Artificial Intelligence

Are you ready for AI?
Is AI ready for you?

ICTIEE – Hyderabad
8 Jan 2019

Prashant.Rao@mathworks.in
@_prashantrao_
prashantrao
Alexa –
Write my keynote talk for me
Alexa –
Play soothing jazz
Artificial Intelligence Today

The capability of a machine to match or exceed intelligent human behavior

by training a machine to learn the desired behavior
There are two ways to get a computer to do what you want

Traditional Programming

Data → COMPUTER → Output

Program → COMPUTER → Output
There are two ways to get a computer to do what you want

Machine Learning

Data

Output

COMPUTER

Program
There are two ways to get a computer to do what you want

Machine Learning

Data → COMPUTER → Model → Output

Artificial Intelligence  Machine Learning
Are you ready for AI?
Are you ready for AI?

Data

Output

Model
Are you ready for AI?

- Access Data
- Analyze Data

Data
Output
Model
Are you ready for AI?

- Data
- Output
- Model

Access Data
Analyze Data
Develop
Deploy

© 2018 The MathWorks, Inc.
Are you ready for AI?

Access Data
Analyze Data
Develop
Deploy

Data
Output
Model

EVERYTHING ELSE
Are you ready for AI?

Access Data

Analyze Data

Develop

Deploy

AI model

Algorithm development

Modeling & simulation
Are you ready for AI?

Access Data
- Sensors
- Files
- Databases

Analyze Data
- Data exploration
- Preprocessing
- Domain-specific algorithms

Develop
- AI model
- Algorithm development
- Modeling & simulation

Deploy
Are you ready for AI?

Access Data
- Sensors
- Files
- Databases

Analyze Data
- Data exploration
- Preprocessing
- Domain-specific algorithms

Develop
- AI model
- Algorithm development
- Modeling & simulation

Deploy
- Desktop apps
- Enterprise systems
- Embedded devices
Are you ready for AI if …

You’ve never used machine learning?
What is crispiness?

Crispy Sound + Crushing Force = Crispy Enough

Crispy
Crispy Enough
Soggy
Replicating human perception with machine learning
Technical University of Munich

Machine Learning Workflow

Data → Feature extraction → Classification

- Crispy
- Crispy enough
- Soggy
Replicating human perception with machine learning
Technical University of Munich

Classification Learner
Fresh

True Class

93%
91%
91%
89%
95%

91%

91%

Soggy

Predicted Class

Soggy
Are you ready for AI if …

You can’t identify features in your data?
Use deep learning to identify features automatically

Machine Learning Workflow

Data → Feature extraction → Classification

- Crispy
- Crispy enough
- Soggy
Use deep learning to identify features automatically

Machine Learning Workflow

- Data
- Feature extraction
- Classification
- Crispy
- Crispy enough
- Soggy

Deep Learning Workflow

- Data
- Deep neural network
- [95%, 3%, 2%]
- Crispy
- Crispy enough
- Soggy
Are you ready for AI if you can’t identify features in your data?

- **Deep learning**

```matlab
nnet = alexnet;
cam = webcam;
picture = snapshot(cam);
picture = imresize(picture,[227 227]);
label = classify(nnet, picture)
```
FREE

Learn to Use MATLAB for Deep Learning in 2 Hours
Are you ready for AI if ...

If you don’t have the right data?
AI for Predictive Maintenance

- Measure the wear of each blade
- Predict and fix failures before they happen
- Can’t rely on failures in the field
Predictive maintenance with synthetic failure data with MATLAB & Simulink
Predictive maintenance with synthetic failure data with MATLAB & Simulink

Measured data → Refine model → Simulink model → Inject failures → Failure conditions → Failure data
Are you ready to teach AI?
Experiential Learning
Online Learning
Collaborative Learning
MATLAB Enabled Campus

Experiential Learning
- Interactive Live Editor and App Designer
- Hardware Connectivity and Internet of Things

Online Learning
- MATLAB Online and MATLAB Mobile
- MATLAB Grader
- MATLAB Online Self-paced Training
- MATLAB Courseware

Collaborative Learning
- Student Competitions
- MOOCs
WHAT IF EVERYONE
ON CAMPUS HAD MATLAB?

More than 1 million students and 700 universities around the world—including the top 10 ranked universities—have unlimited access to MATLAB and Simulink with a Total Academic Headcount (TAH) license.

HANDS-ON LEARNING
42,000
Faculty and students using MATLAB to program hardware

“On multidisciplinary projects, students with quite different educational backgrounds can work together more easily because they are using the same tools.”
Professor Jakob Skaarup, Aalborg University

JOB OPPORTUNITIES
82%
Fortune 100 companies with a MATLAB license

“If you want to work at Google, make sure you can use MATLAB.”
Jonathan Rosenberg, Senior Vice President of Products, Google

RESEARCH PRODUCTIVITY
1,970,000
Google Scholar results referencing MATLAB

“Our teams are here to do world-class research, and easy access to MATLAB enables them to be their most productive.”
Shalisha Stanley, Director of Research Computing, Albert Einstein College of Medicine of Yeshiva University
MATLAB Online Self-paced Training

MATLAB Academic Online Training Suite (MAOTS)

- Includes all MATLAB Online Self-paced Training Courses
- Bundled with University Campus License
- Available to all registered University staff/students
- Access to course completion certificate
Manipal Institute of Technology Integrates MATLAB and Simulink into the Engineering Curriculum

Challenge
Revise the core curriculum in the college of engineering to build upon a reputation for producing industry-ready graduates and improve worldwide rankings

Solution
Provide students and faculty with campus-wide access to MATLAB and Simulink and integrate the tools into introductory and upper-level engineering courses

Results
- Students well-prepared for graduate studies
- Learning environment improved with expanded access to tools
- Competitive edge ensured

“We are fortunate to have the autonomy to define a curriculum that enables us to best prepare our students and differentiate our university from other schools. To help us meet those goals, we have integrated MATLAB and Simulink into the engineering curriculum, starting in the first year.”

- Dr. Vinod V. Thomas, Manipal Institute of Technology
MathWorks supports Smart India Hackathon 2019

OR

[QR Code Image]
Are you ready for AI?

Access Data

- Sensors
- Files
- Databases

Analyze Data

- Data exploration
- Preprocessing
- Domain-specific algorithms

Develop

- AI model
- Algorithm development
- Modeling & simulation

Deploy

- Desktop apps
- Enterprise systems
- Embedded devices

© 2018 The MathWorks, Inc.
With MATLAB and Simulink, you ARE ready for AI!
Thank You!