

## Part 4: Predictive Analytics and AI

The goal of these slides is to review the previous week's content and to dive into a deeper analysis of the basic mechanics of predictive analytics and AI.

This document is designed to walk you through the content (originally split into two 90 minute sessions) and to collect notes that might be helpful as you go.

### *About The Tool(s)*

KNIME is a drag and drop tool used for statistical analysis and machine learning. You start with raw data, then you use KNIME to connect, analyze, and transform your data. Once everything is ready, you can use KNIME to analyze, visualize, and model data until you get the perfect result.

TEACHABLE MACHINE is a Google-developed web-based program that makes “machine learning models” that are easy to use. Can demonstrate how info is gathered and used to analyze future data.

### *Slideshow contents:*

- Recap/Looking ahead
- Weekly reflections
- Predictive Analytics and AI
  - What we know about AI so far...
    - i. Parts I, II, III
  - What are predictive analytics?
  - Review: machine learning and historical data
- Demonstrating Predictive Analytics & AI with KNIME (Originally by Dr. Alice Mello)
  - Hand out activity guide
- Next Time:
  - Continue Predictive AI discussion
    - i. Group activity: Teachable Machine (Google)
  - Talk about the final project, etc.
  - Debrief
  - Look ahead at Week 5
    - i. Generative AI
- [Halfway Point] Predictive Analytics and AI
  - Discuss terms from presentation
  - Teachable Machine Activity
  - Ethics discussion
- Predictive AI terms
- Activity: Teachable Machine
  - Hand out sheet
- Ethical discussion
- Debrief on everything that was discussed this week
- Final project discussion

**Last time, we:**

- Shared the second round of our reflective assignments
- Talked about Ethics
  - Overview
  - In AI (different settings)
  - Small group activity

**Today will be about...**

- Third round of reflective assignments
- Predictive Analytics & AI
- Definition
- The data it uses
- Where we see it today
- Demonstration activity using KNIME
  - [Halfway point here, if you want to break into two sessions]
- Continue Predictive AI discussion
  - Terms
  - Group activity: Teachable Machine (Google)
  - Ethics
- Talk about the final project, etc.
- Debrief
- Look ahead at Week 5
  - Generative AI

**Our Weekly Reflections:**

- How it works (schedule)

## **Predictive Analytics And AI**

- So far, we discussed...
  - What AI is
    - Definition and history
  - The components and keywords of AI
  - The ethics surrounding AI's application and usage
  
- The Story So Far
  - Part One: The Basics
  
  - Part Two: Different AI Types
  
  - Part Three: AI in the Everyday
  
- Machine learning is...
  - Historical data is...

**Demonstrating Predictive Analytics & AI with KNIME**

- Most used tools for Predictive Analytics
- Quick Intro to KNIME
- Example: Collecting and analyzing 10 years of NBA Data
- Can we predict player performance?

## **Tools for Predictive Analytics:**

Two categories:

- Open Source
  - Python : several packages including TensorFlow (Google), PyTorch (Facebook)
  - R
  - KNIME
  
- Proprietary
  - Proprietary
  - IBM Watson Studio
  - Microsoft Azure Machine Learning
  - Google Cloud AI Platform
  - Amazon SageMaker
  - DataRobot
  - H2O.ai (also an Open-Source version)
  - Databricks

## **What is KNIME?**

- KNIME is a drag and drop tool used for statistical analysis and machine learning.
- Imagine you have a bunch of ingredients (data) that you want to cook up into a delicious dish (insights).
- KNIME helps you do that by providing all sorts of tools and gadgets (nodes) that you can use to prepare, mix, and analyze your ingredients.
- You start with raw data, just like you start with raw ingredients for cooking. Then, you use KNIME to chop, dice, mix, and transform your data just like a chef would prep ingredients.
- Once everything is ready, you can use KNIME to bake, fry, or boil your data (analyze, visualize, and model) until you get the perfect result (insights).

## **KNIME for AI**

(Demonstrates drag-and-drop function and assembly)

## **Descriptive Statistics**

(Column = topics, including position, age, etc.)

## **KMEANS in KNIME**

Imagine you have a big basket of colored marbles, but they're all mixed up. Your job is to group them based on their color. The KMeans algorithm is like a smart sorting machine that helps you do this automatically.

- Put the Marbles in the Machine

- Decide on Groups

- Sorting Begins

- Repeat Until Sorted



### **What is a classification tree model?**

You're planning a vacation but you're not sure where to go. You have a list of destinations and criteria that are important to you, like weather, activities, and cost. The KNIME tree model is like a super-smart travel advisor that helps you make the best decision based on your criteria.

- Destination Options

- Decision Criteria

- Branching Decisions

- Final Recommendations

**[Halfway point] Last time, we...**

- Shared our third round of weekly reflections
- Did a deep dive on Predictive Analytics & AI
- KNIME Activity
  
- Any questions? Refreshers?

**Today, we will...**

- Continue Predictive AI discussion
  - Terms
  - Group activity: Teachable Machine (Google)
  - Ethics
- Talk about the final project, etc.
- Debrief
- Look ahead at Week 5
  - Generative AI



**Activity: Teachable Machine**

The activity is based around examining how data that is gathered can be used for further usage by AI programming.

Hand out worksheets.







### **Unanticipated Impacts**

- Fire Department vs. Police Department dilemmas

- Predictive data cycle

## Final Project

*Edit as you see fit*

- Break into groups (no more than three people) based on common community type (remember week one)
  - Pick a situation/use case related to that community where AI could play a part.
  - Define potential ethical limits and issues
  - Present findings via a media form of your choosing (video, slideshow, etc.)
  - In addition to your media presentation, write two paragraphs that summarize your project and explain how this issue also impacts your city, whether as a whole or in your respective neighborhood(s).
- 
- The group's write-up ("memo") included:
    - Background
      - Their community
      - AI and their community
    - Options
      - Positive impacts
      - Potential ethical issues
    - Recommendations
      - Important values for AI policies
      - Suggestions

## Debrief and Upcoming reflections

- Debrief! A chance for you to tell us how it's going. For instance:
  - What went well this week?
  - What didn't?
  - What are you excited for?
  - What are you unsure about?

- PREDICTIVE ANALYTICS & AI: BONUS READING

*Note: no weekly reflection was prepared for this week. However, a fitting substitute may be to have the participants present the fire department/police department scenario to their friends and families while responses are noted.*