Home Task Robots

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This work was created in an open classroom environment as part of a program within the Sutardja Center for Entrepreneurship & Technology and led by Prof. Ikhaq Sidhu at UC Berkeley. There should be no proprietary information contained in this work. No information contained in this work is intended to affect or influence public relations with any firm affiliated with any of the authors. The views represented are those of the authors alone.
Hypothesis

Home task robots will start to become commonplace in 5 years.
Source: ABIresearch “Consumer and personal robots”, January 7, 2013
Robotics in Perspective
Home Task Automation

Steam-powered Washing Machine
Dishwasher
Motorized Vacuum Cleaner
Food Processor
Electric Drip Coffeemaker
Vacuum Cleaner Robot
Smart Thermostat (IoT)
Cooking Robot
...
Comparison of Robotics and PC Markets

- 1950: Mainframes
- 1960: Minicomputers
- 1973-1977: Hobby Kits
- 1981-1984: IBM PC + clones
- 1995: PCs + Windows 95

1970s: Manufacturing Robots
1980s: New expensive prototypes
2002: Simple service robots
2005: Arduino/Hobby kits
2020: The Maker Movement
2020: Advanced Task Robots

The Maker Movement
Comparison of Robotics and PC Markets

1950
- Mainframes

1960
- Minicomputers

1973
- Hobby Kits

1977
- Apple II

1981
- IBM PC + clones

1984
- Macintosh

1995
- PCs + Windows 95

1970s
- New expensive prototypes

1980s
- Manufacturing Robots

2002
- Arduino/Hobby kits

2005
- Simple service robots

2020
- Advanced Task Robots

The Maker Movement
The Gartner Hype Cycle

- Autonomous Vehicles
- IoT
- Crypto Currencies
- Hybrid Cloud Computing
- Virtual Reality
- Virtual Personal Assistants
- Smart Robots

- Plateau will be reached in 5-10 years
Technology
Components

Source: ABIresearch, Pike Research, John C. McCallum, author estimates.
Other Enablers

• Mobile Technologies
• Connectivity & Cloud computing
• 3D Printing
• Software (open source & APIs):
  – Mapping & Navigation
  – Machine Learning, Computer Vision
  – Manipulation and Sensor Processing
  – Speech Recognition, Natural Language Processing, Text to Speech
Cleaning & Cooking

Deep Dive
Current Players

- Samsung
- Neato Robotics
- iRobot
- Casabots
- Rotimatic (A Zimplistic Product)
- Sereneti
Market Opportunity

North America - $2.3 billion
- iRobot: 15.4%
- Other Robots: 3.0%
- Traditional Vacuums: 81.6%

EMEA - $2.7 billion
- iRobot: 14.2%
- Other Robots: 8.6%
- Traditional Vacuums: 77.2%

APAC - $2.3 billion
- iRobot: 11.5%
- Other Robots: 6.7%
- Traditional Vacuums: 81.8%

$7.2 billion annual market opportunity

Source: Vacuum Cleaners >$200 USD, 2014 retail prices (based on NPD, GfK, Euromonitor, iRobot internal data)
iRobot Revenue

~90% Consumer Robots
Robotic vacuums revenue

Total Market Opportunity

Robotic Vacuum Revenue trend

- $0
- $1,000
- $2,000
- $3,000
- $4,000
- $5,000
- $6,000
- $7,000
- $8,000


Millions
Cleaning Conclusions

• High growth market with high customer demand

• Value in automating highly mechanical chores

• Future Improvements
  – Increased reachability - Shrinking size or dual bots.
  – Reduced maintenance (self emptying, self cleaning)
  – Better mapping and room awareness.
  – Better battery life

• Winners - iRobot, Neato
Cooking Robots
**Market Need**

What many families do today

- 1-2 hours shopping every weekend
- ~1 hour to cook every day.

Wouldn’t this be nice?

- Groceries automatically come home based on my cooking machine
- Fancy dinner <5 min. of my time every day.
Total Addressable Market

- Hardware price tag ~ $600
- If household income > $72k per year, 0.6% of yearly income = $600

USA
$9B

India
$2.5B

China
$6B
Cooking Conclusions

- No entrants have yet proven themselves - nascent market
- Competitive differentiation based on features and kinds of food cooked
- Possibility of new entrants taking over
Societal Factors
Family Dynamics

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Acceptance of Robots
Effect on Job Market
Fear of AI
Conclusion
Predictions

Task robots will start to become commonplace in 5 years.

Cleaning will lead the way.

Food market will start to grow over next 5 years.

Market is ripe for new entrants to take over.
Appendix
The Gartner Hype Cycle

- Expectations
  - Advanced Analytics with Self-Service Delivery
  - Autonomous Vehicles
  - Internet of Things
  - Speech-to-Speech Translation
  - Machine Learning
  - Wearables
  - Cryptocurrencies
  - Consumer 3D Printing
  - Natural-Language Question Answering
- Peak of Inflated Expectations
  - Hybrid Cloud Computing
  - Augmented Reality
  - Virtual Reality
  - Autonomous Field Vehicles
- Trough of Disillusionment
  - Cryptocurrency Exchange
- Slope of Enlightenment
  - Enterprise 3D Printing
  - Gesture Control
- Plateau of Productivity

Plateau will be reached in:
- ○ less than 2 years
- ● 2 to 5 years
- ● 5 to 10 years
- ▲ more than 10 years
- ◦ before plateau

As of July 2015
Task Automation

- Steam-powered Washing Machine
- Electric Lightbulb
- Internal Combustion Automobile
- Motorized Lawn Mower
- Motorized Vacuum Cleaner
- Refrigerator (home use)
- Food Processor
- Electric Drip Coffeemaker
- Robotic Lawn Mower
- Handheld Vacuum Cleaner
- Robotic Cat Litter Cleaner
- Robotic Vacuum Cleaner
- Smart Thermostat, Lighting, Alarms
- Cooking Robot
- Self-driving Car
- Smart Refrigerator, Trash Robot, All-purpose Cleaning, Gardening, Security Drone, Home Repair, First Aid, Elder Care, ...

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Cleaning: Product Features

Roomba - Automated vacuum cleaning robot Scooba
Braava - Floor Mopping Robot
Verro - Swimming pool cleaning robot
Looj - Gutter cleaning robot
Environment

- Manufacturing and materials from 4 contract manufacturers in China
- In House Design, Development and Marketing. R&D approx 13% of revenue
- Selling throught 30 retail partners in US and Canada. Through Distributors and retail in rest of world. approx 6% through own online stores
Scope

Including:
• Floor Cleaning
• Food

Excluding:
• Gardening
• Social
• Security/surveillance
• Outside home
Worldwide 3D printer ASV Trend

- Price ranges from sub-$1,000 to seven figures
- Customers indicate short ROI after 3D printer investment

*IDC Special Study – WW 3D Printer 2012-2017 Forecast and Vendor Shares, #244304, November 2013

SOURCE: IDC.
3D Printing Industry Forecast

Worldwide 3D Printing Industry Forecast, Billions

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New 'Lost Generation': The Cooking Illiterate

By TRISH HALL

Food marketers and researchers say that despite the desire to cook, the cooking skills of Americans have declined precipitously.

In the last decade, cooking has evolved into an optional activity, like skiing or playing chess. Many young adults never learned how to cook, or they simply don't bother, because there are so many other choices, like fast food, takeout or frozen dishes that can be microwaved.

1 hour saved every day

Today's young adults haven't learnt much cooking 😞

but don't know how to cook it 😞