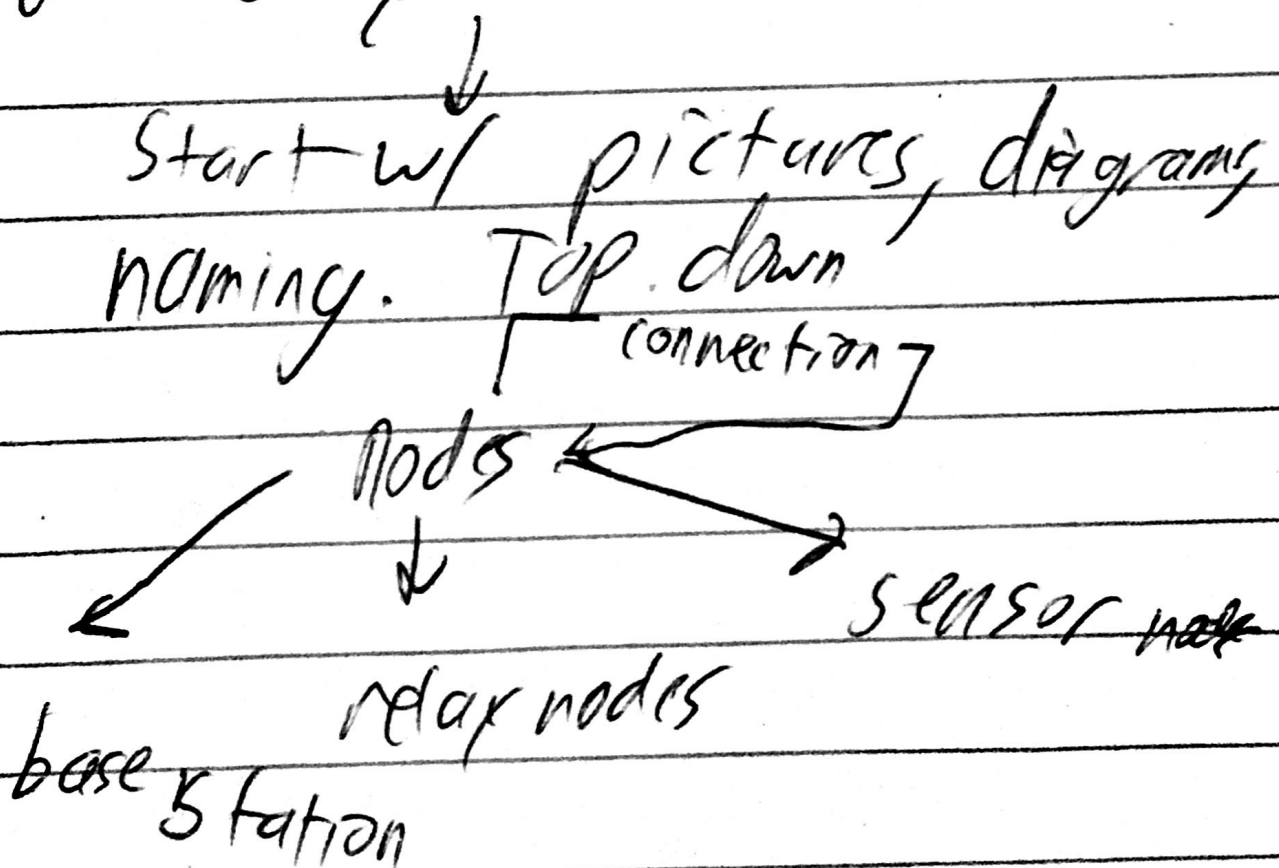
However, this takes us off
the internet for sure.

we can't depend on internet
connections anyway...

Only the laptop might
have actual internet access
↳ spare WiFi dongle, etc...
to overcome this

Web-based monitor app—
No need to install stuff on
someone's laptop.

First: Lay out a functional
design, with no implementation
details yet.



What does each do, but not
how they do it.

→ May allow nodes # to be expanded / multiple networks... on the go

Then, ask questions about what's possible / not possible

Make sure you're not missing any major functional blocks / "glue"

→ Where does each team member belong

→ Draw a use case diagram / diagrams to determine functions

→ name staff

→ Think a bit about implementation technologies to evaluate...

1st
←
1/2 of
1st
semester

→ security: prevent embarrassments

don't want to be vulnerable → protect devices on campus network
→ connect / disconnect from campus network

Also - figure out which technologies are highest-risk, do ~~feas~~ feasibility tests.

→ ad hoc networking

→ relative locations

\$50/node or less is

optimal (not a strict requirement)

→ working on special devices (not PCs/servers) has challenges.

→ backing up, connecting to internet to get packages, etc.

→ take documentation seriously but don't overdo it