Proiect Cercetare – Lab 3

1. Cuprinsul lucrarii

1. **Abstract**
2. **Introduction** – prezentarea problemei
3. **Related work** – mentionare tehnologii existente
4. **Methodology** – prezentarea metodei proprii applicate
    a. (eventual subcapitole?)
5. **Results and discussion** – analiza rezultatelor, perormanta, comparatii lucrari existente
6. **Conclusion and future work**
7. **Bibliography/References**

2. Referinte bibliografice

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3. Plan pentru partea aplicativa a lucrarii

Ipoteza de lucru

Imbunatatirea performantei OCR/HTR folosind o preprocesare mai amanuntita si euristici specializate pentru fiecare pas al implementarii; incercarea de autoadaptare la conditiile de input pe baza unor analize statistice (ex. alegerea unui algoritm de edge detection care scoate cel mai bine textul in evidenta).

Metodologie

1. Extragerea textului din imagini sub o forma matematica
   posibila ipoteza de lucru:
   1.1. Canny Edge Detection
   1.2. Identificarea curbelor Bezier folosind un CNN

   alternativa: raster-to-vector/image tracing

2. Pe baza ecuatiilor curbelor obtinute anterior, se realizeaza o analiza statistica pentru a deduce unde s-ar putea afla textul
   2.1. se efectueaza un fel regresie care incearca sa ghiceasca pozitiile anumitor caractere (glyphs) existente intr-o baza de date, cu transformarile geometrice necesare (rotation, scaling, skew)
   2.2. Datele identificate se adauga in baza de date, eventual cu validare umana
3. Zonele identificate ca fiind posibil text sunt trecute printr-un model AI (CapsNet) care acorda atentie mai multor detalii (ex. legaturile dintre litere). Optional: Se compara rezultatele modelului cu predictiile caracterelor individuale de la pasul 2
4. (Optional) Post procesare: auto-corectii de cuvinte pe baza unui mini-NLP (distincii intre *a* si *o*, intre *l* si *1*, *ui* vs *iu* etc)

In partea 2.1, datasetul original nu va fi folosit ca date de antrenament in mod traditional, ci mai mult ca un set de date de referinta (expandabil). Algoritmul va trata in mod identic datele “cunoscute” in baza de date si cele “noi” din input si doar va compara rezultatele procesarii acestora. Experimente:

- diferiti algoritmi de edge detection

- construirea unei metode de vectorizare a imaginii cu acuratete inalta
- cum comparam doua curbe? Cum comparam o curba cu o parte din alta curba? Poate fi vazuta ca o problema de clusterizare?

Posibila contributie originala

- Personalizare. Modelul va raspunde diferit in functie de utilizator. Ex. daca cineva isi scaneaza multe materiale cu propriul scris, acesta este probabil sa fie recunoscut cu acuratete mai mare decat daca acelasi algoritm scaneaza la un moment dat scrisul altei persoane. Se vrea util pentru aplicatii non-industriale (in care nu se prelucreaza mai multe amprente caligrafice, cum se face de ex. in banci). Main targets: **manuscrise vechi**, **documente personale**.
- Efortul este pus in a verifica daca preprocesarea amanuntita ajuta la imbunatatirea acuraterii?
- si daca capacitatea modelului de a se auto-adapta la inputurile primite il face mai bun la a identifica acelasi tip de scris?
- posibile extinderi: capactitatea de a extinde modelul sa separe automat amprentele caligrafice diferite?