



# 无时无地感测与认知

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# 议程

英特尔研究院简介

研究由起

无时无地感测与认知

关键要点及项目简例

问答

# 英特尔研究院的使命

“推进超越产品的，悠关英特尔前景的探索性的研究”

探索性研究

世界级的技术水准

多学科团队

开放合作，  
大学联络网



# 与世界研究机构紧密合作

- ★ 紧密大学合作（研究所）
- ★ 深入合作关系（核心学校）
- ★ 外部联合研究项目（研究委员会）





您生活中不可  
缺少的

体身体心的计算

使工作与生活中的所有方面更方便和更丰富

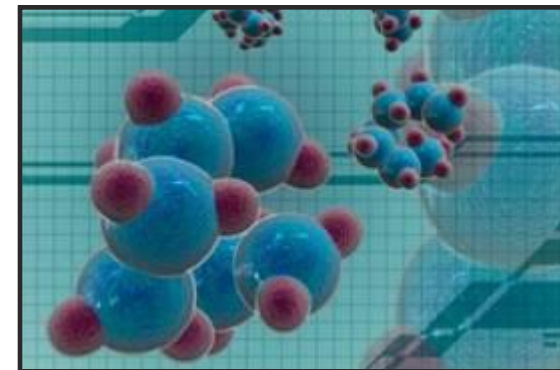
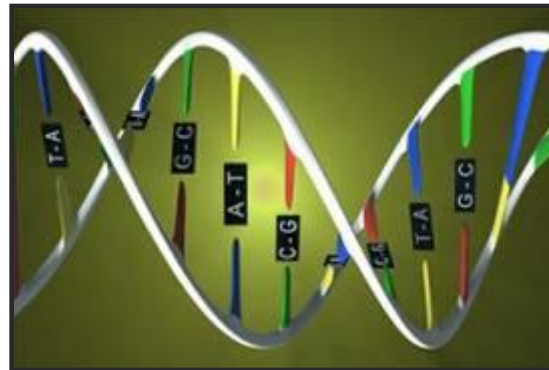
# 计算机擅长于解析型的任务



- 琐细任务的自动化

- 复杂分析和优化

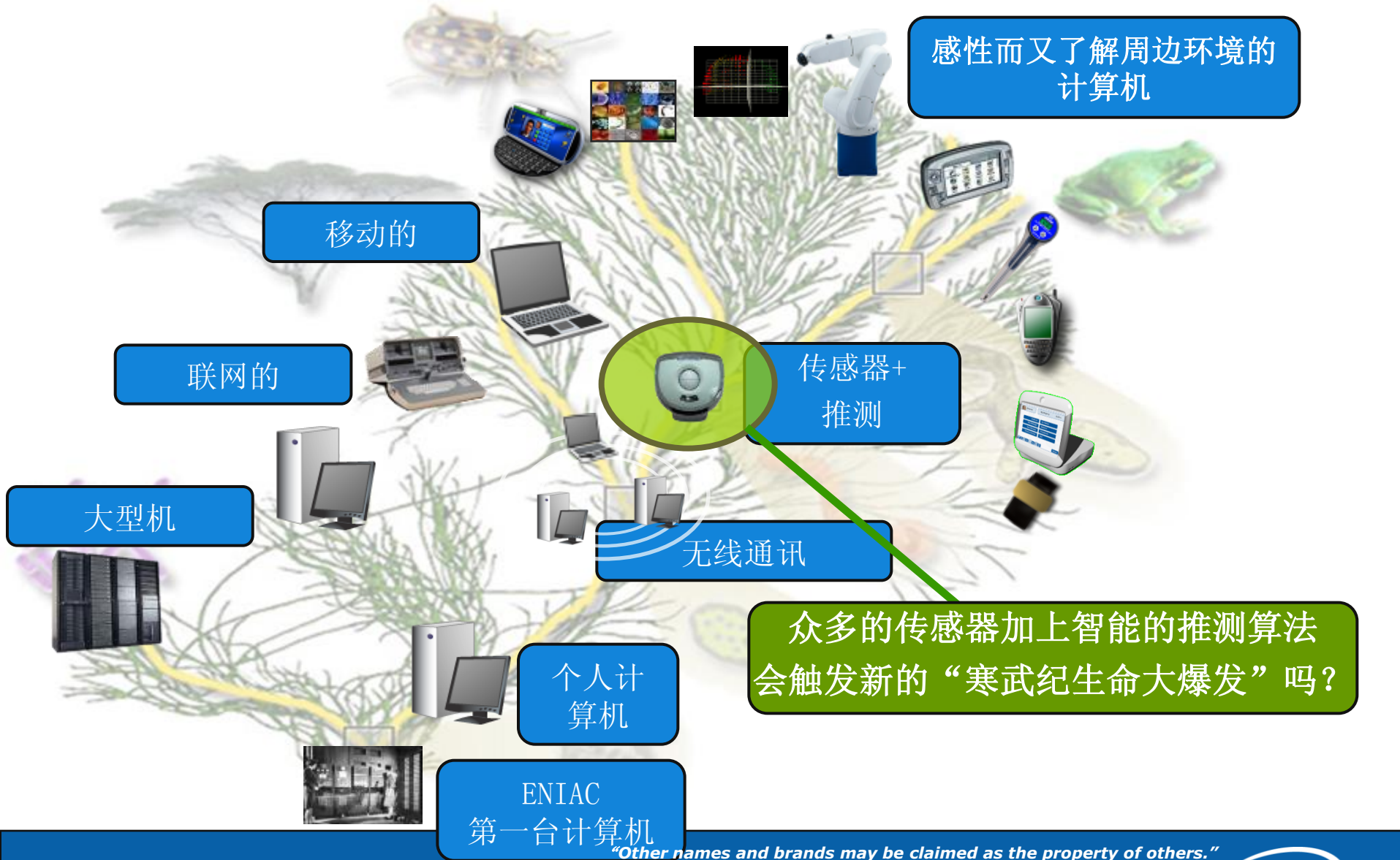
- 新的理解 — 建模及仿真



# 人们每天都干什么



# 体身体心的计算





# 日常感知

(简记为ESP: Everyday Sensing and Perception)



“进行深刻的研究以使计算系统能够了解并深入日常生活及环境”

广泛应用的必需条件：准确性，适应性（多样性，环境），节省能源，保护隐私

若能达到“对90%的日常活动有90%的准确度”，则智能推测就会走向广泛的实际应用而不是仅仅停留在构想的事例中（主流应用）



ESP: 使计算系统能够在日常活动和环境中了解用户和相关的事件

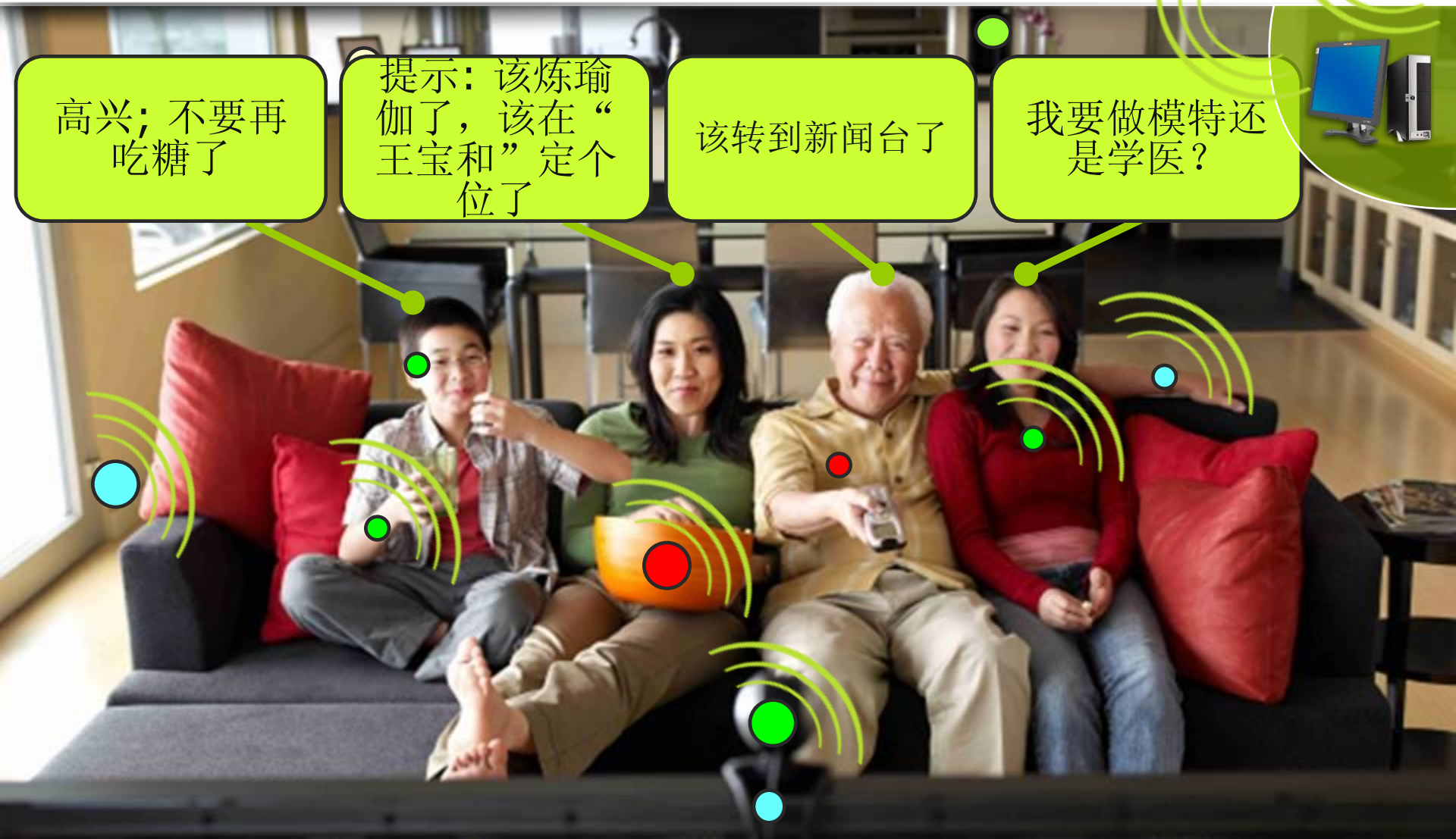
# 日常感知的一些基本组成事例

高兴; 不要再吃糖了

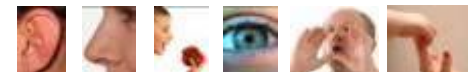
提示: 该练瑜伽了, 该在“王宝和”定个位了

该转到新闻台了

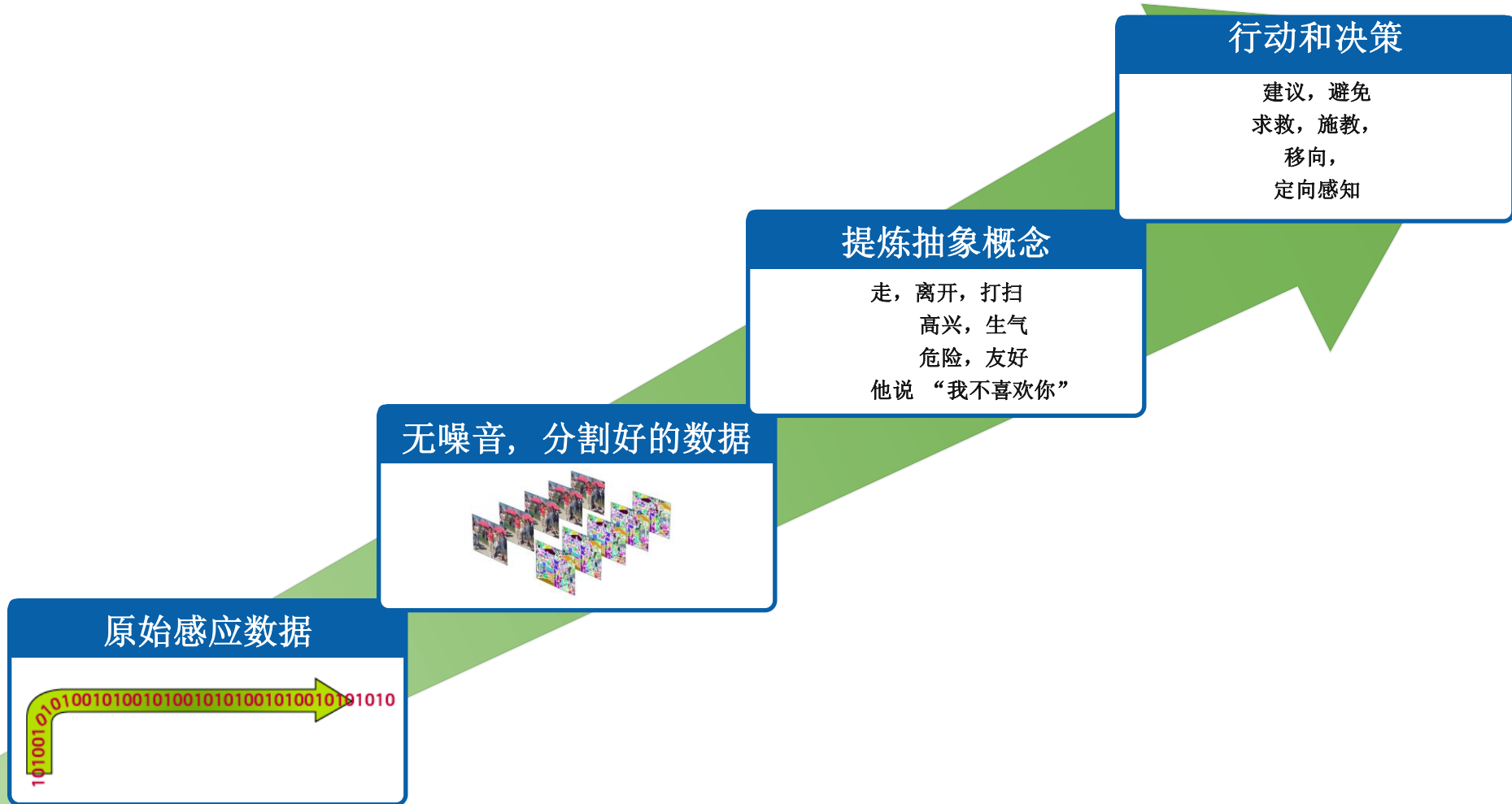
我要做模特还是学医?



# ESP 面临的挑战：高效的感测



# ESP 面临的挑战：提炼高一层的理解



# ESP 面临的挑战：实时指标

## 行动和决策

建议，避免  
求救，施教，  
移向，  
定向感知

## 提炼抽象概念

当今的视频事件探测技术：万亿  
次计算，10 kW

手持计算 => 必须减少到1W...

## 原始感应数据

1010010101001010010100101001010010101010

# 每个人都想快乐

了解活动，环境，情绪，喜欢什么和不喜欢什么

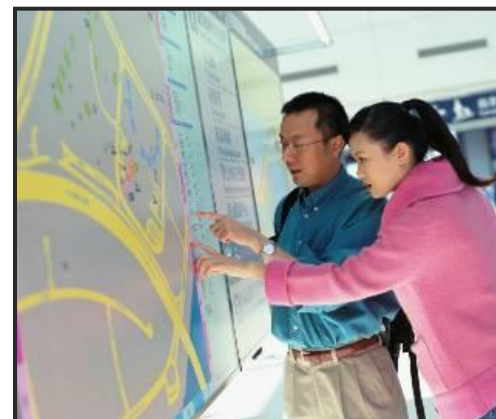
- 活动：运动，声音，图像
- 情绪：言语，动作，或生理
- 喜欢或不喜欢：以上+具体行动（买或卖，观点，交谈）

执行的操作：建议，规劝，相关的趣闻，选取音乐，指点，买礼物，及其他的“机灵的”应用



## 关于事件监测的录像：

由于象Youtube 这样用户产生的内容，电视上丰富的媒体，以及象录像监控这样的应用，录像在我们的生活中越来越重要。如果计算机能够理解录像，用户就能够找到他们想看的部分，而且能够产生新的能够理解用户手势的自然的人机界面。我们的方法把录像当作一个时空的立体，并且能够在录像中有很多噪音时还能查找到要找的事件。



# 增加您的知识，助您发展

了解兴趣与动机；目标和现在的能力

- 从读写 / 网上冲浪 / 说话 / 重复性动作了解兴趣
- 从感性的反馈了解偏爱和动机
- 从交谈—或其他直接的交流来了解目标

执行的操作：教你想要学的，合适的难度，正确的方法，和什么时候你已准备好

执行的操作：实时理解对话和实时施教



# 生活在一个物质世界里

了解各种具体物件及其动态

- 识别 – “你能递给我X吗?”
- 安全的拿起并挪动
- 轻柔，力感，端庄，或可爱!

执行的操作：抓住我，整理好那个，搬动我，跳舞!



## 有关个人机器人的录像：

我们认为个人机器人将会成为人们生活中的重要组成部分。每个个人机器人都是一个可以与人互动的智能体。它们可以感知环境、理解任务、并执行操作。它们可以与人协作，也可以独立完成工作。它们可以成为我们的助手、伴侣、甚至是家庭成员。它们可以为我们提供各种服务，如家务、娱乐、教育等。它们可以让我们生活得更方便、更舒适、更快乐。它们可以成为我们在这个物质世界中的最佳伙伴。

## 有关物件识别的录像：

这个录像展示了英特尔西雅图研究院开发的实时物件识别系统。这个系统每秒能处理10帧图像，并且能够识别几十个物件。当这个系统识别一个物件时，它在物件周围画一个光圈，并标出物件的名称和标识码。小十字是识别系统用的局部图像特征。这个系统应用了一个新的监督学习算法，叫做无定核技术（Indefinite Kernel Machine）。这个项目的最终目标是要识别手持物件模组的百上千个物件。如果能够识别几乎所有我们可能遇到的物件（一般人家只涉及大约500个物件。新颖的建筑外表，熟人的面孔，海报，餐馆菜单，以及其他非家居环境会增加物件几个数量级）。训练这个系统我们用了每个物件的15个不同光线下不同角度的例子。

property of others."





# 让我们周游四方

了解与此地及环境相关的信息 – “位置或经纬度”；“星巴克”；“在人群中”；“第一次约会”

找路 – 穿过一个拥挤的房间，广场，购物中心，城市

- 避开障碍，导航，多种方式到达目的地

了解行进规则（不要碰坏别的东西，在相关的地方要遵守交通法规）

执行的操作：指向，移动，并适应环境



## 有关“大挑战”的录像：

这种技术的一个代表性的例子是无人驾驶汽车。它们不光能提高行驶的安全性，而且能够帮助那些因为年纪或身体问题而不能驾车的人。它们还可以帮我们做很多日常重复性的事情，如接踢完球的孩子，购买平常日用品，取回干洗的衣物等。在2007年11月，英特尔赞助了两辆参加“街区挑战赛”的无人驾驶汽车。在这个比赛中，无人汽车要穿过90公里的街区的环境，包括交叉路口，停车场，多车道，及50辆有人驾驶的车子来假扮正常交通路况。这既录像

# ESP: 计算机帮助您的日常活动



# Mash Maker: 以您想要的方式重组网页



## 通过添加构件建立个性化网页

添加可视化，来自别的来源的数据，经过转换的...

## 开放且可扩展

可用一个简单的应用程序接口（API）创造新的构件 - 引入新的方法来加强网页

## 主动建议网页糅合

Mash Maker 会“猜测”您的喜爱来建议一些网页糅合

Facebook | All Friends - Mozilla Firefox

Build your own trip - SFO to PVG - Mozilla Firefox

File Edit View History Bookmarks Tools Mash Help

http://www.expedia.com/pub/agent.dll?tovr=-1294657289

labs! legroom New Timeline Timeline on expedia economy legroom

# Expedia

Home Flights Hotels Cars Vacation Packages Cruises Activities

Start search over

Change your search

Departure airport: SFO (San Francisco)

Destination airport: PVG (Shanghai)

Departing: (mm/dd/yy) 3/20/2008

Returning: (mm/dd/yy) 3/26/2008

Airline: No Preference

Class: Economy / Coach

Nonstop flights only

Refundable flights only

Go

Change Travelers

1 Adult

Change travelers

- Indicates flight is operated by another airline. Move your mouse over the icon for details.

## San Francisco, CA (SFO) to Shanghai, China

Nonstop	All Results	Air China	Singapore Airlines	Philippine Airlines
1 stop	from \$1205 see below	from \$1205	---	---
2+ stops	from \$1077 see below	from \$1077	from \$1439	from \$149

Note: The prices shown below are estimated and may vary. Itinerary requires paper tickets the day before departure.

1 Choose a departing flight

Sort by: Price Duration

from \$2535 Roundtrip

1:40 pm Depart San Francisco (SFO) Thu 20-Mar  
Arrive Shanghai (PVG) 9:05 pm Duration: 16hr 25mn

legroom: 30-32

from \$1205 Roundtrip

2:50 pm Depart San Francisco (SFO) Thu 20-Mar  
Arrive Shanghai (PVG) 10:30 pm Duration: 16hr 40mn

legroom: 34,

from \$1971 Roundtrip

8:00 am Depart San Francisco (SFO) Thu 20-Mar  
Arrive Shanghai (PVG) 4:30 pm +1 day Duration: 17hr 30mn

legroom: 31-34,

from \$1971 Roundtrip

7:15 am Depart San Francisco (SFO) Thu 20-Mar  
Arrive Shanghai (PVG) 4:30 pm +1 day Duration: 18hr 15mn

legroom: 31-34,

PRICE NOTE

For your convenience, we've added estimated price hints to some of these

Expedia 和 legroom  
糅合在一起

san francisco bay area apts/housing for rent classifieds - craigslist - Mozilla Firefox

File Edit View History Bookmarks Tools Mash Help

http://sfbay.craigslist.org/apa/

62C8FE65-4EBB-45E

search for: in: apts/housing for rent Search

rent min max 0+ BR cats dogs has image

[ Wed, 19 Mar 11:17:46 ] [ free credit reports ]

[ stating a discriminatory preference in a housing post is illegal ]

[ housing forum ] [ success story? ]

**[ AVOIDING SCAMS & FRAUD ]**

**[ PERSONAL SAFETY TIPS ]**

Wed Mar 19

/ 2br - two bedroom apartment - (fremont / union city / newark) pic

Yelp Listings:

Gyro Express

Category: Greek and Mediterranean

us a couple times how the food was (g

0.8 Miles

7. Cafe Bueno Sera

Category: Italian

address: 4425 bidwell drive at sund... Fremotn ca US

\$1750 Spacious, Bright, Freshly Painted, Farming Studio - (USF / panhandle) pic

\$1150 / 2br - 2 bedroom 1 bathroom in Antioch - (pittsburg / antioch) pic

\$1355 / 1br - Great Apartments and Friendly service! At Archstone San Jose! - (san jose west) img

Yelp Listings:

2. El Amigo Burrito

Category: Mexican

4485 Stevens Creek Blvd  
Santa Clara, CA, 95051  
(408) 248-3113

Good solid REAL authentic Mexican food. I have eaten Mexican food for many, many years from San Antonio to Houston to Chicago to various California

0.2 Miles

3. Aroy-Dee Thai Restaurant

Category: Thai

375 Saratoga Ave  
San Jose, CA, 95106

Yelp 和 craigslist  
糅合在一起

# Mash Maker: 技术预览!



## Intel® Mash Maker

- 扩展浏览器，由英特尔研究院与英特尔软件解决方案事业部共同研制
- 将在2008年4月22日的Web 2.0 大会上发布

## 包括对微软网络浏览器 (IE) 和火狐 (Firefox) 的支持

- 先进的窗口部件、可视化设计、第三方数据、开放可扩展的应用程序接口 (API)

邀请您畅游网络未来  
[MashMaker.Intel.com](http://MashMaker.Intel.com)

# 要点回顾

前瞻性研究并和科研界紧密合作

体身体心的计算

日常感知 – 引领令人振奋的，在感知方面能增加新的功能和手段的进步

# 若想了解更多，请参阅

## 研讨

- FUTS005 生物传感器和信息系统：正在改变生物医学研究与实践范例
- FUTS006 集体（Collective）来临：3维互联网时代新“社区”的需求

## 演示（技术展示区）

- BU025 组合计算
- BU029 个人机器人技术
- BU028 电子生物传感器阵列

[www.intel.com/research](http://www.intel.com/research)

提问？



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