

ATTENTION U-NET INTEGRATED WITH NOISE ANALYSIS FOR FORGERY SEGMENTATION IN INVOICE DOCUMENT IMAGES

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What ?

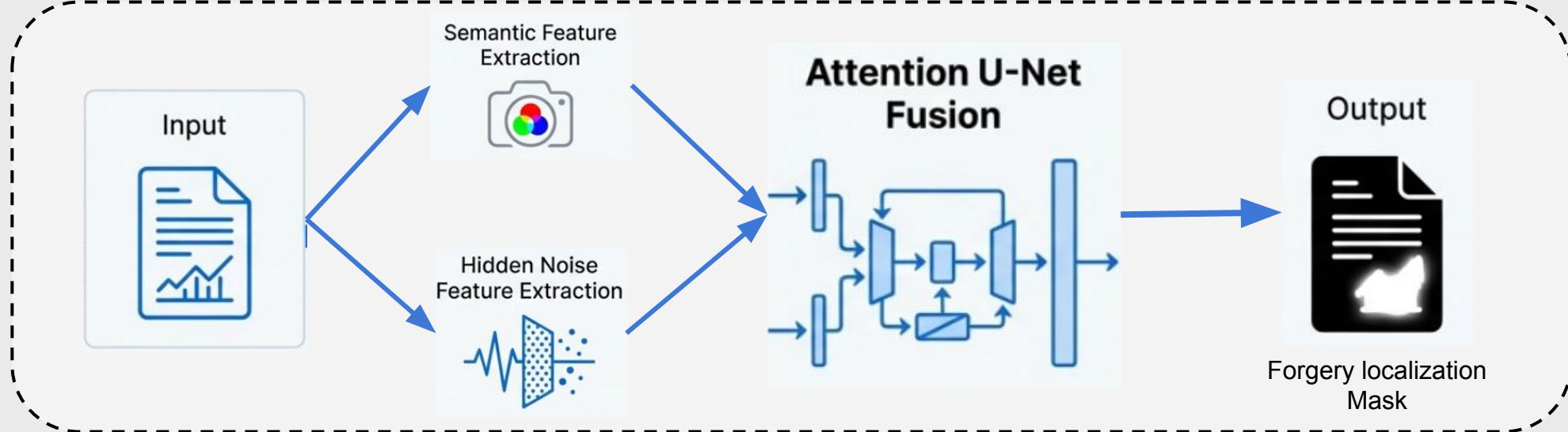
Automate the detection of manipulated administrative documents (invoices, receipts):

- **Targets:** Copy-pasting regions from other images, cloning areas within the same image, removing or altering text or numbers
- **Output:** A pixel-perfect binary mask highlighting the forged regions.

Why ?

- **Financial Risk:** Document fraud causes massive financial losses annually.
- **Invisible Traces:** Modern editing tools create manipulations undetectable by the human eye.
- **Technical Challenge:** Standard CNNs struggle to distinguish subtle *tampering artifacts* from the document's natural *paper texture* and noise.

Overview



Description

1. Semantic feature extraction

Input Processing: The Encoder network processes the raw RGB document image.

Context Learning: Extracts high-level spatial features to understand document structure, text layout, and global context.

Role: Provides the "semantic map" identifying *what* the document contains.

2. Hidden noise feature extraction

Artifact Detection: Applies high-pass filters to suppress visual content (text/logos).

Invisible Traces: Reveals subtle, invisible anomalies like compression artifacts and resampling traces.

Role: Highlights *inconsistencies* in the noise distribution that indicate tampering.

3. Attention U-Net Fusion

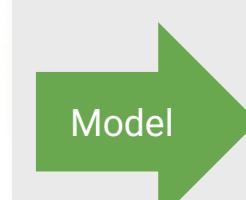
Smart Integration: Fuses semantic and noise features within the U-Net Decoder.

Attention Gates: Act as dynamic filters at skip connections to suppress irrelevant background signals (paper texture).

Precision: Focuses the model on **boundary artifacts**, generating a precise binary mask of the forged regions.

Company Name	COMMERCIAL INVOICE		
Ober Company 133 Company Street Karian, NA 65126 E-mail: mvinn@gmail.com	Tonno: 0082366 Commercial AC30050 TN9/6/787/22		
Vendor Information	Vendor Information		
Venderry Non 125 Loney Street Commerella, NX 25115 Phone: 335 6804	Condary: Besonarve: Cost: 00233		
Item Description	Quantity	Unit Price	Total
One plated provates hroschest	1	\$30.00	\$150.00
Subscribed fnavotore otks mast	1	\$19.00	\$158.00
Reset the ment brshere maueritbes	1	\$20.00	\$50.00
Resers snake of item	1	\$10.00	\$36.00
		Subtotal	\$394.00
		TOTAL AMOUNT DUE	\$2,135.00

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Description:
A forgery designed to be undetectable by the human eye.

Source Sans Pro:
Source Sans Pro 412345

4. Potential applications

Automated expense reporting

Insurance claim processing

Enhance e-KYC process

Digital document forensics