Lista proiecte MLAV

**Cerinte generale:**

* Problema este una de vision: clasificare, regresie, localizare. Problema trebuie rezolvata intr-un mediu de tip Deep Learning
* Predarea trebuie sa contina:
  + solutie functionala – se demonstreaza functionarea pe cinci poze/secvente video din baza de date
  + **Scurt** raport (max 2 pag):
    - Definirea problemei,
    - specificul bazei de date,
    - arhictectura,
    - libraria,
    - performanta atinsa, masurata statistic,
    - Comparatie cu rezultate din literatura identificate prin cautare dupa articolul care introduce baza de date

**Observatii**

* Libraria pentru implementare este la alegere.
  + Laboratorul este in TensorFlow, dar acest fapt nu impune nimic
* Arhitectura, daca nu este impusa specific, este la alegere
* “Parameter ablation” se refera la performanta obtinuta cand diferite valori pentru “learning rate” respectiv augumentare bazei de date prin adaugare de zgomot, rotatii etc.
* Problemele de retrieval folosesc drept descriptori ultimul strat fully-connected al arhitecturii
* Daca baza de date este foarte mare, puteti sa va limitati la 10.000 - 11.000 poze pentru antrenament si 2.000-3.000 pentru test
* **Atentie:** Proiectul **nu** se poate face in mai putin de **1 zi.** Desi exista pe net parti mari de cod necesare proiectului, de obicei, trebuie scrisa parsarea bazei de date in formatul impus de librarie si cod de evaluare. In plus, antrenarea dureaza, eventual nu merge din prima; in functie de problema pot fi necesare mai multe antrenari.
* **Atentie**: Proiectele cu YOLO in primul rand si cele cu Mask R-CNN au nevoie de zile pentru a se antrena pe un calculator cu GPU. Yolo trebuie rulat macar 10000 de iteratii. Pe calculator fara CPU poate depasi o saptamana.

**Grila de punctaj (orientativ):**

* Absenta raportului sau codul nu ruleaza pe baza de date specificata : proiect = 0 pct
* Penalizari (din pct aferent proiectului):
  + Raport sumar, dar realizare practica completa-10%
  + Lipsa variatie de parametri – 10-20%
  + Alta arhitectura 20%
  + Lipsa metrica relevanta 10%
  + Lipsa comparatie cu alte metode care raporteaza pe baza de date 10%

**Calculatoare**

* Va descurcati!!!!
* In B135A se poate lasa un calculator sa ruleze peste weekend
* Microsoft Azure offers 100 hours of GPU for free: <https://medium.com/@kairui/azure-launches-free-100-credit-for-students-gpu-enabled-179f193242eb>
* Verificati ca codul poate fi intrerupt si reluat de la ultima epoca.

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| Nr | **Tema / descriere** | **Student** | **Nota** |
| 1 | **Problem:** Bird Species Identification from an Image using the [Caltech-UCSD Birds dataset](http://www.vision.caltech.edu/visipedia/CUB-200-2011.html) dataset  **Architecture** **: ResNet-18**  **Database:** Caltech-UCSD Birds-200-2011: <http://www.vision.caltech.edu/visipedia/CUB-200-2011.html>  **Request: Parameter ablation** | NICULESCU A.G. Ioan-Rareş |  |
| 2 | **Problem:** Flower Species Identification from an Image using “*Oxford Flowers 102”* dataset  **Architecture : ResNet-18**  **Database:** *Oxford Flowers 102:* http://www.robots.ox.ac.uk/~vgg/data/flowers/102/index.html  **Request: Parameter ablation** | TIMISICĂ M. Gabriel-Nicolae |  |
| 3 | **Problem:** Main object identification from a painting using “*The Paintings Dataset”* dataset  **Architecture : : ResNet-18**  **Database:** *The Paintings Dataset:* http://www.robots.ox.ac.uk/~vgg/data/paintings/  **Request: Parameter ablation** | RAGEA R. Raluca-Adriana |  |
| 4 | **Problem:** Sculpture retrieval using “*Sculptures 6k dataset”* dataset  **Architecture : : ResNet-18**  **Database:** *Sculptures 6k dataset:* http://www.robots.ox.ac.uk/~vgg/data/sculptures6k/  **Request: Parameter ablation** | CATAI L. Alexandru |  |
| 5 | **Problem:** Car **localization** using Yolo on DETRAC database  **Architecture :** Recommended -Tiny Yolo  **Database** DETRAC database*:* <https://detrac-db.rit.albany.edu/download>  *For annotation ask Corneliu Florea on e-mail*  **Request:** none | STAN S. Vlad-Costin |  |
| 6 | **Problem:** Pedestrian **localization** using Yolo on Caltech Pedestrian database  **Architecture :** Recommended -Tiny Yolo  **Database** Caltech Pedestrian database*: http://www.vision.caltech.edu/Image\_Datasets/CaltechPedestrians/index.html*  **Request:** none | BRAD I. Mihai |  |
| 7 | **Problem:** Home object **localization** using Yolo on Home Object database  **Architecture :** Recommended -Tiny Yolo  **Database:** Home Object database*: h*ttp://www.vision.caltech.edu/pmoreels/Datasets/Home\_Objects\_06/  **Request:** Parameter ablation | BUDACU V.A. Andra-Claudia |  |
| 8 | **Problem:** Hand **localization** using Yolo on Hand database  **Architecture :** Recommended -Tiny Yolo  **Database:** Hand Dataset*: http://www.robots.ox.ac.uk/~vgg/data/hands/*  **Request:** Performance comparison with baseline code downloadable with database | PAPADOPOL I. Cosmin |  |
| 9 | **Problem:** Pedestrian **localization** using Yolo on USC Pedestrian database  **Architecture :** Recommended -Tiny Yolo  **Database** USC Pedestrian database*:*  http://iris.usc.edu/Vision-Users/OldUsers/bowu/DatasetWebpage/dataset.html  **Request:** none | **NOBODY** |  |
| 10 | **Problem:** Logo **localization** using Yolo on Flickr –Logo-27 database  **Architecture :** Recommended -Tiny Yolo  **Database** Flickr Logos 27 dataset database*:*  http://image.ntua.gr/iva/datasets/flickr\_logos/  **Request:** none | ŞERBĂNESCU A. Andrei |  |
| 11 | **Problem:** Face detection **(localization)** using Yolo on Wider-Face  **Architecture :** Recommended -Tiny Yolo  **Database** WiderFace dataset database*:*  http://mmlab.ie.cuhk.edu.hk/projects/WIDERFace/  **Request:** Limit the size of the database. | ILIE N. Mădălina-Iuliana |  |
| 12 | **Problem:** Semantic **segmentation** of cars using on Box Car database with Mask R-CNN  **Architecture :** Mask R-CNN  **Database** BoxCar116k*:* https://github.com/JakubSochor/BoxCars  **Request:** none | NITROI E. George-Iulian |  |
| 13 | **Problem:** Semantic segmentation of flower using on Oxford 17 flowers database with Mask R-CNN  **Architecture :** Mask R-CNN  **Database** Oxford 17 flowers database : <http://www.robots.ox.ac.uk/~vgg/data/flowers/17/index.html>  Annotation for segmentation :http://www.robots.ox.ac.uk/~vgg/data/bicos/  **Request:** none | FÎCIU N. Ionuţ-Dorinel |  |
| 14 | **Problem:** Semantic segmentation of horses using on Wiezmann Horse database with Mask R-CNN  **Architecture :** Mask R-CNN  **Database** Horse flowers database : <http://www.msri.org/people/members/eranb/>   * See the bottom of the page   **Request:** Database is small, insist on augmentation | ADAM F. Marian |  |
| 15 | **Problem:** Semantic segmentation of objects from the ADE20K database with Mask R-CNN  **Architecture :** Mask R-CNN  **Database** : ADE20Kdatabase : http://groups.csail.mit.edu/vision/datasets/ADE20K/  **Request: none** | IVANCIU Gh.M. Vlad-Gabriel |  |
| 15 | **Problem:** Romanian Painting **retrieval** on Pandora 18k and PandoraRom  **Architecture :** AlexNet  **Database:**  Pandora 18k: http://imag.pub.ro/pandora/Download/Pandora\_18k.zip  PandoraRom: http://imag.pub.ro/pandora/Download/Romanian\_paintings.zip  **Request:** CNN trained on style recognition on Pandora-18k. Afterwards 200 images from Pandora-Rom are taken and precision- recall is reported with respect to Pandora | **NOBODY** |  |
| 16 | **Problem:** Romanian Painting **retrieval** on Pandora 18k and PandoraRom  **Architecture :** MobileNet  **Database:**  Pandora 18k: http://imag.pub.ro/pandora/Download/Pandora\_18k.zip  PandoraRom: http://imag.pub.ro/pandora/Download/Romanian\_paintings.zip  **Request:** CNN trained on style recognition on Pandora-18k. Afterwards 200 images from Pandora-Rom are taken and precision- recall is reported with respect to Pandora | PETRACHE C. Robert-Sorin |  |
| 17 | **Problem: Head pose estimation** using Boston database  **Architecture**: MobileNet  **Database:** Boston University Head pose database : <ftp://csr.bu.edu/headtracking/>  **Request**: Face need to be cropped before by face Detection (MTCNN or Viola-Jones). Usi uniform light only. Estimate all angles having ground truth | LISCAN M. Florentina-Roxana |  |
| 18 | **Problem:** Face (Eye) Landmarks localization on the HELEN dataset  **Architecture :** ResNet-18  **Database** HELEN database : http://www.ifp.illinois.edu/~vuongle2/helen/  **Request:**  Face need to be cropped before by face Detection (MTCNN or Viola-Jones)  Select only 10 landmarks for all images | COJOCARU L. Diana |  |
| 19 | **Problem:** Face (Eye) Landmarks localization on the Labeled faces in the Wild (LFW) dataset  **Architecture :** ResNet-18  **Database** LFW database : <http://vis-www.cs.umass.edu/lfw/#download>  *Ask Corneliu Florea for landmark annotation*  **Request:** 75-25 train-test. Face need to be cropped before by face Detection (MTCNN or Viola-Jones) | POPESCU G. Mădălina-Andreea |  |
| 20 | **Problem:** Face Landmarks localization on the BioID dataset  **Architecture :** ResNet-18  **Database** BioID database https://www.bioid.com/facedb/  **Request:** 75-25 train-test. Face need to be cropped before by face Detection (MTCNN or Viola-Jones) | **NOBODY** |  |
| 21 | **Problem:** Face (Eye) Landmarks localization on the Eye Chimera Dataset  **Architecture :** ResNet-18  **Database** Eye Chimera database : <http://imag.pub.ro/common/staff/cflorea/EyeChim2Download/Eye_chimeraToPublish.rar>  **Request:** 75-25 train-test. Face need to be cropped before by face Detection (MTCNN or Viola-Jones) | NECULA C. Marius-Ştefan |  |
| 22 | **Problem:** Face (Eye) Landmarks localization on the Caltech 10, 000 Web Faces  **Architecture :** ResNet-18  **Database** Caltech 10, 000 Web Faces database : http://www.vision.caltech.edu/Image\_Datasets/Caltech\_10K\_WebFaces/  **Request:**  Face need to be cropped before, by Face Detection (MTCNN or Viola-Jones) | **NOBODY** |  |
| 23 | **Problem:** Face (Eye) Landmarks localization on the MUCT database  **Architecture :** ResNet-18  **Database** MUCT Faces database : http://www.milbo.org/muct/  **Request:**  Face need to be cropped before, by Face Detection (MTCNN or Viola-Jones) | **NOBODY** |  |
| 24 | **Problem:** Face landmark localization on the Siblings Database (retrieval)  **Architecture :** ResNet-18  **Database** Siblings Database database : https://areeweb.polito.it/ricerca/cgvg/siblingsDB.html  **Request:**  Face need to be cropped before, by Face Detection (MTCNN or Viola-Jones) | **NOBODY** |  |
| 25 | **Problem:** Sibling detection on the Siblings Database (retrieval)  **Architecture:** ResNet-18  **Database** Siblings Database database : https://areeweb.polito.it/ricerca/cgvg/siblingsDB.html  **Request:**  none | DUMITRAŞCU C. Georgian-Andrei |  |
| 26 | **Problem:** Expression recognition on the FER 2013 database  **Architecture :** ResNet-18  **Database** FER 2013 : https://www.kaggle.com/c/challenges-in-representation-learning-facial-expression-recognition-challenge/data  **Request:**  Face need to be cropped before, by Face Detection (MTCNN or Viola-Jones) | CIUNEL D. Dumitru-Iulian |  |
| 27 | **Problem:** Saliency Prediction on Mexican object dataset MexCulture142  **Architecture : ResNet 34**  **Database** MexCulture142 : http://www.labri.fr/projet/AIV/MexCulture142.php  **Request:**  saliency map can be computed at 32x32 | ANTON A. Mihaela |  |
| 28 | **Problem: Gender and age prediction on** IMDB-WIki Database  **Architecture ResNet 34**  **Database** IMDB-WIki Database : <https://data.vision.ee.ethz.ch/cvl/rrothe/imdb-wiki/>  **Request:** Parameter ablation | ŢAPLÜK M. Aurelia |  |