乐山市首届国际人工智能（农业科技）研讨会工作方案

一、研讨会时间

2018年3月6日（星期二）下午13:30—17:30。

二、研讨会地点

乐山高新区安港路489号盛泰工业孵化器A园12层3号会议室

三、参加人员

（一）政府嘉宾

乐山市科技局：谢毅副局长

乐山市农业局：毛剑副局长

乐山高新区管委会：董金平副主任

（二）专家嘉宾

Ben Goertzel 博士：西美农业技术产业研究院首席科学家，人工智能先驱，SingularityNET 公司创始人兼 CEO，汉森机器人公司首席科学家。

四川省农业厅：封传红（植保站副站长）、万宣伍（病虫测报科科长）

四川省农业科学院植保所：彭云良教授（四川农业大学教授、农业部重点实验室主任）

Agenda for the First International Artificial Intelligence (Agro-tech) Seminar in Leshan City

I. Time

13:30-17:30, 6 March, 2018, Tuesday

II. Address

No.3 Meeting Room, 12 Floor, Shentai Industrial Incubator Park A, No. 489, Angang Road, High-tech Industrial Development Zone, Leshan City

III. Participant

i. Government officials

- Officials from technological and agricultural bureaus of Leshan City: Xie Yi, Mao Jian
- Officials from committees of the High-tech Industrial Development Zone of Leshan City: Dong Jinping

ii. Experts

- Dr. Ben Goertzel: the Chief Scientist of Leshan CCM Agricultural Technology & Industry Research Institute Co., Ltd., a pioneer in artificial intelligence field, founder and CEO of SingularityNET,

Image Analysis for Ethiopian Coffee Plant Diseases Identification

Abrham Debasu Mengistu *abrhamd@bdu.edu.et*
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P.O.BOX 26

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Computing Faculty, Bahir Dar Institute of Technology,
Bahir Dar University, Bahir Dar, Ethiopia
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Abstract

Diseases in coffee plants cause major production and economic losses as well as reduction in both quality and quantity of agricultural products. Now a day's coffee plant diseases detection has received increasing attention in monitoring large field of crops. Farmers experience great difficulties in switching from one disease control policy to another. The naked eye observation of experts is the traditional approach adopted in practice for detection and identification of coffee plant diseases. This paper presents an automatic identification of Ethiopian coffee plant diseases

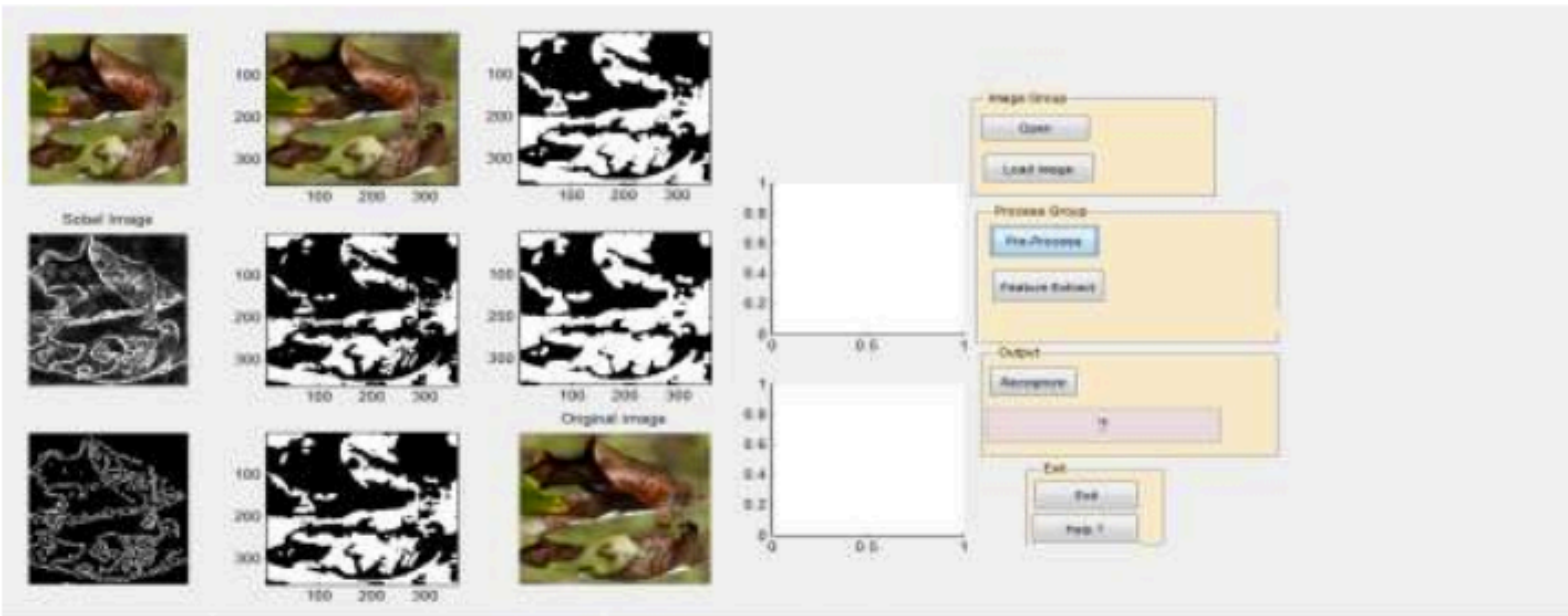
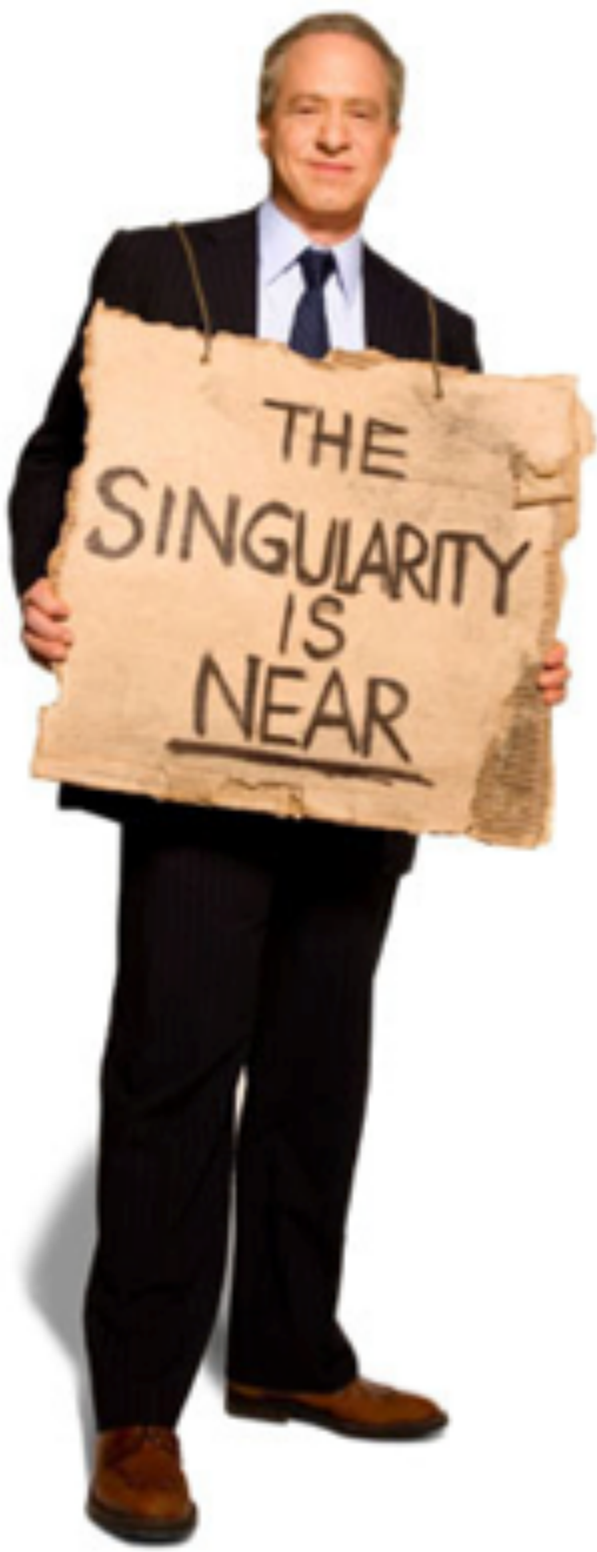


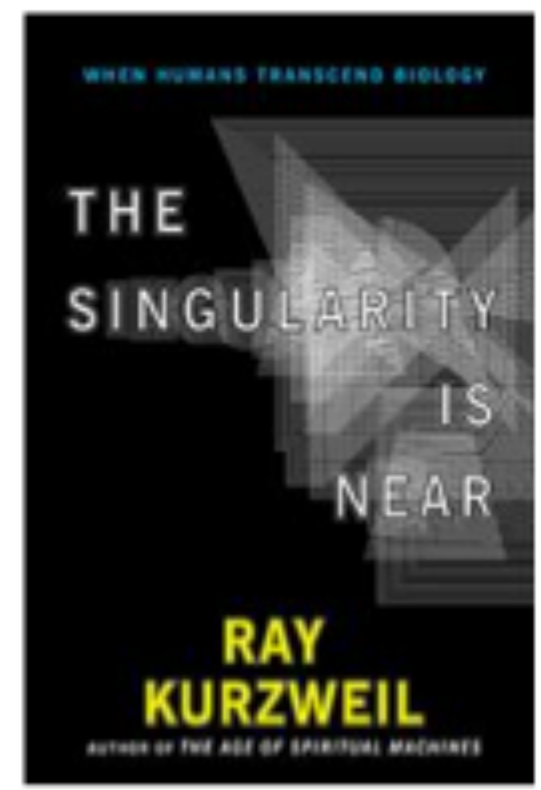
FIGURE 2: Coffee Diseases Recognition Prototype.



“I set the date for the Singularity- representing a profound and disruptive transformation in human capability- as 2045.

The nonbiological intelligence created in that year will be one billion times more powerful than all human intelligence today."

The Singularity is Near, When Humans Transcend Biology - Ray Kurzweil (2005)



OpenCog

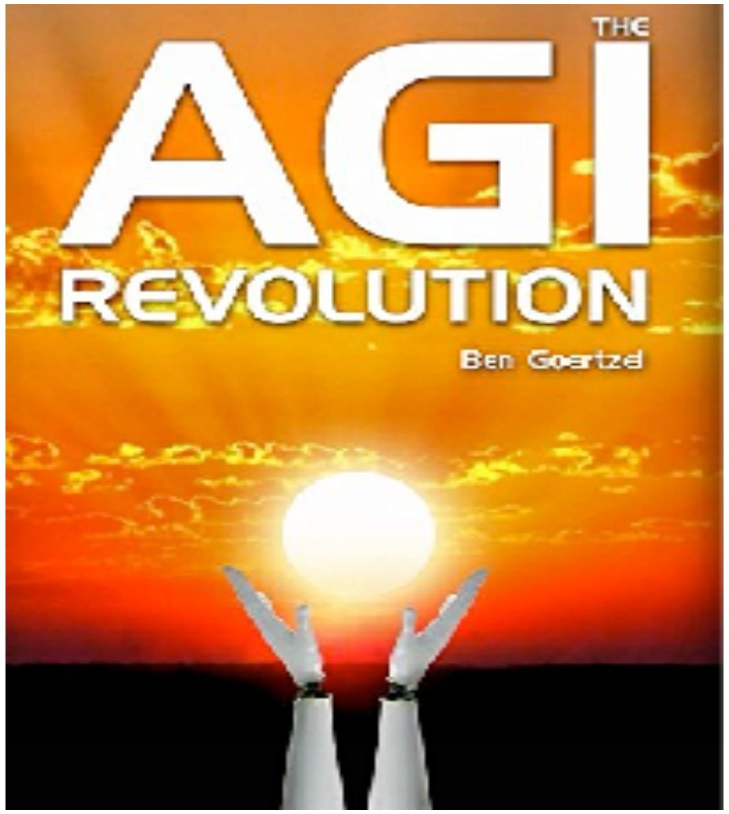
AGI society

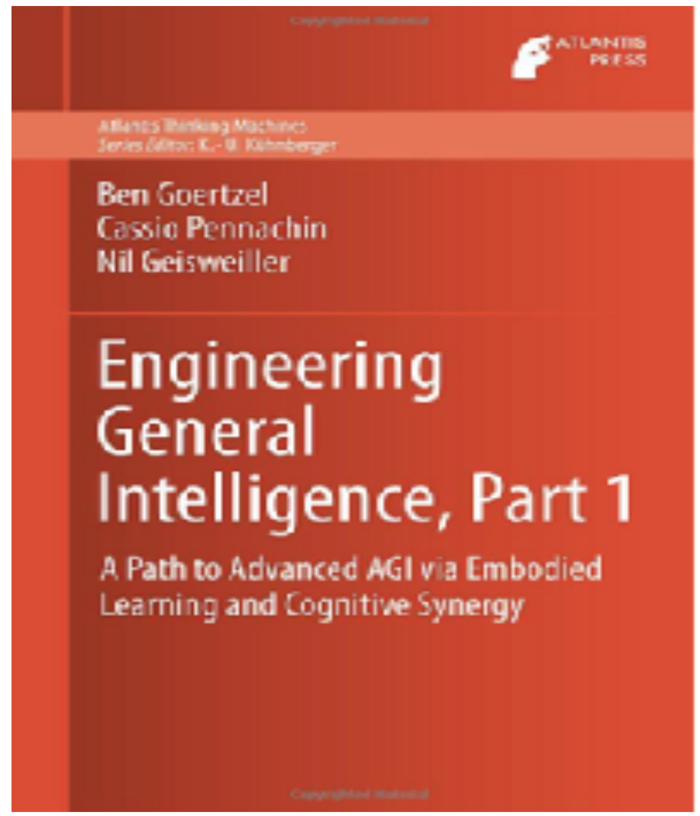
Hanson Robotics

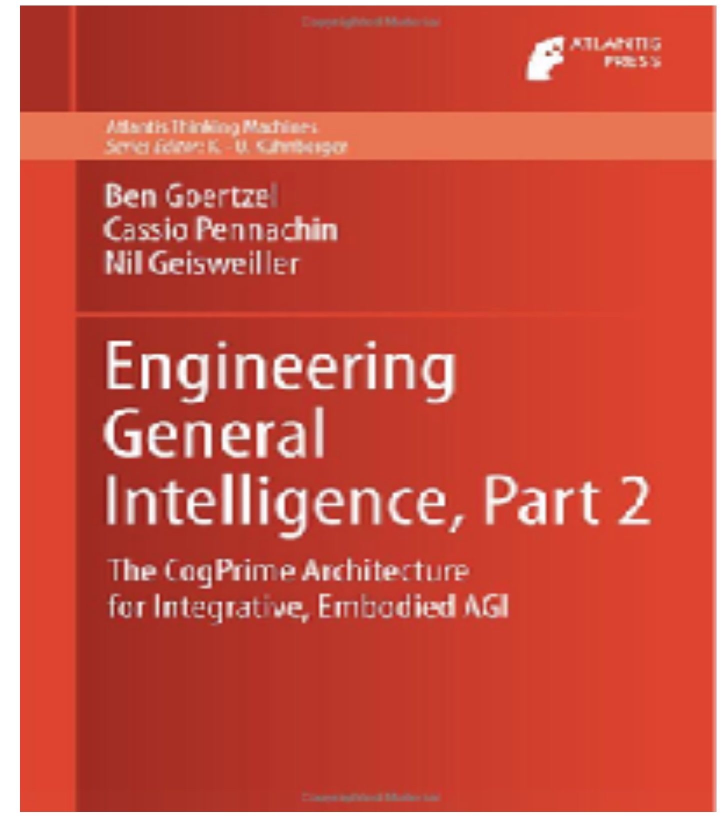
Singularity Net

Narrow AI vs. Artificial General Intelligence

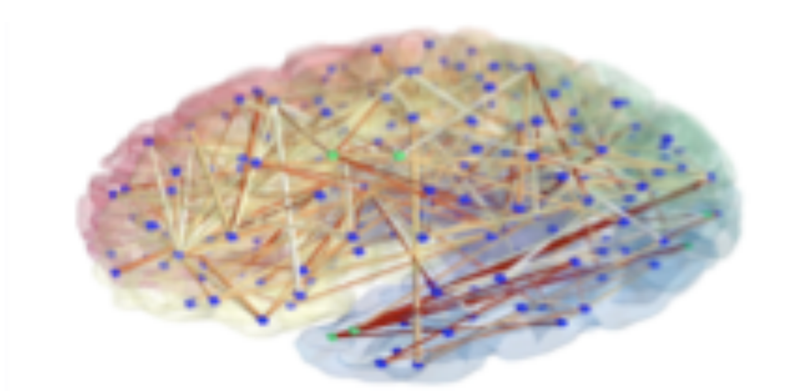
- Self-Driving Cars are a great leap forward –
- but they can't ***learn*** to drive different types of vehicle besides cars (trucks, boats, motorcycles)
- And they are poor at adapting to unforeseen road conditions

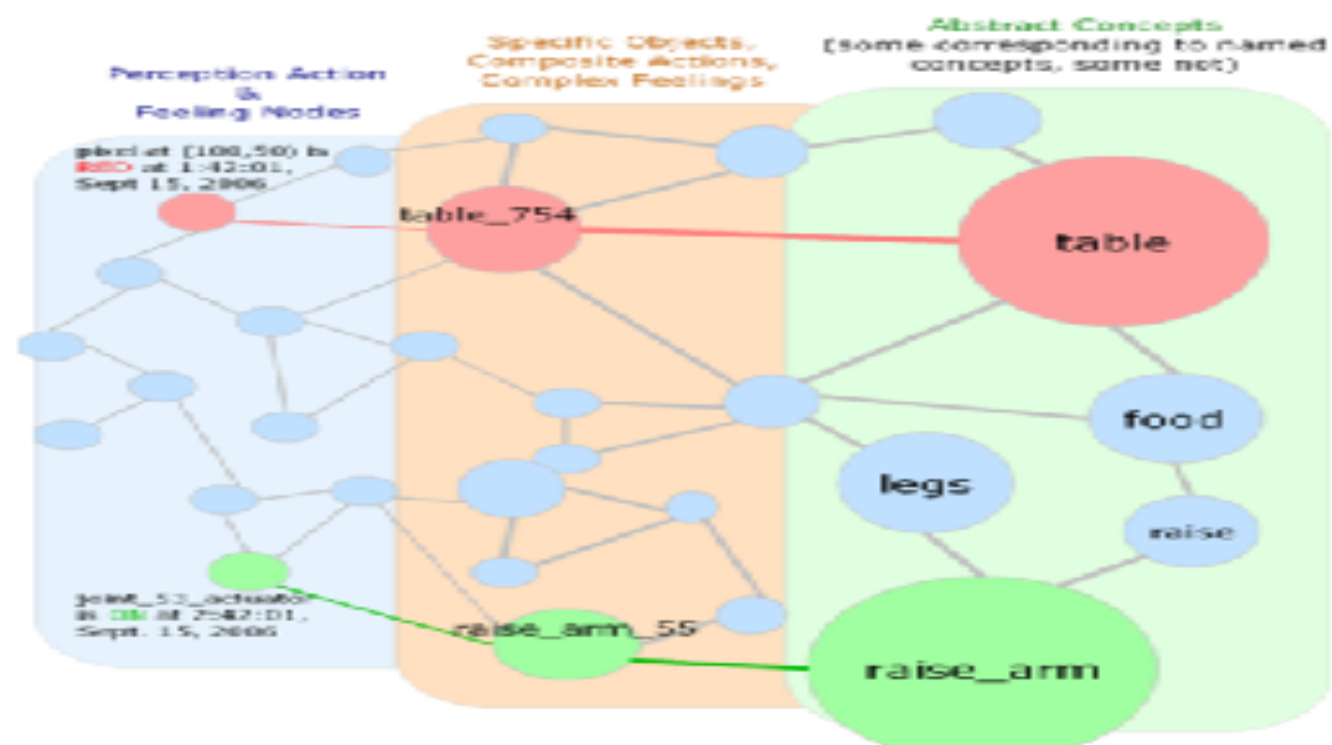

THE
AGI
REVOLUTION
Ben Goertzel

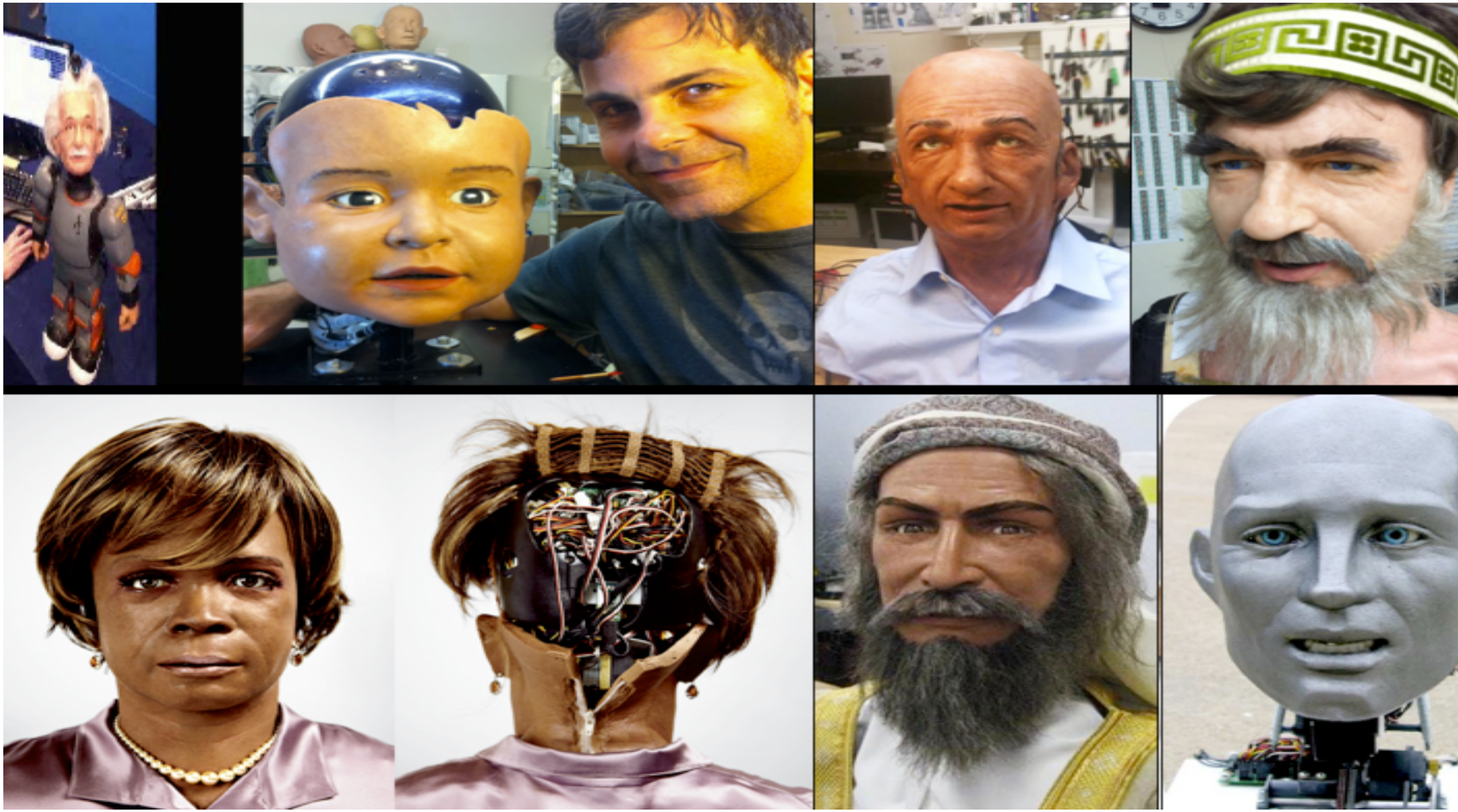

Ben Goertzel
Cassio Pennachin
Nil Geisweiller
Engineering General Intelligence, Part 1
A Path to Advanced AGI via Embodied Learning and Cognitive Synergy

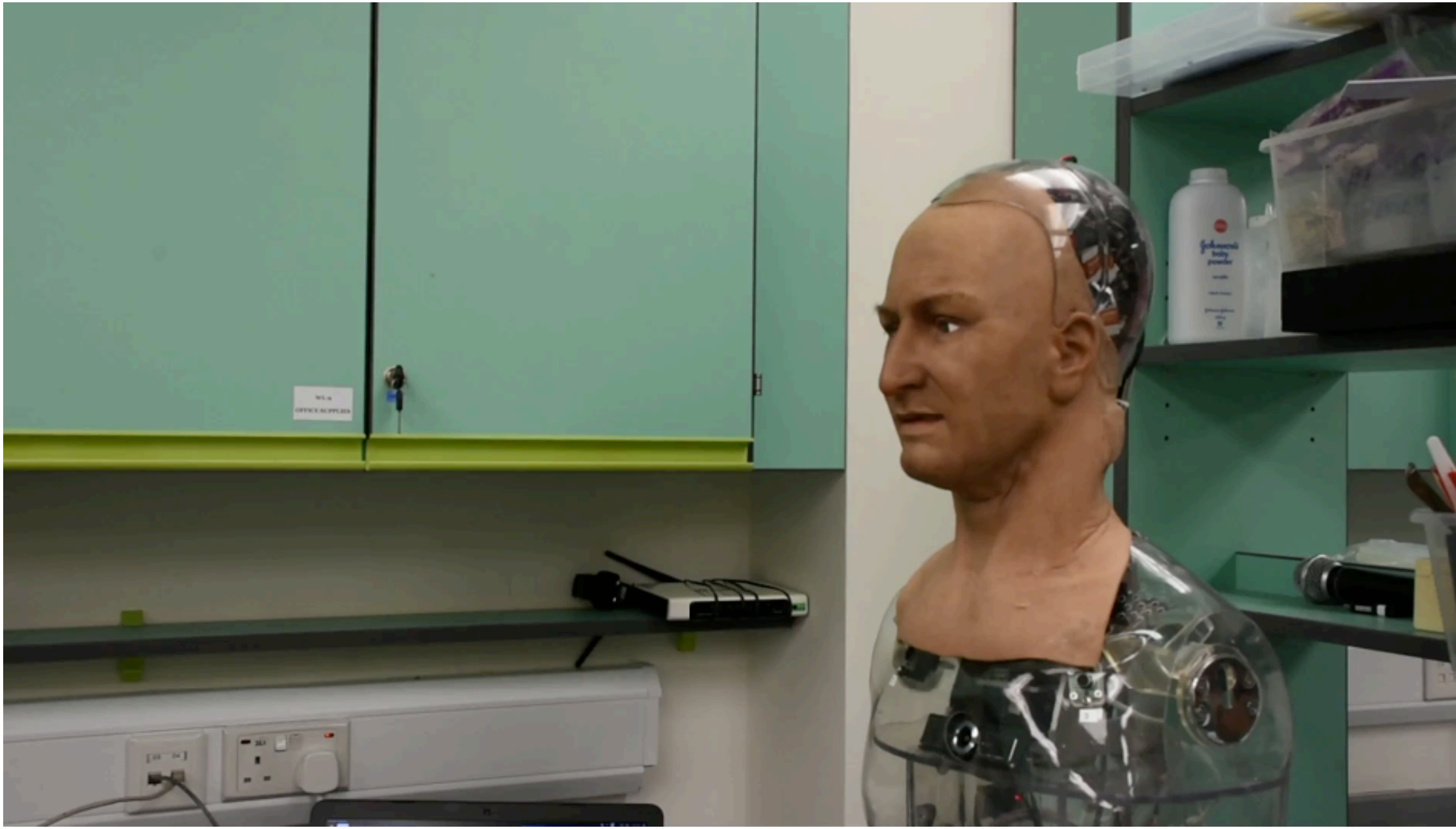

Ben Goertzel
Cassio Pennachin
Nil Geisweiller
Engineering General Intelligence, Part 2
The CogPrime Architecture for Integrative, Embodied AGI

OpenCog – an opensource software aimed at AGI -- stores and manipulates knowledge in the form of complex graphs (weighted, labeled hypergraphs) — **with multiple cognitive algorithms acting on the same knowledge graph**









Using Deep Learning for Image-Based Plant Disease Detection

Sharada Prasanna Mohanty[1,2], David Hughes[3,4,5], and Marcel Salathé[1,2,6]

[1]Digital Epidemiology Lab, EPFL, Switzerland; [2]School of Life Sciences, EPFL, Switzerland; [3]Department of Entomology, College of Agricultural Sciences, Penn State University, USA; [4]Department of Biology, Eberly College of Sciences, Penn State University, USA; [5]Center for Infectious Disease Dynamics, Huck Institutes of Life Sciences, Penn State University, USA; [6]School of Computer and Communication Sciences, EPFL, Switzerland

This manuscript was compiled on April 15, 2016

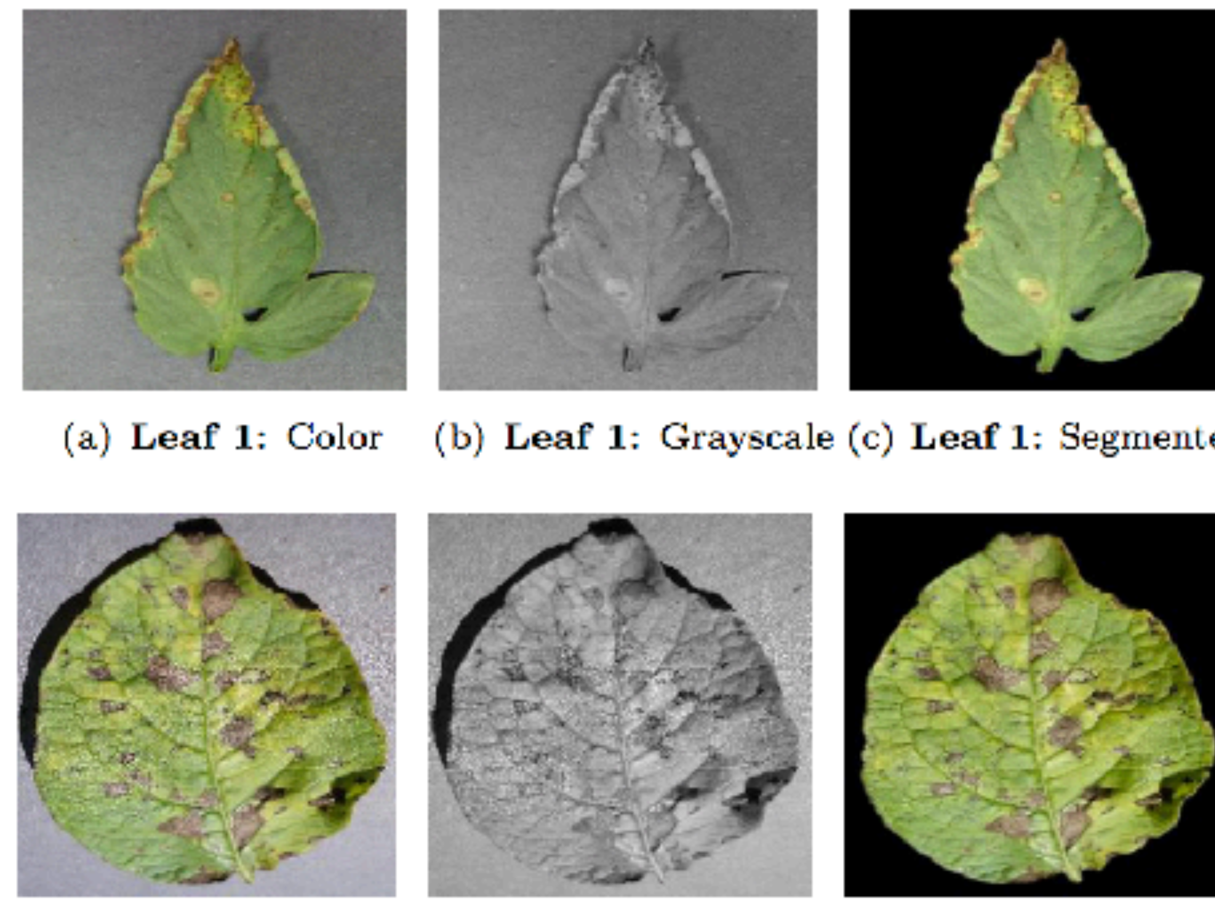
Crop diseases are a major threat to food security, but their rapid identification remains difficult in many parts of the world due to the lack of the necessary infrastructure. The combination of increasing global smartphone penetration and recent advances in computer vision made possible by deep learning has paved the way for smartphone-assisted disease diagnosis. Using a public dataset of 54,306 images of diseased and healthy plant leaves collected under controlled conditions, we train a deep convolutional neural network to identify 14 crop species and 26 diseases (or absence thereof). The trained model achieves an accuracy of 99.35% on a held-out test set, demonstrating the feasibility of this approach. When testing the model on a set of images collected from trusted online sources - i.e. taken under conditions different from the images used for training - the model still achieves an accuracy of 31.4%. While this accuracy is much higher than the one based on random selection (2.6%), a more diverse set of training data is needed to improve the general accuracy. Overall, the approach of training deep learning models on increasingly large and publicly available image datasets presents a clear path towards smartphone-assisted crop disease diagnosis on a massive global scale.

Deep Learning | Crop Diseases | Digital Epidemiology

ing internet penetration worldwide. Even more recently, tools based on mobile phones have proliferated, taking advantage of the historically unparalleled rapid uptake of mobile phone technology in all parts of the world[8].

Smartphones in particular offer very novel approaches to help identify diseases because of their tremendous computing power, high-resolution displays, and extensive built-in sets of accessories such as advanced HD cameras. It is widely estimated that there will be between 5 and 6 billion smartphones on the globe by 2020. At the end of 2015, already 69% of the world's population had access to mobile broadband coverage, and mobile broadband penetration reached 47% in 2015, a 12-fold increase since 2007[8]. The combined factors of widespread smartphone penetration, HD cameras, and high performance processors in mobile devices lead to a situation where disease diagnosis based on automated image recognition, if technically feasible, can be made available at an unprecedented scale. Here, we demonstrate the technical feasibility using a deep learning approach utilizing 54,306 images of 14 crop species with 26 diseases (or healthy) made openly available through the project PlantVillage[9]. An example of each crop - disease pair cann bee seen in Figure 1.

Computer vision, and object recognition in particular,



(a) **Leaf 1**: Color (b) **Leaf 1**: Grayscale (c) **Leaf 1**: Segmented

(d) **Leaf 2**: Color (e) **Leaf 2**: Grayscale (f) **Leaf 2**: Segmented

Fig. 2. Sample images from the three different versions of the PlantVillage dataset used in various experimental configurations.

PLOS | ONE

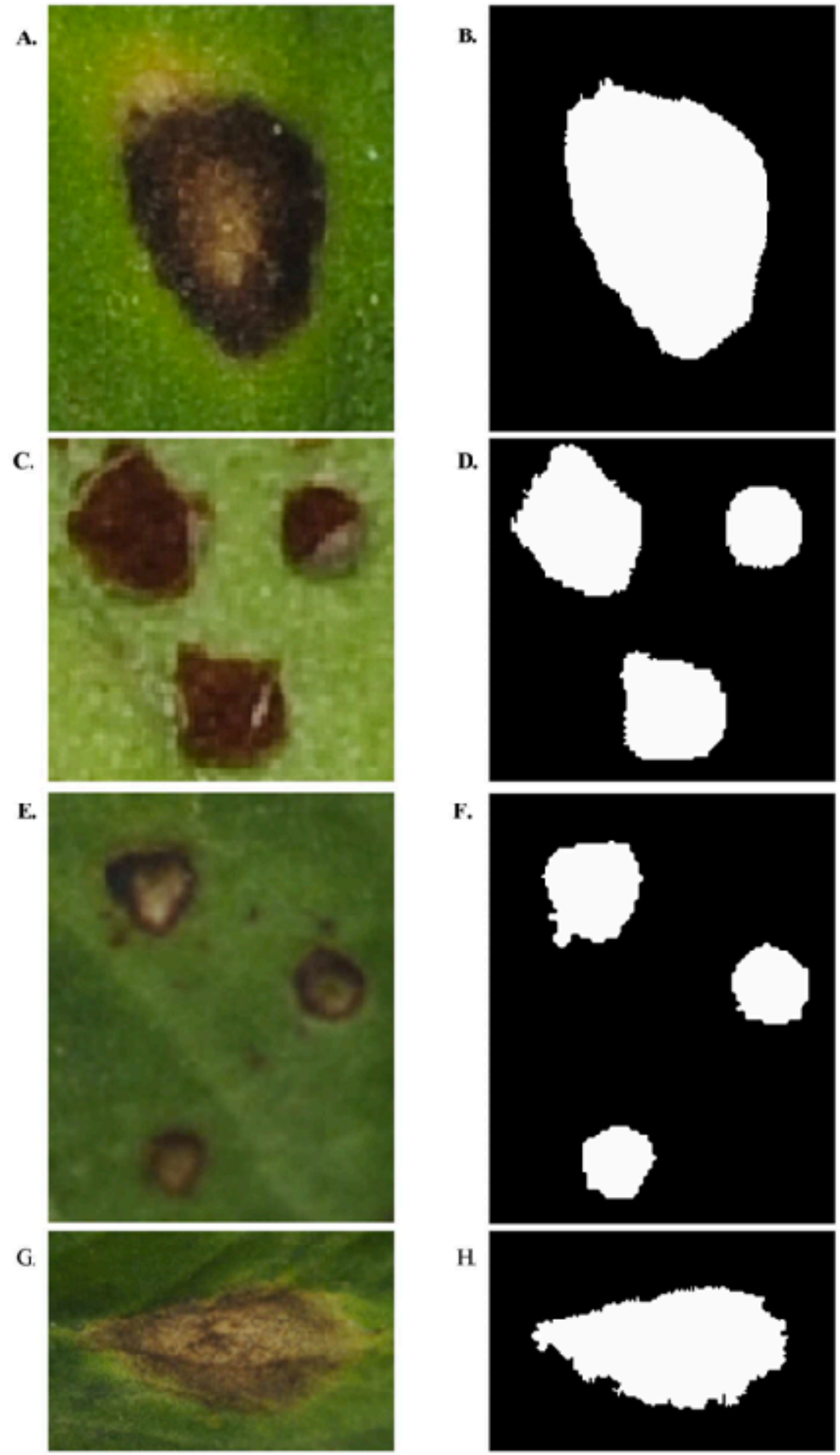
RESEARCH ARTICLE

Identification of Alfalfa Leaf Diseases Using Image Recognition Technology

Feng Qin[1], Dongxia Liu[2], Bingda Sun[3], Liu Ruan[1], Zhanhong Ma[1], Haiguang Wang[1]*

1 Department of Plant Pathology, China Agricultural University, Beijing, China, 2 College of Agriculture and Forestry Science and Technology, Hebei North University, Zhangjiakou, Hebei Province, China, 3 Institute of Microbiology, Chinese Academy of Sciences, Beijing, China

* wanghaiguang@cau.edu.cn

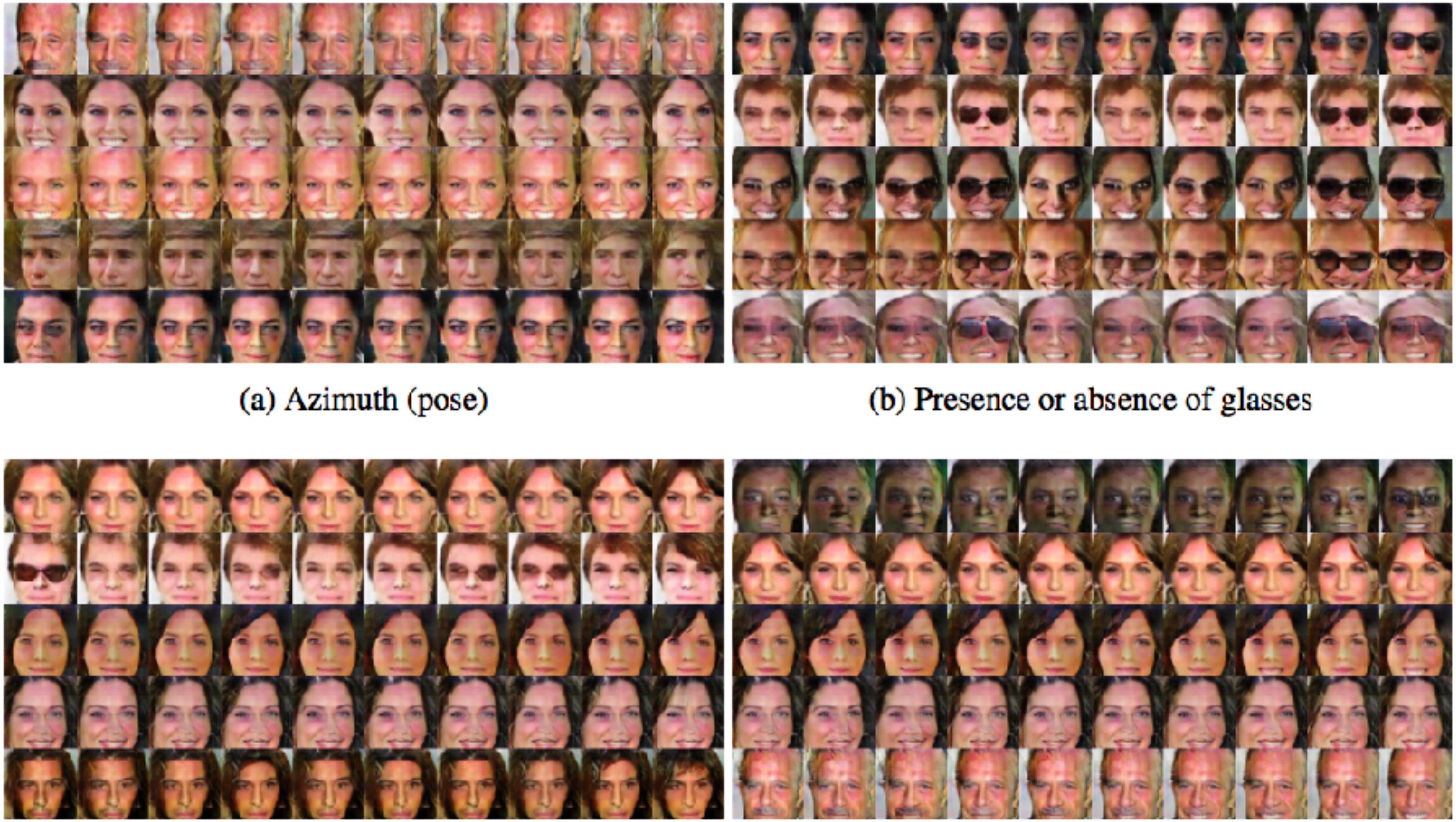


InfoGAN: Interpretable Representation Learning by Information Maximizing Generative Adversarial Nets

Xi Chen[†‡], Yan Duan[†‡], Rein Houthooft[†‡], John Schulman[†‡], Ilya Sutskever[‡], Pieter Abbeel[†‡]
† UC Berkeley, Department of Electrical Engineering and Computer Sciences
‡ OpenAI

(a) Rotation (b) Width

Figure 4: **Manipulating latent codes on 3D Chairs:** In (a), we show that the continuous code captures the pose of the chair while preserving its shape, although the learned pose mapping varies across different types; in (b), we show that the continuous code can alternatively learn to capture the widths of different chair types, and smoothly interpolate between them. For each factor, we present the representation that most resembles prior supervised results [7] out of 5 random runs to provide direct comparison.



(a) Azimuth (pose)

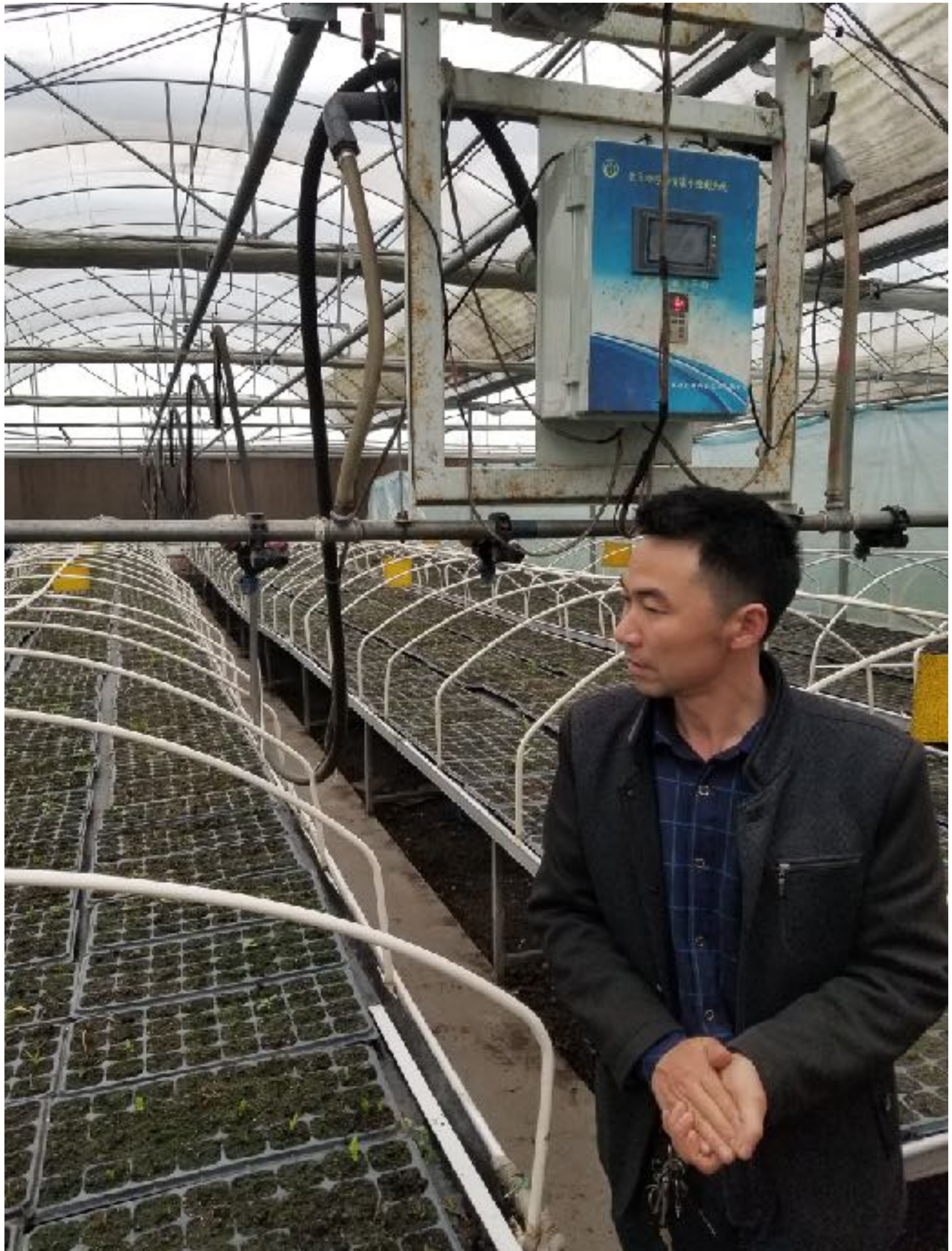
(b) Presence or absence of glasses

(c) Hair style

(d) Emotion

Figure 6: **Manipulating latent codes on CelebA:** (a) shows that a categorical code can capture the azimuth of face by discretizing this variation of continuous nature; in (b) a subset of the categorical code is devoted to signal the presence of glasses; (c) shows variation in hair style, roughly ordered from less hair to more hair; (d) shows change in emotion, roughly ordered from stern to happy.


乐山禾康农业科技开发有限公司
禾康农业科技
电话：18080644480
符溪直营店
热烈欢迎世界级科学家一行莅临禾康公司
Welcome Dr.Ben Goertzel to HeKang
服务三农增产增收
创造农业核心价




土壤水分:1.1% 土壤温度:15.5℃7号-二氧化
碳
二氧化碳:459ppm8号-光照
光照度:98lux区域:5号育苗区
21号-温湿度
空气湿度:0.1% 空气温度:16.57℃22号-土壤
温湿度
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Preliminary Conclusions from Discussions with Leshan Farmers

Core issue is often not identifying the disease, but predicting the advent of the disease early

Or — predicting what pesticide will work best in a particular case

Or when enough of a pesticide has been given

The answers to these questions often depend on context: e.g. soil, weather, history of diseases on the farm

The picture of the plant only tells part of the story.

AI can help, but it needs rich data

Possible Approach

Analyze leaf images using InfoGAN or similar,
to obtain summary variables

Feed these summary variables,
alongside variables indicating soil, weather,
pesticide use
and other contextual conditions,
to a symbolic regression (AI) algorithm

Train this algorithm
to predict disease course
based on training dataset

Possible Further Steps — *Obsoleting the Dilemmas of Pesticide Use*

Encourage and incent farmers
to bring plant samples to agri-stores
when reporting diseases
and purchasing pesticides

Analyze these samples genetically

Use this data to drive experimental evolution and genetic engineering of disease-resistant crops