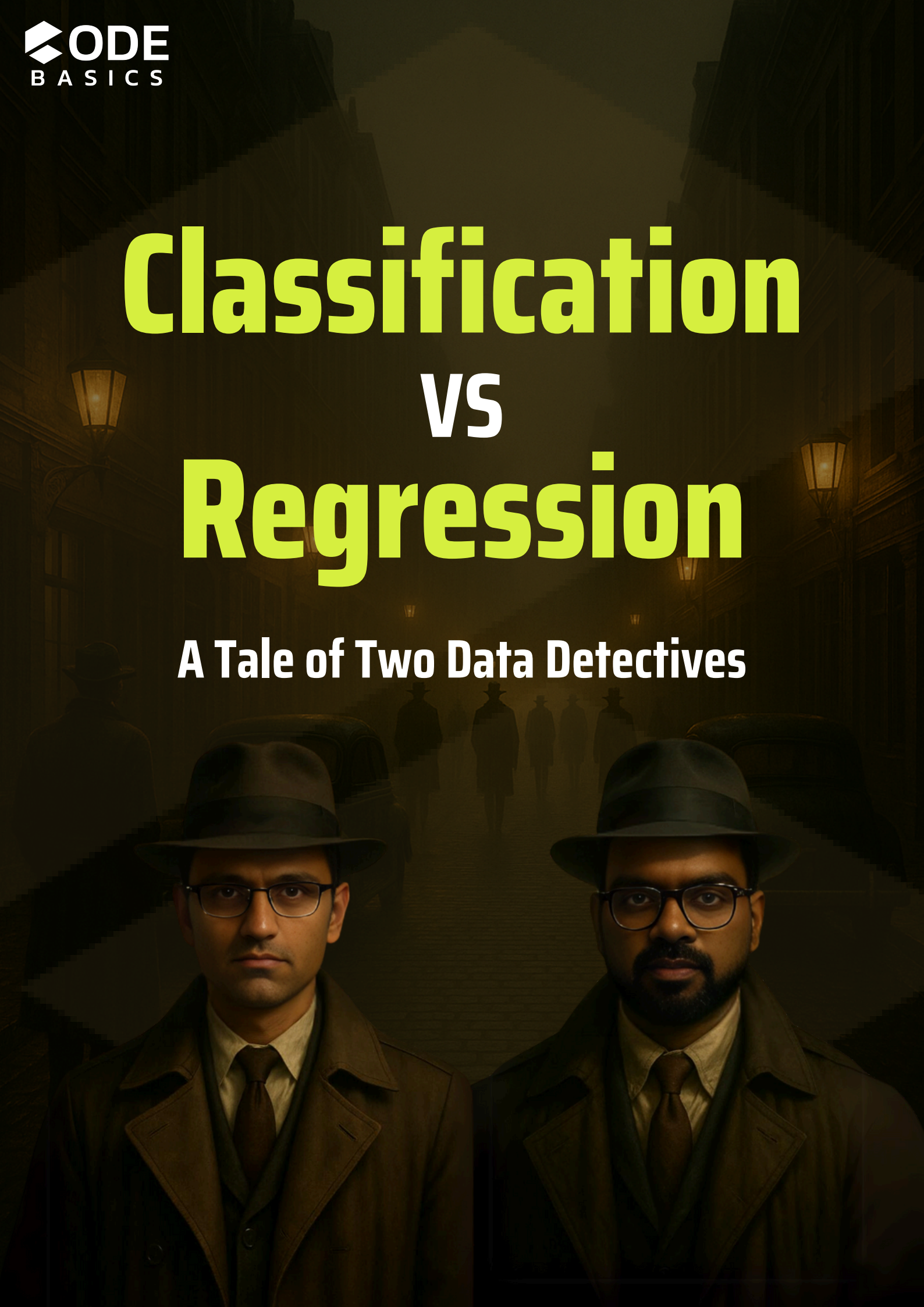
CODE BASICS

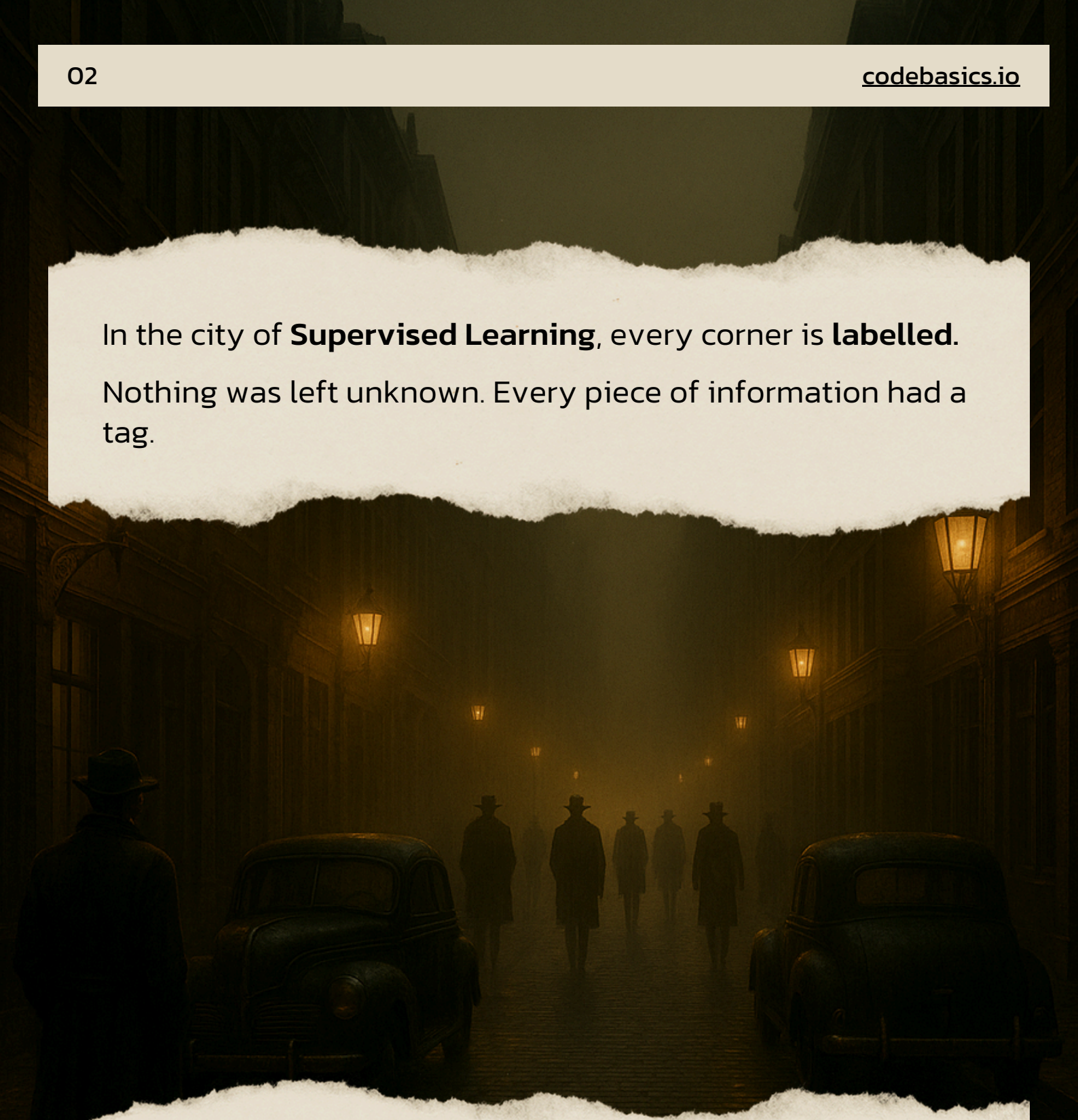
Classification VS Regression

A Tale of Two Data Detectives



In the city of **Supervised Learning**, every corner is **labelled**.

Nothing was left unknown. Every piece of information had a tag.



In this city, there were **two famous detectives**.

Whenever a new mystery came up, people called them for help.

Hello! I am Detective **Classification.**
I love solving **who or what** questions.
Is it a cat? Is this fake?
Just ask me — I can tell you exactly what it is!

Examples:

✅ Is this news article real or fake?

✅ Is this image a dog, a cat, or a bird?

✅ Is this transaction fraudulent or safe?

👉 The answer I give is a Category — a class or a label.

👉 I choose from given options.

👉 The tools I often use: Decision Trees, Random Forest, Logistic Regression.

Hello! I am **Detective Regression.**
I predict **how much, how many, or how far.**
Prices, time, weight — that's my world!

Examples:

✅ What will be the price of a used car?

✅ How many products will sell tomorrow?

✅ What will the temperature be in 3 hours?

👉 The answer I give is a number — a value on a number line.

👉 I do not choose categories — I predict continuous values.

👉 The tools I often use: Linear Regression, Decision Trees, Neural Networks.

A Knock at the Door — A New Mystery Arrives

One foggy morning, the city postmaster rushed to the detectives' building and knocked on the door.

He said, “Detectives! I need to sort these emails — which ones are spam?”

A big pile of emails sat on the table.

Q&A Time: Who will solve this case — Classification or Regression?

Detective Classification tipped his hat. “Leave this to me.”

He looked at the words in the emails —
“Congratulations!”, “You’ve won!”, “Click here!”.

Then he opened his old case files — a large notebook filled with past labelled examples.

Each example was carefully marked:

- **Spam:** Emails with too many flashy words, strange links, or unknown senders.
- **Not Spam:** Emails from trusted friends, work messages, and newsletters the postmaster had signed up for.

By comparing the new emails to these known examples, Detective Classification quickly spotted patterns.

Soon he said:
“These 12 emails — spam. The rest are safe.”

The postmaster smiled.
“You saved my inbox, Detective!”

A New Day, A New Mystery

A landowner hurried into the detectives' office, carrying a map and a stack of papers.

"Detectives," he said, "I want to sell this land, but I'm not sure what price to ask."

He unrolled the map on their desk.

"It's a good piece of land — but prices seem to change all the time!"

Q&A Time: Who will solve this case — Classification or Regression?

Detective Regression leaned forward, interested.

"You've come to the right place," he said.
"I can help you predict a fair price."

He studied the landowner's documents — **past land sales, plot size, location, nearby schools, market trends.**

"I'll look for patterns," he explained.
"How much similar lands have sold for. What features increased the price. What factors lowered it."

After running the numbers and drawing a few charts, Detective Regression spoke:
"Based on the data, a fair price for your land would be around **12 lakh rupees per acre**."

The landowner smiled.
"Now I can sell with confidence. Thank you, Detective!"

Understanding Supervised Learning: The Takeaway

The city you've seen is **Supervised Learning** — a type of **Machine Learning** (ML).

It works with **labelled data**, where each example is already marked with the correct answer.

For example, an email labelled as **"spam"** or **"not spam"**, or a house labelled with its **price**.

This labelled data is used to train the model, so it can **learn patterns** and **make predictions** on new, unseen data.

The **two detectives** in the story represent the two main **types of Supervised Learning:**

- **Classification** → solves classification problems (Who? What? Which category?)
- **Regression** → solves regression problems (How much? How many? How far?)

And that's how Supervised Learning helps us solve real-world mysteries — just like in this city!

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