

# GESTURE SOCCER

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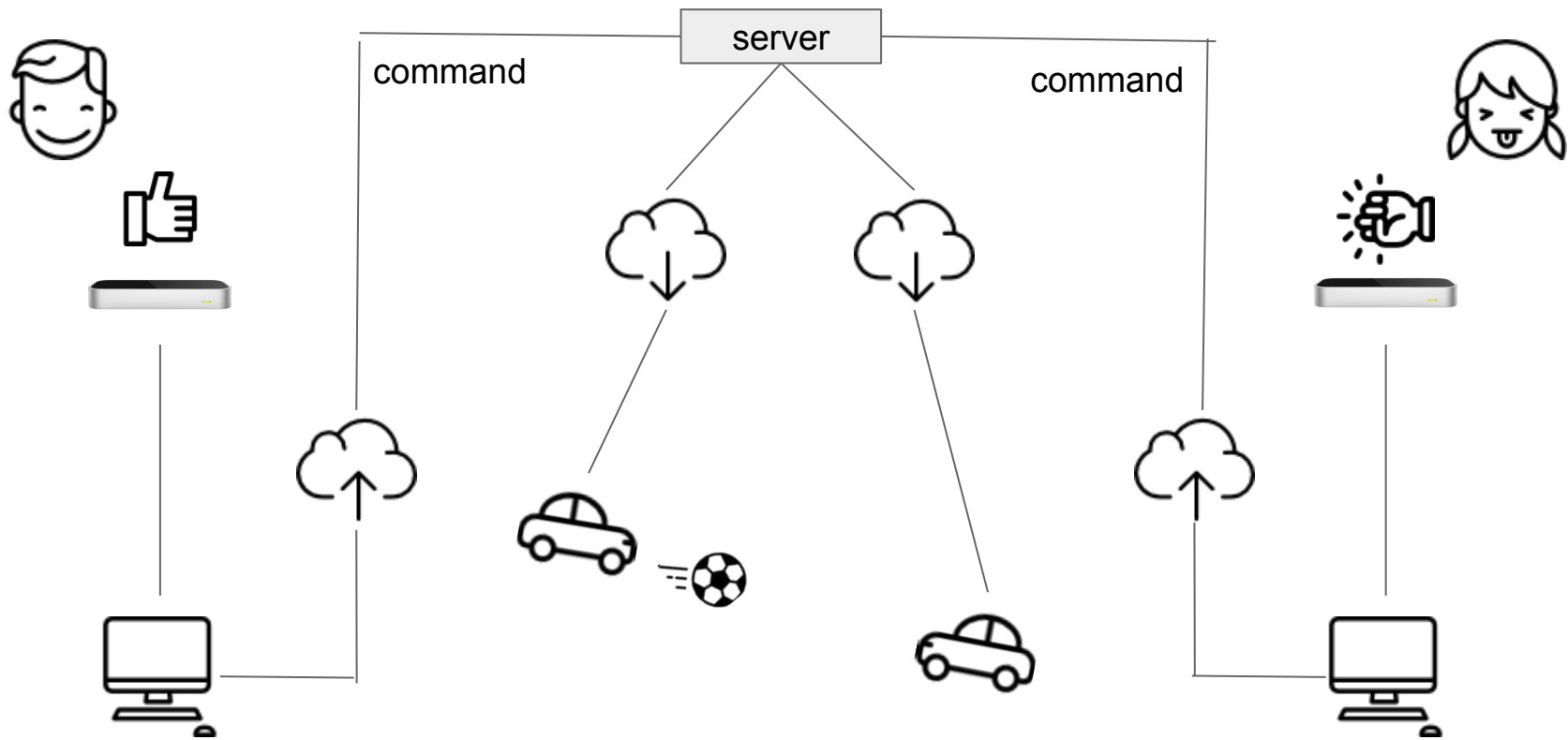
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# GESTURE SOCCER IS A **INTERNET OF THINGS** SYSTEM.



# SERVER / DATABASE IS THE PIVOT OF IOT.

- Php code on server
  - A bridge to the database
  - Insert / Query to the database
- Table of our database
  - A single table for our system
  - Car\_id / gesture\_command / x / y / time

car_id	gesture	time ▼ 1	x	y
24	9	2018-04-28 15:01:55	0	0
24	3	2018-04-28 15:01:54	0	0
24	3	2018-04-28 15:01:50	0	0
24	0	2018-04-28 15:01:43	0	0
24	0	2018-04-28 15:01:42	0	0

# GESTURE IS A NATURAL FORM OF COMMUNICATION.

- Natural and universal
- Easy to understand

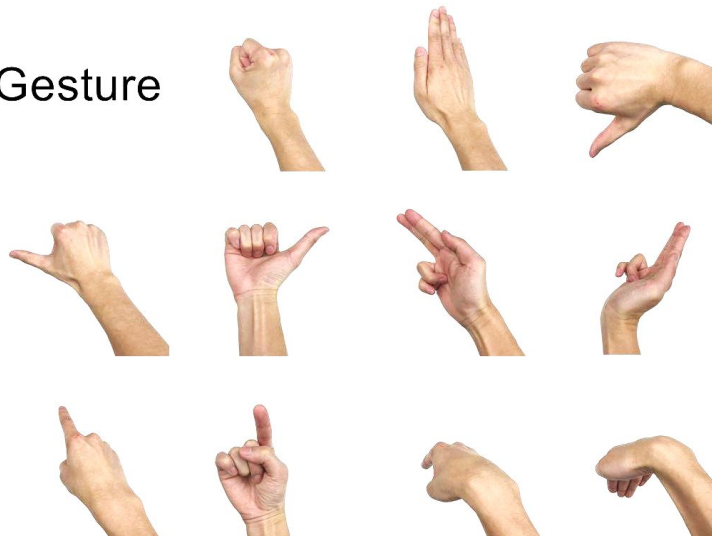
Use of gesture to make tasks easier



# USE INTUITIVE AND DIVERSE GESTURES TO CONTROL CARS.

- Basic maneuver
  - Forward, Backward
  - Turn left, turn right
- Action
  - Stop
  - Kick
- Ease for control
  - Turn left(right) a little
  - Move at 45 degree towards front
  - \*Pointing

Gesture

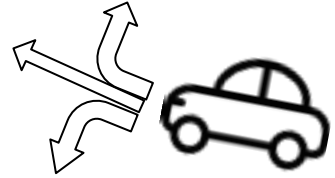


# MACHINE LEARNING IS USED TO LEARN THE GESTURE.

- Recording the gestures
  - Intuitive link to its functionality
  - Diverse enough for better recognition rate
- Data preprocessing
  - 2 points location for each finger (total 30 values)
  - Choose a reference point (tip of the thumb) to make the data scale and rotational invariant
- The model
  - Fully connected neural network (with two hidden layers)
  - Implemented in tensorflow

# CAR CONTROL IS DONE WITH MOTOR CALIBRATION.

- Motor calibration to perform actions specified by gesture
  - Changing linear speeds
  - Moving at a certain angle
- Code calibration
  - Arduino for motor controlling
  - Raspberry pi for action time specification
- Real time performance
  - Check server command every 1 second
  - Assure action performed is the newest command







# GESTURE SOCCER IS A DESIRABLE PRODUCT

- Easy to Use
  - Everyone uses gestures
- Affordable
  - Same Price range as RC cars
- Unique Experience
- Long Term and Short Term Enjoyment
  - Competition is fun

# GESTURE SOCCER IS UNIQUE

- Physical system that is gesture controlled
  - Many Apps use gestures to control electronics
  - Some require a special wrist band
- Anyone can use it
  - Step up to the controller, and gesture above
  - Even old people
  - Not amputees

# GESTURE SOCCER IS ENJOYABLE

- Short term
  - Controlling a robot minion is fun
- Mid Term
  - Mastering the system to beat your friends
- Long Term
  - New software game modes
  - New physical devices

# ACCESSIBLE GAME FOR EVERYONE.

- Ease of controlling
  - No learning involved for basic control
- Precise gesture
  - Larger training dataset
  - Various new gestures commands
- Complex machine learning approach
  - Models suitable for dynamic gestures
  - Pointing to a specific direction