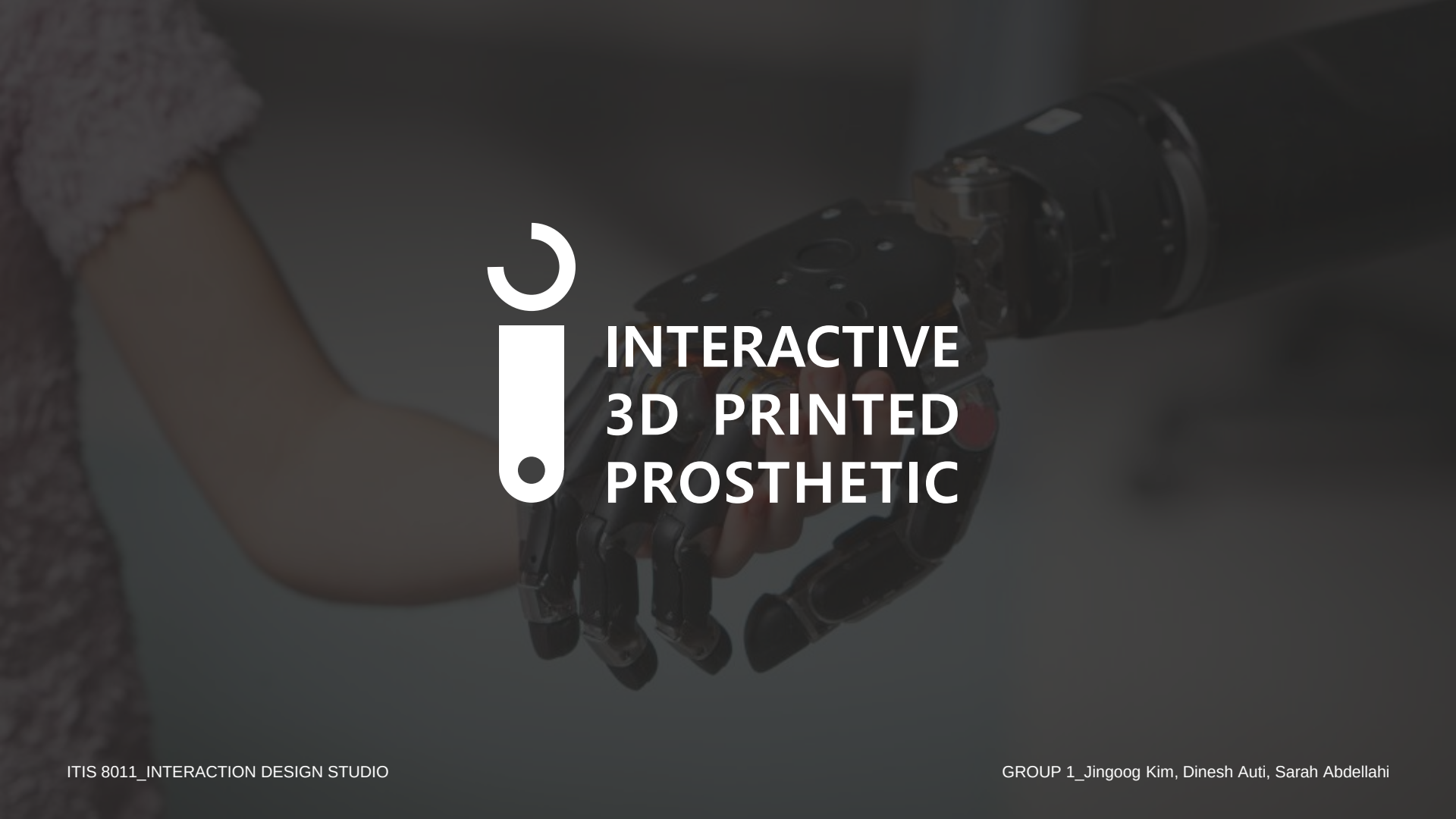
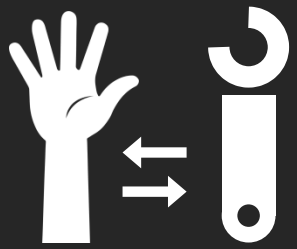


INTERACTIVE 3D PRINTED PROSTHETIC

ITIS 8011_INTERACTION DESIGN STUDIO

GROUP 1_Jingoog Kim, Dinesh Auti, Sarah Abdellahi

SOCIAL



FRIENDS

INTERACTIVE ACCESSORIES FOR PROSTHETIC

FUNCTIONAL

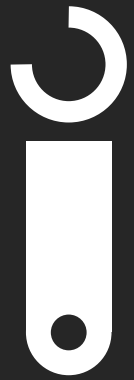
VOICE

INTERACTIVE VOICE COMMAND SYSTEM FOR PROSTHETIC

DESIGN

BLACK BOX

DATA COLLECTION SYSTEM FOR DESIGNERS



FRIENDS

INTERACTIVE
ACCESSORIES FOR
PROSTHETIC

WHAT PROSTHETIC DOES

"My hand is not a grasping tool."

WHAT HANDS DO

Learnable hand

Mimicking behavior, Asking questions, and learning activities.

Playful hand

Playing game, instrument, and physical fun activities.

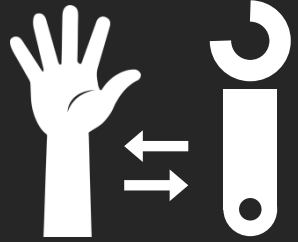
Emotional hand

Expressing emotion with hand gesture.

Communicative hand

Communicating with hand gesture.

Design Goals



Learnable hand:

Facilitating learning activities

Playful hand:

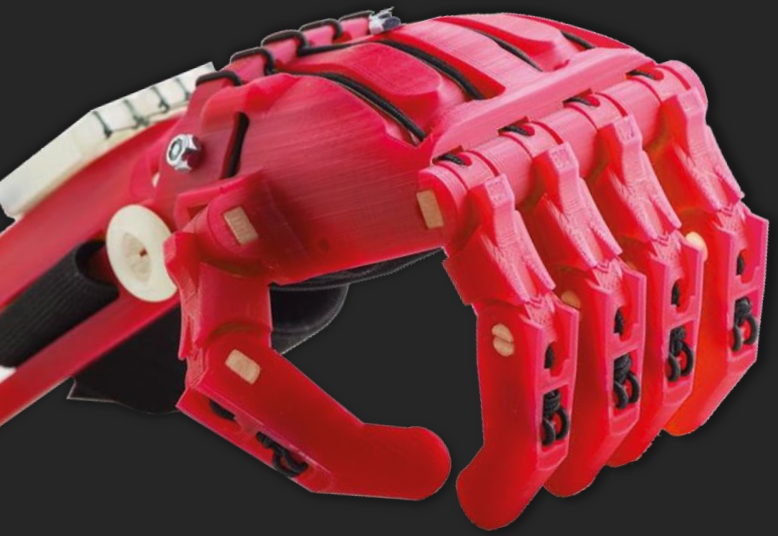
Supporting playing activities

Emotional hand:

Visualizing hand gestures to replace physical gestures

Communicative hand:

Enhancing parents-child bonding, and friendship



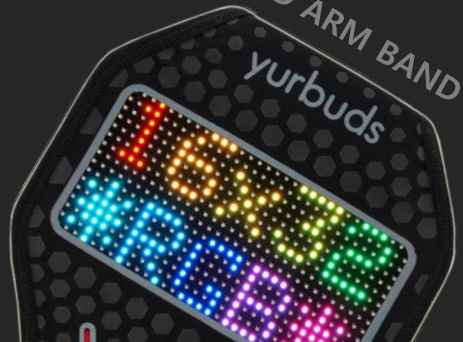
SOUND FINGERTIP

FINGER BRUSH

FRIENDS

INTERACTIVE ACCESSORIES FOR PROSTHETIC

LED ARM BAND



“Can you play this?”

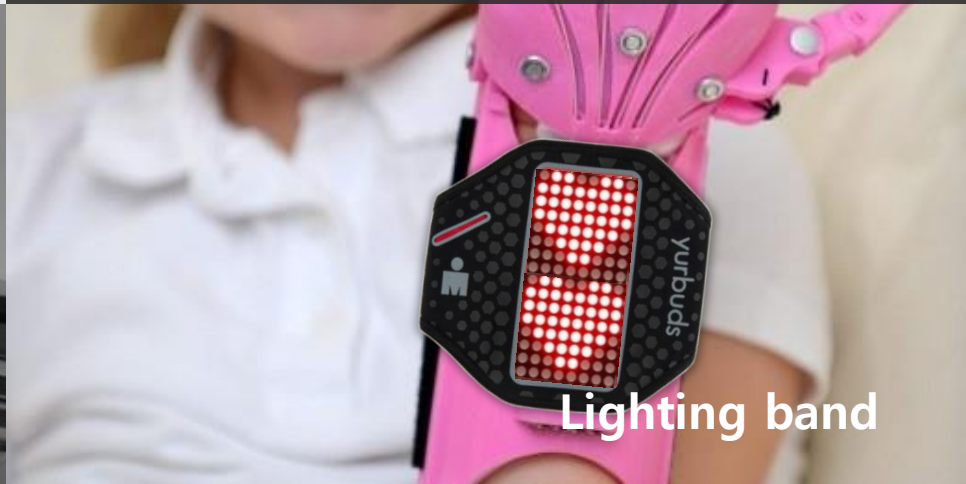
“No, but I can play without guitar!”

Sound fingertip

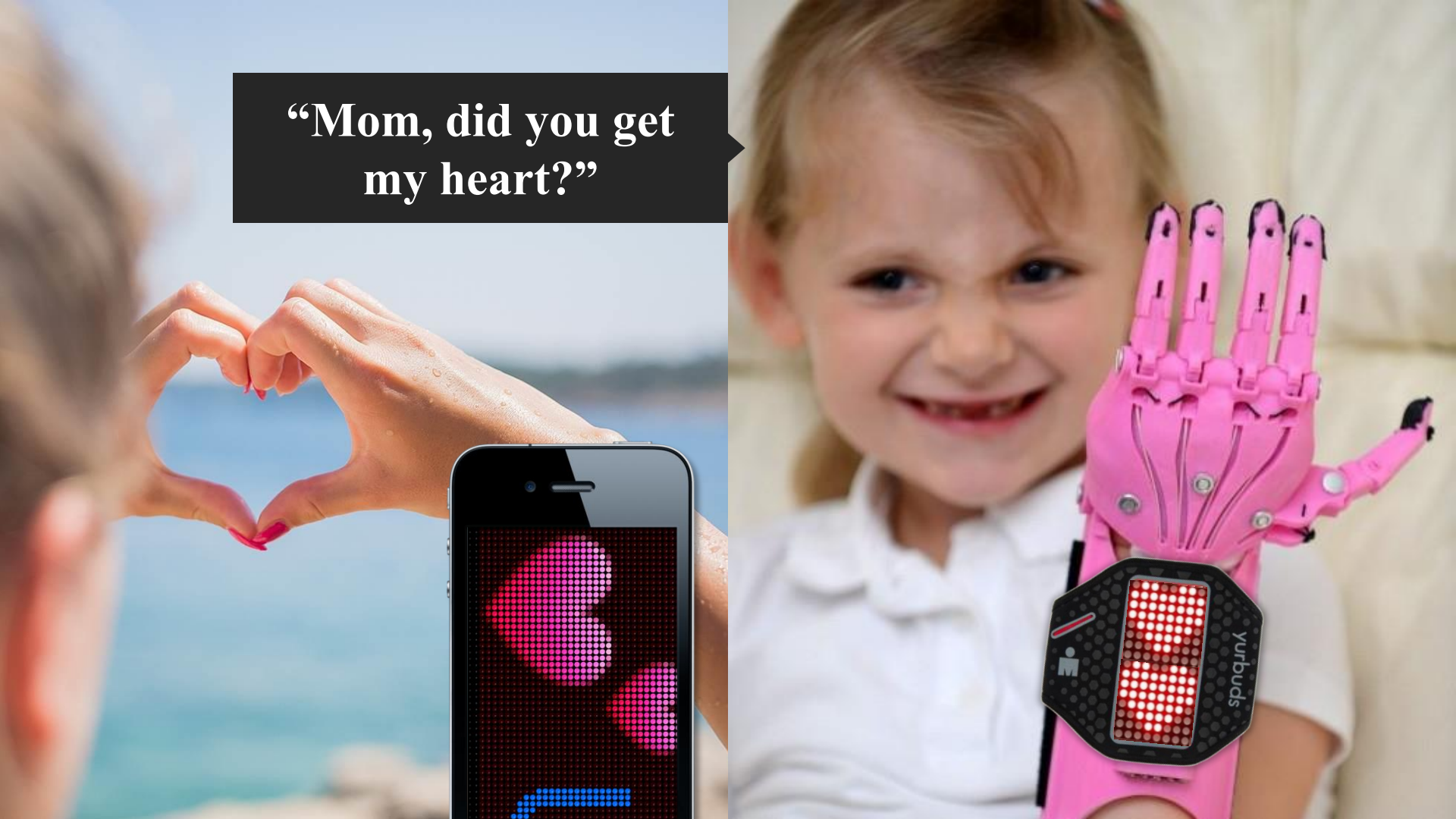
“Do you want to join us?”

“Can you do this?”

“No, but I can do this!”



Lighting band

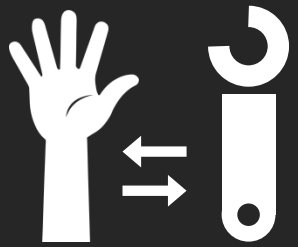

“Mom, did you get my heart?”
yurbuds

“Can you draw this?”

“Sure. I even have a teacher!”

Drawing fingertip & Lighting band


“Hey, show me what the next shape is.”
yurbuds



INTERACTION MODEL

Accessory Type	User Action	System Action
Sound	Pointing / Touching	Playing pre-assigned sound
	Tapping / Tilting / Shaking	Playing pre-assigned sound
Lighting	Banding wrist (Single / Double)	Displaying pre-assigned shape
	Tilting / Shaking	Displaying / removing shape
	Neighboring (Shape - Empty)	Copy shape to another display
	Neighboring (Shape - Shape)	Playing pre-assigned effect


VOICE
INTERACTIVE VOICE
COMMAND SYSTEM
FOR PROSTHETIC

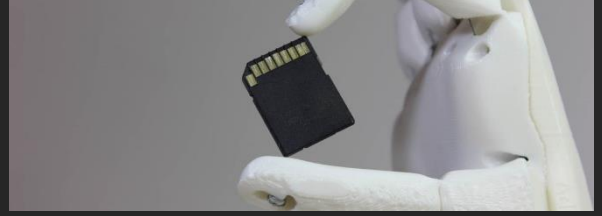

“How long does he have to hold the spoon?”

Factors in Nonwear	Prosthesis Rejecters		Frequent Wearers	
	Percentage of Respondents[a]	Median Rating	Percentage of Respondents[a]	Median Rating
Just as or more functional without it*	98	3	60	1
More comfortable without it*	95	3	66	1
Too difficult or tiring to use*	88	2	39	0
Too heavy*	88	2	65	1
Too hot	88	2	77	2
More sensory feedback without it*	85	2	44	0
Inconvenience*	93	2	53	1
Lifestyle	80	2	N/A	N/A
Dissatisfaction with prosthetic technology	70	1.5	N/A	N/A
Appearance of the prosthesis*	70	1	33	0
Medical factors (i.e., skin irritation, blisters, etc.)	55	1	64	1
Stopped working and needs repair	49	0	56	1
Cost	48	0	N/A	N/A
Availability of prostheses	48	0	N/A	N/A
Availability of healthcare services	51	1	N/A	N/A
Lack of information about prosthetic options	28	0	N/A	N/A
Lack of training	28	0	N/A	N/A
Someone else made the decision	15	0	N/A	N/A
Moral, cultural, or religious reasons	8	0	N/A	N/A
Must be removed (i.e., for sleeping, swimming)	N/A	N/A	71	2
Mood	N/A	N/A	51	0
Fear of damage	N/A	N/A	35	0

[a] The percentage of respondents who considered the factor to be of some importance in the decision not to wear a prosthesis.

* Factors that were rated significantly more important ($P < 0.001$) by prosthesis rejecters than by frequent wearers.

N/A: As indicated, some factors (e.g. availability, fear of damage, etc.) were not applicable to both prosthesis rejecters and frequent wearers



Design Goals

Reduced muscle fatigue:

Supporting long time holding

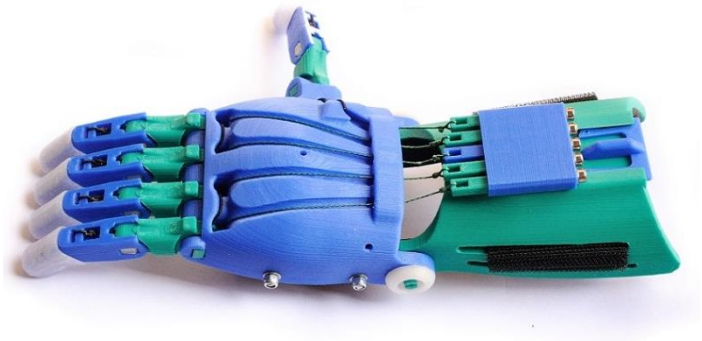
Comfortable grasping:

Supporting easy grasping

Customized user action and system action:

Facilitating frequently used gestures for individual pattern

VOICE COMMAND




“Grasp my Mini Mouse!”
“Release my Mini Mouse!”

CUSTOMAZING INTERACTION

+ Voice command

+ Gesture

INTERACTION MODEL

User Action	System Action
Say “Grasp”	Grasping
Say “Release”	Opening hand
Say a customized word	Pre-assigned gesture

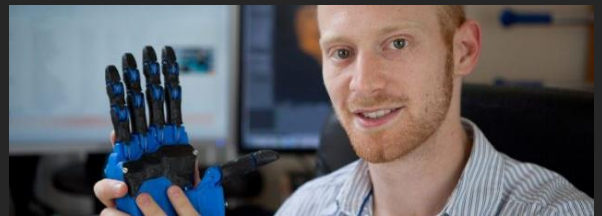
BLACK BOX

INTERACTIVE DATA COLLECTION SYSTEM FOR PROSTHETIC DESIGNERS

"How do you collect data to improve the design?"

INTERVIEW VS. OBSERVATION

Design Goals



Data collection system for designers:

Facilitating data collection to improve the current design

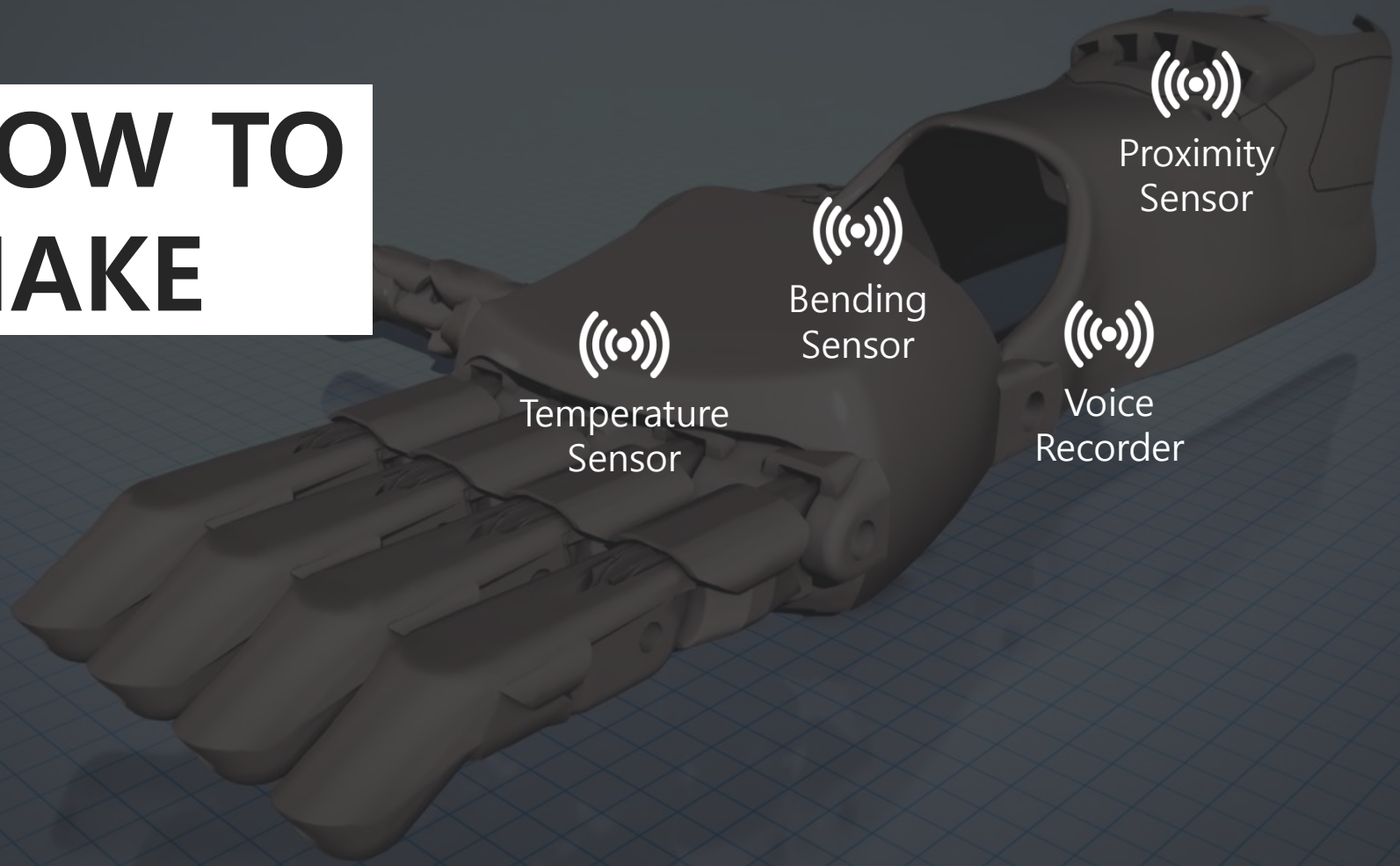
Monitoring tool for parents:

Providing smart monitoring

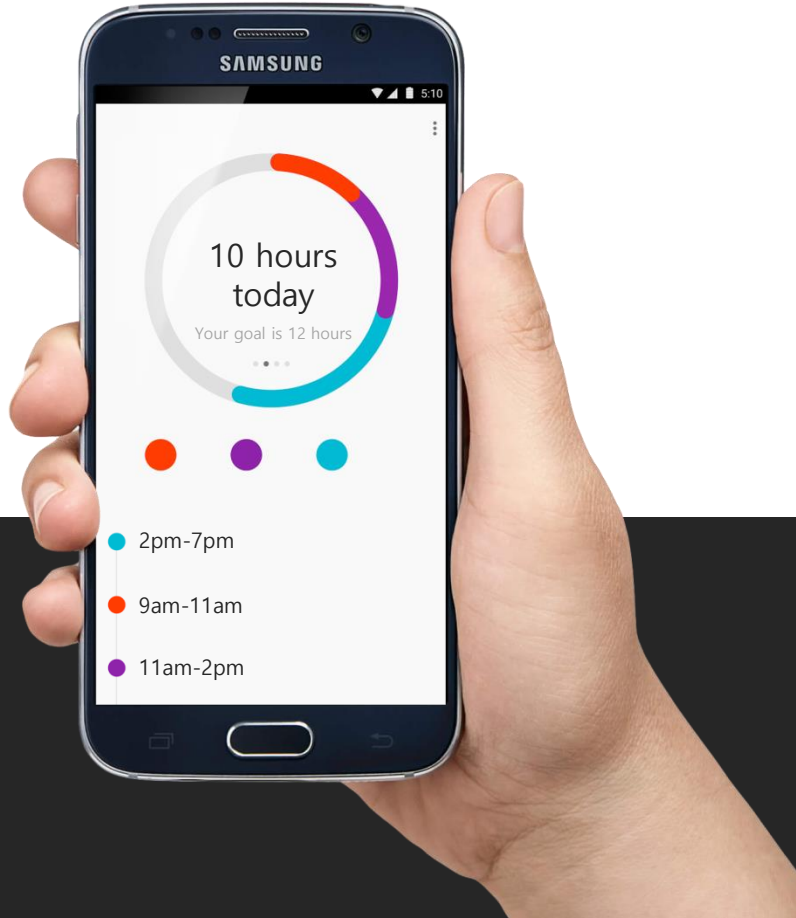
WHAT DATA YOU NEED

+ How often is it used
+ How long is it used
+ When is it most used
+ Inside temperature
+ Joy points & pain points

HOW TO MAKE


Proximity Sensor
Bending Sensor
Temperature Sensor
Voice Recorder

MOBILE APP



“We can easily monitor the use pattern of the new hand.”

INTERACTION MODEL

User Action	System Action
Put on	Count wearing number and time
Take off	Count taking off number and time
While it’s on the user	Check internal temperature
Press	Record time-stamp