Sany

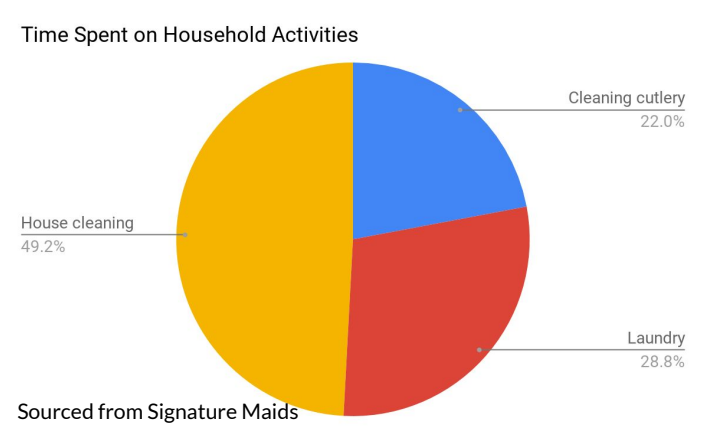
The need for floor-cleaning robots to reduce the workload of housekeeping

Real Life Problem

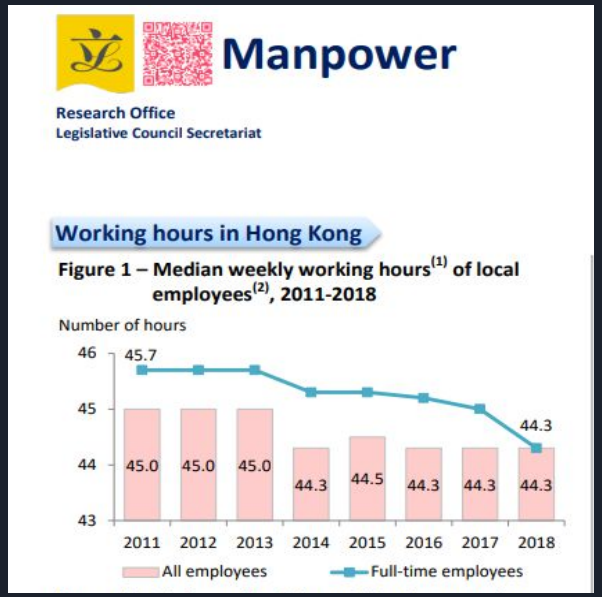
What is housekeeping?

- the management of house and home affairs
- the work or activity of cleaning and preparing rooms for customers

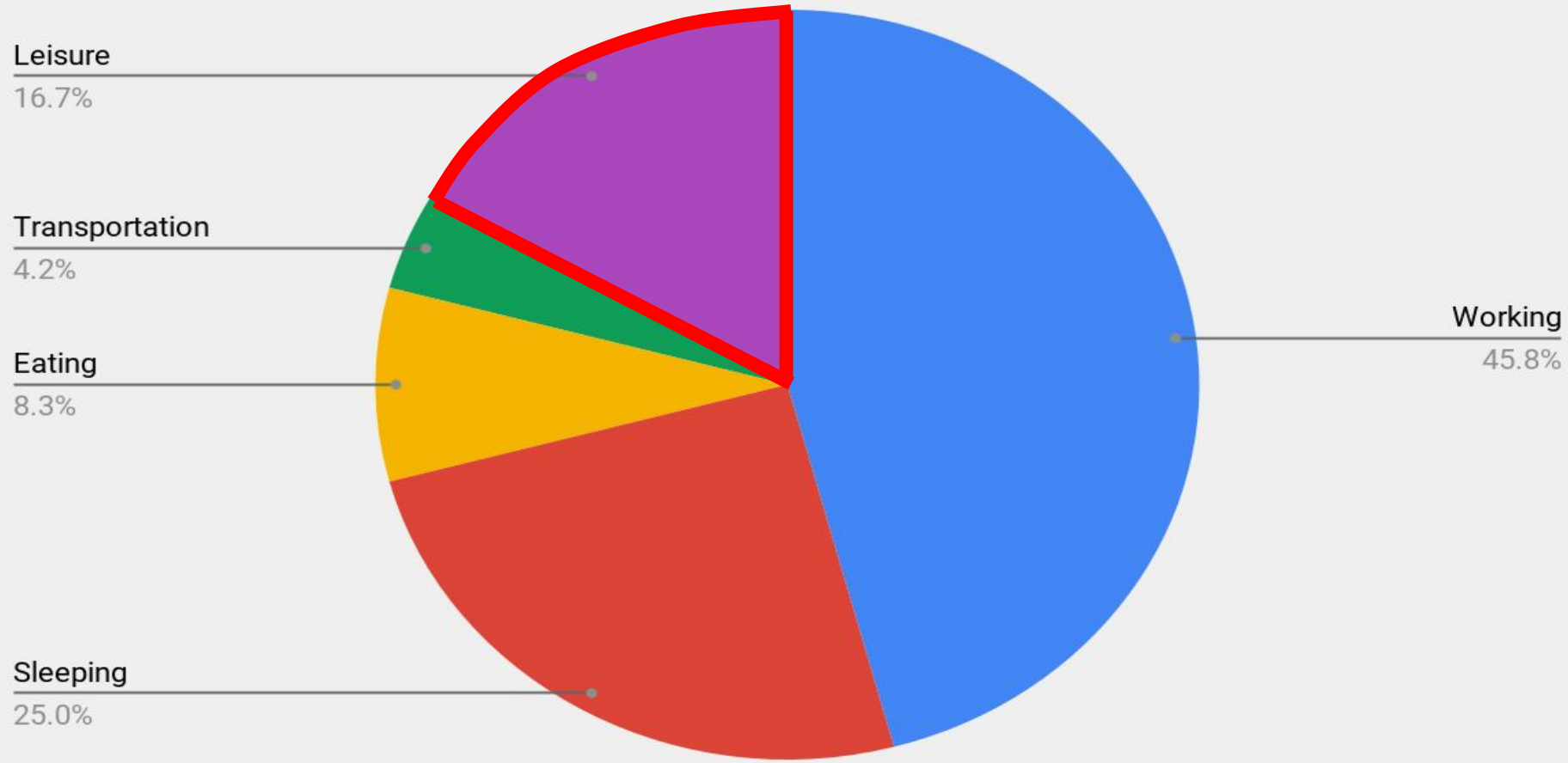
- Real life problem on floor cleaning
- Time
  - Time-consuming (30 minutes per day)



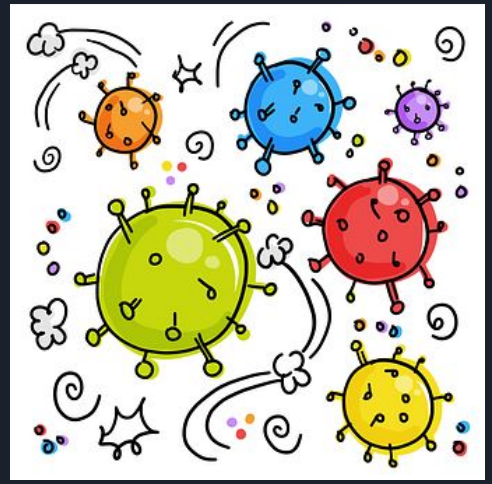
- an average of 11 working hours a day



Division of time



- Real life Problem on floor cleaning
- Health and hygiene
  - Dirty mop = spread filth around house
  - Still dirty in micro perspective



- Real life Problem on floor cleaning

- Psychologically
  - Frustration
  - Laziness
  - Procrastination

- what needs to be done to solve the problem

- Automatic
- Efficient and convenient
- Effective on killing germs and bacteria

Introducing The New Product

By Technical Engineer - Tim Tam Ka Ho and Ligma Leung Chun Wai

Introducing our New-generation floor-cleaning robot

- New nozzle design
- New battery design

- New Operating System with pre-installed appications
- Wireless firmware updates
- Compatibilize with Home assitance
- Reduced noise level
- New chips on mapping, path calculating and edge detection

- Redesigned flexible wheels
- New sensor for obstacle detection
- UV bacterial killing light

Introducing our New-generation floor-cleaning robot

Software-wise new features:

1. New Operating System with pre-installed appications
2. Wireless firmware updates
3. Compatibilize with Home assitance

Hardware-wise new features:

1. Reduced noise level
2. Redesigned flexible wheels
3. New sensor for obstacle detection
4. New chips on mapping, path calculating and edge detection
5. New nozzle design
6. New battery design
7. UV bacterial killing light

1. New Operating System with pre-installed appications

Our new design:

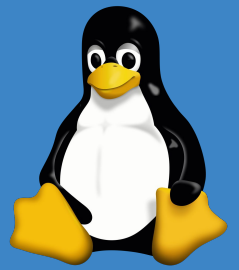
1. Using Linux System
- Open-source Unix-like operating system
- Require less hardware resources but still able to run program

Existed designs on the market:

1. Only accept simple commands
2. Limited algrothium of path is avaliable

a. Some place remain unclean

b. Bad effiency



2. Wireless firmware and applications update

Our new design:

When the robot is connected to the home network via WiFi

- User can update the firmware of the robot
- User can installe programs for the robot

No cable is needed

Existed designs on the market:

1. No update avaliable as no OS support and no internet are supported

3. Compatibilize with Home assitance/Mobile App

Our new design:

1. User can control the robot with Home assistance applications using the owner's voice via
   - Google Assistant
   - Apple Siri
   - Amazon Alexa
2. Scheduling the work by Home assistance
3. Manually controlled by Mobile Apps

Existed designs on the market:

- Controlled by traditional on/off button
- No scheduling at all

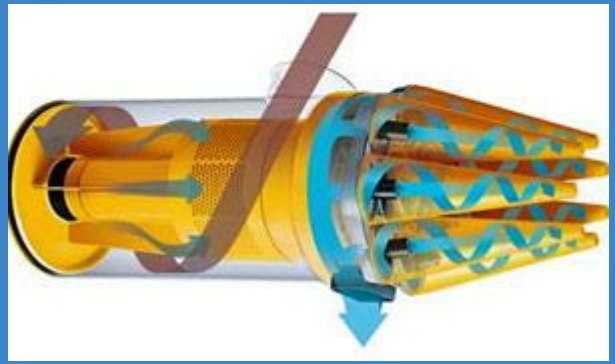
4. Reduced noise level

Our new design:

- New design for the vacuum motor
- Centrifugal vacuum motor

Existed designs on the market:

- The vacuum motor generates noise
  - Annoying and disturbing



5. Redesigned flexible wheels

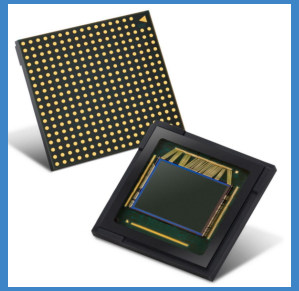
Our new design:

1. Up-liftable wheels
   - Lift up the wheels to avoid get jammed by obstacle
2. 360-degree-movable wheels
   - Provides more flexible movements

Existed designs on the market:

1. Wheels could easily get jammed by uneven floors
2. Wheels could easily get jammed by obstacle
   - For example, socks, wires

6. New sensors for obstacle detection



Our new design:

1. Ultrasound sensor is used
   - Obstacles can be detected by its size, density and distance
2. Infrared sensor is used
   - Living creatures can be detected by its temperature

Existed designs on the market:

1. Sensors are not used
   - Robot will easily get jammed obstacle, living creatures and pets

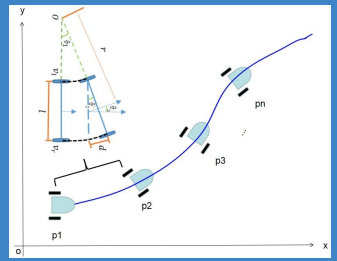
7. New chips on mapping, path calculating and edge detection

Our new design:

- Using new chips
  - To build the map after receiving signals from the sensors
  - To calculate an effective cleaning path which covers all the floor areas
  - To calculate the driving distance for returning to its initial position
- Train the pathing model with cloud server

Existed designs on the market:

1. The cleaning Path is randomly generated
2. Particular spot remains unclear
   - Cleaning efficiency is low
3. Unable to back to its charging position
   - Unable to charge automatically



8. New nozzle design

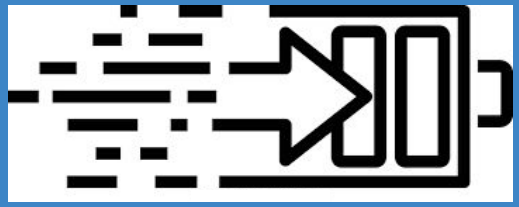
Our new design:

1. Smaller cleaning nozzle
    - Corners and edges can be clean
2. Nozzle are installed at the both the front and the back of the robot
    - More accurate cleaning angle

Existed designs on the market:

1. Corners and edges cannot be reached by the robot
    - The house is not fully clean

9. New battery design



Our new design:

1. Enlarged battery capacity
   - Maintain multiple clearing cycles after one charge
2. New Quick charge feature
   - Shorten charging time

Existed designs on the market:

1. Low battery capacity
   - Battery life failed to maintain multiple cleaning cycles
2. Long charging time
   - Most of the time the device is charging

10. UV bacterial killing light

Our new design:

- The UV is pointed toward the floor for sterilization

Existed designs on the market:

- The floor is not fully clean as there is no sterilization

Limitation (new product)

by Design Engineer - Ray Fong Lam Sum

High Power consumption

- Work for long time
- Always high power for cleaning
- Many functions use simultaneously

Dust box always full

- clean the dust box frequently
- It will stuck if forget to clean
- Make the robot broken

Limited in one-story house

- It doesn’t work in two-story house
- Unable for going second floor

Solution

High Power consumption

- Ability to automatically detect dirt
- Automatically change the mode by situation

Dust box always full

- will not increase the capacity of the dust box
- Make a new design of the charger
- Clear up the dust while charging

Limited in one-story house

- Make it fly(like quadcopter drone)
- Add two big wheels

The Company's Objectives

Create Automation for daily minute tasks to improve business efficiency and cost

HYGIENE

HEALTH


AHAM
VERIFIDE


AUTOMATIC SOAP DISPENSER

Window Cleaning Robot

Has been a great success

Singapore is where we first opened our sales

Singapore Telecommunications is one of the first companies to be our customers

Our First Vaccuum Robot

Housework occupies 4% of our lifetime

Vacuuming is more disliked than liked

Could very well be easily automated

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