Manasi Kattel

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Education

Erasmus Mundus Joint Masters in Medical Imaging and Applications Sep 2021 – Present

University of Burgundy, University of Cassino, and University of Girona

CGPA: 16.646/20

Major Courses: Computer Aided Diagnosis, Medical Image Segmentation; Medical Image Registration; Computed Aided Surgery and Medical Robotics; Medical Sensors; Image Processing; Machine and Deep Learning; Statistical Learning and Data Mining; Introduction to Robotics; Applied Mathematics; Digital Signal Processing; Software Engineering.

Bachelor in Computer Engineering Aug 2015 – Oct 2019

Kathmandu University, Nepal

CGPA: 3.9/4

Academic Projects

Surgical Visual Question Answering on large-scale surgical video dataset | *Python* Jul 2022 – Present

- The existing datasets on Laparoscopic Cholecystectomy are used to create a VQA dataset which contains questions that deal with detection, counting, localization, spatial relationship and surgical action in an image of Cholecystectomy procedure.
- The developed method involves developing a DeepLabv3-based segmentation model, and a Yolov5-based tool detection model to generate surgical scene graphs, which is ingested by a Question Generation engine to generate question-anwer pairs.
- Classification-based VQA model is trained on VisualBERT-based architecture.
- Supervised by Prof. Nicolas Padoy at the CAMMA Lab, University of Strasbourg, France.

Weakly-supervised Cell detection for Cytotoxicity Standardization | *Python* Mar 2022 – Jul 2022

- *Best Paper award at the Domain Adaptation and Representation Transfer Workshop, MICCAI 2022.*
- Image-level weak labels are used to perform the cell-type detection required for ISO 10993-5 standard reactivity of Cytotoxicity. The statistical measures of extracted cells reveal the sought reactivity.
- Our approach involves a Faster-RCNN architecture which is trained using the pseudo-labels obtained from handcrafted methods along with the image examples of living, dead, and inhibited cells.
- Supervised by Prof. Alessandro Bria and Prof. Claudio Marrocco at the University of Cassino, Italy.

Morphologically Consistent Eye Vessel Segmentation | *Matlab* Sep 2021 – Dec 2021

- Performed eye vessel segmentation on retinopathy images to extract vessels' morphology which plays a vital role in detecting many diseases including Diabetes, Glaucoma, and Hypertension.
- Developed a method that involved two sequential steps: (i) morphological image processing for local shape priors; and (ii) matched filter based global shape prior between a known template and the input morphological structure.
- Supervised by Prof. Fabrice Meriaudeau at the University of Burgungy, France.

Honors and Awards

In-person registration waiver award for CVPR 2022
Awarded to attend CVPR 2022 in-person.

Erasmus+: Erasmus Mundus Joint Master (EMJMD) scholarship (2021-2023)
Awarded at rank 9 out of 800+ applicants covering tuition and living expenses during MAIA master.

Kathmandu University Merit-based Scholarship
Awarded twice for the highest merit in the Computer Engineering cohort.

Full scholarship for NAAMII Winter School in AI
Eleven day school with series of lectures, lab sessions, and scientific paper reading/writing sessions in AI.

One first and two second positions in National Level essay competitions
Competitions organised by Gorkhapatra, NATTA, Lions and Leo Club of Kathmandu.

Work Experience

Research Intern Jul 2022 – Sep 2022
CAMMA Lab, ICUBE, University of Strasbourg

Surgical Visual Question Answering on large-scale laparoscopic cholecystectomy video dataset.

Machine Learning Engineer Jun 2019 – Aug 2021
Fusemachines Inc., Nepal

- **Medical Imaging**

  - Developed an edge detection method for X-ray images using U-net architecture and Pytorch.
  - Exploited morphing and elastic deformation based Image Augmentation with various loss functions.

- **Time Series Forecasting for a major Game publisher**

  - Developed several Machine Learning based forecasting models for sales, downloadable contents' revenue and active users.

Publication

- Elbatel, M., Bornberg, C., Kattel, M., Almar, E., Marrocco, C., & Bria, A. (2022). Seamless iterative semi-supervised correction of imperfect labels in microscopy images. Domain Adaptation and Representation Transfer, 98-107. doi:10.1007/978-3-031-16852-9_10

Technical Skills

Languages: Python, R, C/C++, SQL, MATLAB
Frameworks: Pytorch, TensorFlow, transformers, scikit-learn, NLTK
Libraries: Pandas, NumPy, Matplotlib, seaborn, OpenCV, pytest
Tools: Git, Github, Jira, AWS, LaTex

Languages

Nepali (Native), **English** (Fluent, 115 TOEFL iBT), **Hindi** (Intermediate)

Leadership and Extra Curricular Activities

- **Mentor, Udeshya: Girls in STEM.**
  Mentoring girls from public schools studying in grades 7 to 12 from Nepal who need further guidance and inspiration in their STEM-based pursuits.
- **Lead Editor, IT Express 2018**
  Management of the editorial team, Making final decisions about the articles, Reviewing content for errors, Fact checking in articles in Kathmandu University Annual IT Magazine.

References

- **Prof. Fabrice Meriaudeau**, PhD
  Image Processing Course Instructor,
  University of Burgundy
  Email: fabrice.meriaudeau@u-bourgogne.fr
  Website: Google Scholar Page
- **Prof. Alessandro Bria**, PhD
  Deep Learning and Advanced Image Analysis course instructor,
  Supervisor for Weakly-supervised Cell detection for Cytotoxicity Standardization project.
  University of Cassino, Italy
  Email: a.bria@unicas.it
  Website: Google Scholar Page
- **Prof. Nicolas Padoy**, PhD
  Surgical Visual Question Answering on large-scale laparoscopic cholecystectomy video dataset.
  University of Strasbourg, France
  Email: npadoy@unistra.fr
  Website: http://camma.u-strasbg.fr/npadoy