Types of Data: Structured and Unstructured

Understanding the fundamental categories of data and how neural networks process them

Structured Data

Unstructured Data

🎛 Structured Data

Organized in databases

Each column represents a **feature** with well-defined format

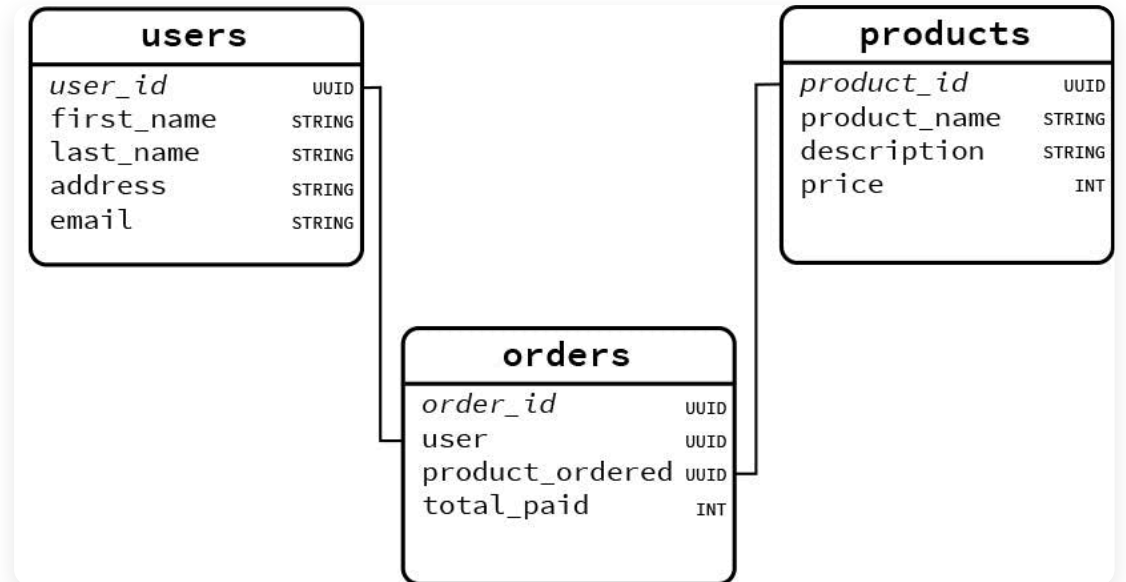### 🏠 House Price Prediction Example

Database with columns for:

Square footage   **Number of bedrooms**   **Location**

Age of house   **Price**


```
users
user_id        UUID
first_name     STRING
last_name      STRING
address        STRING
email          STRING
```

```
products
product_id     UUID
product_name   STRING
description    STRING
price          INT
```

```
orders
order_id           UUID
user               UUID
product_ordered    UUID
total_paid         INT
```

🖼 Unstructured Data

No predefined format

Features are **not organized** in traditional database format

🔺 Types of Unstructured Data

Features include:

- 🖼 **Images (pixel values)**
- 🔤 **Text (words)**
- 🎤 **Audio (sound waves)**
- 🎥 **Video (frames)**
- ✉ **Email**
- 💬 **Social Media**

UNSTRUCTURED DATA EXAMPLES

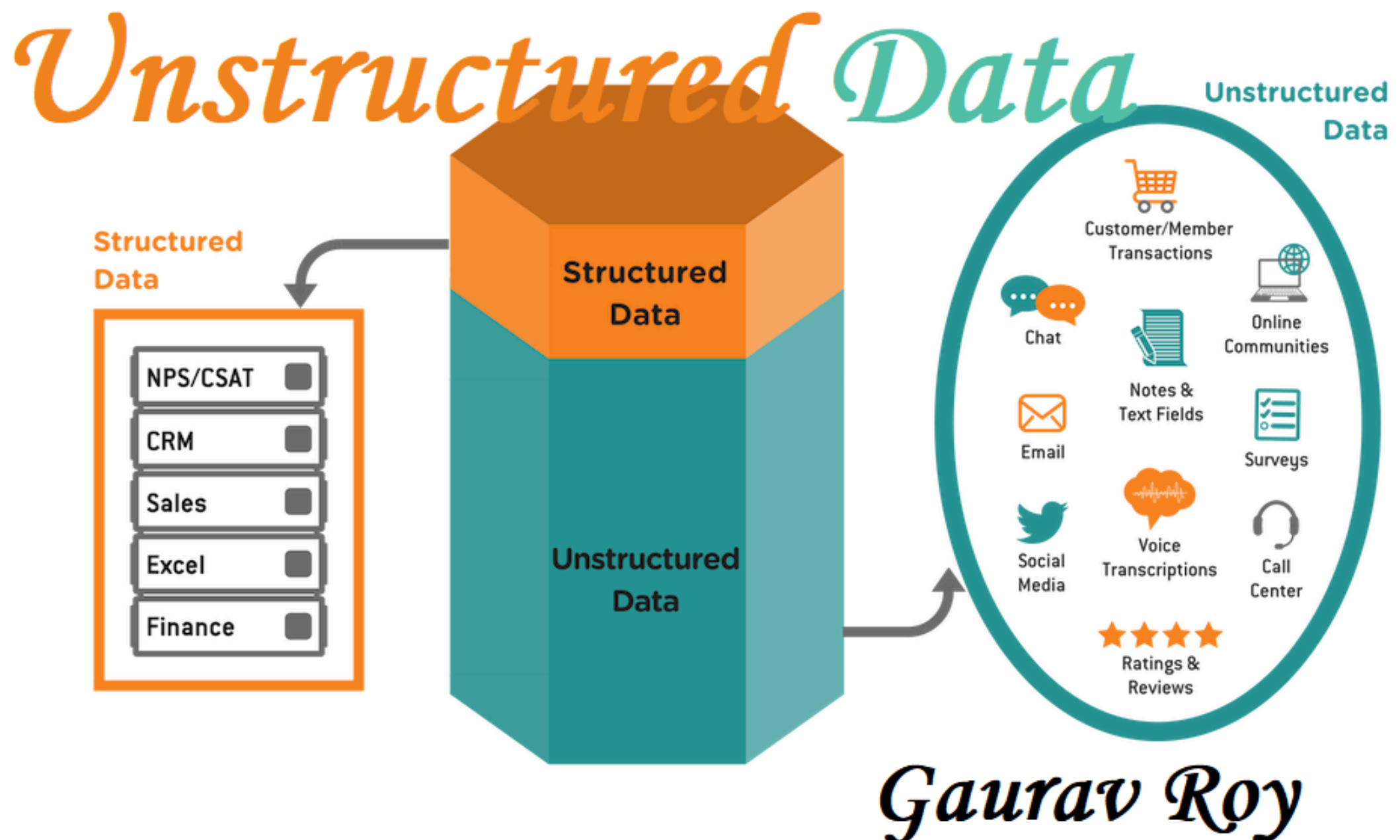|			
📄 Text documents	✉ Emails	🖼 Images	🔊 Audio files
▶ Video files	.LOG Log files	📡 Sensor data	📱 Social media posts

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Structured vs Unstructured Data

Structured Data

- Organized in **tables** with rows and columns
- Each column represents a **feature**
- Easily searchable and **queryable**
- Examples: databases, spreadsheets

Unstructured Data

- No **predefined format** or organization
- Features include **pixel values** or **words**
- Requires **advanced processing** to analyze
- Examples: images, text, audio, video

Unstructured Data

Structured Data

- NPS/CSAT
- CRM
- Sales
- Excel
- Finance

Structured Data

Unstructured Data

Unstructured Data

- Customer/Member Transactions
- Chat
- Online Communities
- Email
- Notes & Text Fields
- Surveys
- Social Media
- Voice Transcriptions
- Call Center
- Ratings & Reviews

Gaurav Roy

Neural Networks and Unstructured Data

Revolutionizing unstructured data processing

Deep learning and neural architectures have dramatically improved computers' ability to understand **unstructured data**

📈 Key Advancements

- ✨ Feature extraction from raw data
- ✨ Pattern recognition in complex formats
- ✨ Context understanding in natural language
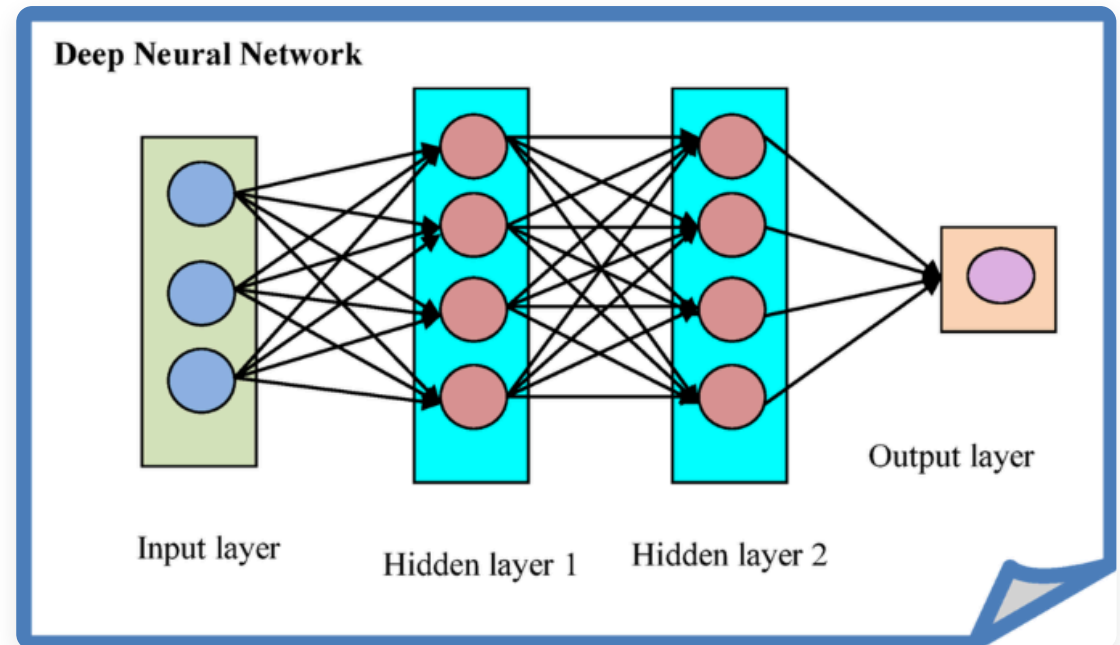- ✨ Real-time processing of multimedia

Past: Limited capabilities

Present: Significant improvement

Future: Continued advancement

Deep Neural Network

Input layer

Hidden layer 1

Hidden layer 2

Output layer

Applications of Neural Networks

Exciting new applications

Neural networks' improved understanding of **unstructured data** has enabled revolutionary applications

Speech Recognition

Converts spoken language into text, enabling voice assistants and transcription services

Image Recognition

Identifies objects, people, and scenes in images for security and medical diagnosis
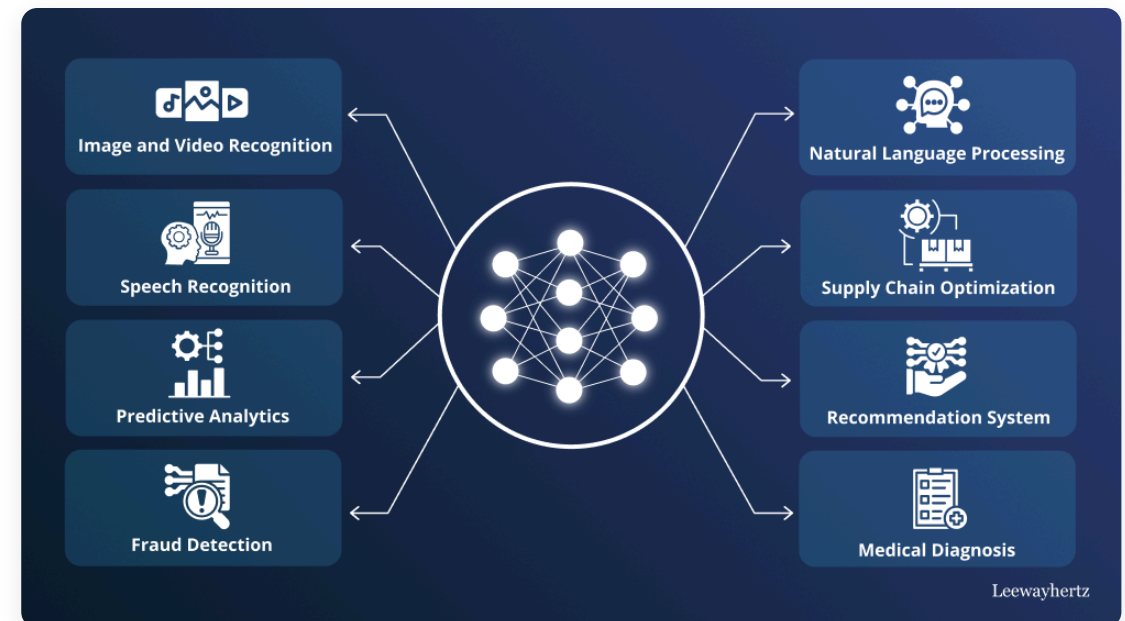
Natural Language Processing

Enables translation, sentiment analysis, and chatbots to understand human language

Video Analysis

Processes video content for surveillance, content moderation, and autonomous vehicles

Image and Video Recognition

Speech Recognition

Predictive Analytics

Fraud Detection

Natural Language Processing

Supply Chain Optimization

Recommendation System

Medical Diagnosis

Leewayhertz

✦ Economic Value and Next Steps

70%+
📈 Short-term Economic Value

Most economic value from neural networks has come from **structured data**, enabling:

📢 **Advertising Systems**

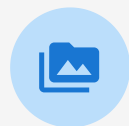💲 **Revenue Recommendations**

☰ **Database Processing**

🧠 Next Topic: Neural Network Types

In our next discussion, we'll explore different types of neural networks based on the **types of data** they process

REVENUE MODEL CHOICE FRAMEWORK

Paid value proposition		Free-to-use value proposition
Pricing tactics		Third-party revenue generator
	Revenue streams	

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Structured Data

Databases with organized features

Unstructured Data

Images, text, audio, video