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WORK EXPERIENCE

Machine Learning Lead, INTERMEDIA. *Oct/2019 - Present.* Tandil, BA, Argentina.

- Researched, designed and developed a LLM powered application, for helping developers to find code vulnerabilities and improve their source codes. The technologies used for these projects include: FastAPI, Python, ChromaDB, OpenAI, Anthropic, LiteLLM, Langchain, CrewAI, Ollama, Weights and Biases.
- Researched, designed and developed a LLM powered chatbot suite, for helping companies to interact with their knowledge bases using a conversational assistant. The technologies used for these projects include: FastAPI, Python, ChromaDB, OpenAI, Langchain, LangSmith.
- Researched, designed and developed a LLM powered chatbot, for assisting developers with everyday code problems. The technologies used for these projects include: FastAPI, Streamlit, Python, OpenAI, Langchain, LangSmith.
- Researched and analyzed the feasibility to develop a system that assists a surgeon in non-invasive hip operations, replacing or adapting existing procedures for hip surgery. The project involved locating and measuring the distance between anatomical points on an irregular surface with an accuracy less than 1 cm, using cameras (RGB and RGB-D) located above the patient. The technologies used were: Python, OpenCV, DepthAI
- Developed a prototype to detect and count the number of seedling capture by an UAV, using: Python and FastAPI (backend); OpenCV (image processing, object detection); Streamlit (frontend prototype)
- Developed a prototype to detect cannabis flowers passing on a conveyor belt, predict their health condition, and track/count the total number of each one, using Python, OpenCV, Tensorflow and Keras.
- Developed a prototype to predict NDVI value using a low cost multispectral sensor, using Python and Scikit-learn.
- Leaded and developed a system to visualize and manage cannabis plants data (sensors and images) collected on field via edge devices and mobiles apps. The system also provides an early alert system that notifies farmers about plants issues using an IA assists that process images and sensors data to detect patterns associated with problems in their crops. The technologies used were: Python and FastAPI (backend); React and Javascript (frontend); Postgresql, Nginx and EC2 instances.
- Developed a whole system to cannabis plants' salubrity, detecting leaves in images and classifying their health condition, using: Python and FastAPI (backend); Tensorflow and Keras (machine learning modeling, object detection and classification); LabelStudio (labeling); Nginx and EC2 instances.
- Developed a prototype device to capture images and data from the environment to feed AI-based models that detected plant diseases. The device has an electronic board developed in-house, a Raspberry Pi microprocessor, two cameras (RGB and NOIR), and temperature, pressure, humidity and illumination sensors. The device can work offline and then synchronize with an internet connection to upload data and images to the Daiana cloud. The device processes locally images to estimate a NDVI value and predict plants health condition (edge computing). The software is implemented as an API to allow local network connections via mobile apps. The technologies used for the project were: Raspberry, Python, Tensorflow, Keras, Sklearn, Fast API, Postgres SQL.
- Developed a system to predict tomato plants' salubrity, detecting leaves in images and classifying their health condition, using: Python and Flask (backend); Tensorflow and Keras (machine learning modeling, object detection and classification); LabelStudio (labeling); React and Javascript (frontend); Nginx and EC2 instances.
- Developed a NLP agent to add voice control support to devices from a cable television provider, using NodeJS, Express , Dialogflow and Google Cloud Functions.

Technical Leader & Deep Learning Engineer, UNIAGROSOFT. *Mar/2018 - Present.* Tandil, BA, Argentina.

- CControlAR project: a tool to monitor and estimate cows body condition score (BCS) from images analysis, using deep learning models to automatically identify and classify them on a free-walk path.
- Developed deep learning models using Tensorflow and Keras and deployed them in embedded computing boards.

Software & Machine Learning Engineer, SINEQUIX Inc. *Mar/2019 - Sep/2019.* Remote, Miami, FL, USA.

- Developed a system for scraping, storing, processing and analyzing construction cost data.
- Developed a serverless meta-API to manage inventory, products, and sales, distributed on e-commerce sites.
- Researched approaches for product matching, product categorization, and product recommendations.
- Developed solutions mainly with Python and several AWS such as S3, Lambdas, API Gateway, Beanstalk, and DynamoDB.

Software Engineer & Researcher, ISISTAN & CIVETAN Research Institutes, CONICET. *Apr/2014 - Apr/2019.* Tandil, BA, Argentina.

- Developed predictive models and statistical visualizations using Matplotlib, SKLearn, Scipy, Tensorflow, Keras and Jupyter Notebooks.

- Developed deep learning models to analyze how different model configurations and machine learning techniques could be used in order to classify cows according to their body condition.
- Developed a deep learning object detection model to identify the presence of cows in video frames.
- Contributed to develop and configure a distributed database, to store agricultural simulation data using MongoDB.

Software Engineering Consultant, SAExploration inc. *Dec/2018 - Apr/2019.* Remote, Houston, TX, USA.

- Designed and developed a geographic information system to control and monitor real-time exploration activities, using ESRI platform, Amazon EC2, PostgreSQL and custom Python and JAVA applications to collect data.

Software Engineering Consultant, Geokinetics inc. *Oct/2014 - Apr/2018.* Remote, Houston, TX, USA.

- Designed and developed a geographic information system to monitor real-time localizations and operations using ESRI platform.

Training Researcher, ISISTAN Research Institute, CIC. *Oct/2012 - Oct/2013.* Tandil, BA, Argentina.

- Applied grid computing techniques to contribute in the development of a gridification tool for agricultural simulation applications, using Gridgain and Apache Ignite support.

EDUCATION

Phd in Computer Science, UNICEN University. (Mar 2019)

Thesis: Estimation of body condition on cows from depth images using Convolutional Neural Networks.

B.Sc. in Systems Engineering, UNICEN University. (Mar 2014)

Thesis: A tool for the gridification of agricultural simulation applications.

TEACHING ASSISTANT

Operating Systems I course, UNICEN university (2018)
Programming I course, UNICEN university (2018)

SCHOLARSHIPS

Post-Doctoral Scholarship, Consejo Nacional de Investigaciones Científicas y Técnicas, CONICET (2019).
Doctoral Scholarship, Consejo Nacional de Investigaciones Científicas y Técnicas, CONICET (2014).
Training Scholarship, Comisión de Investigaciones Científicas, CIC (2012).

PUBLICATIONS

- Estimating Body Condition Score in Dairy Cows From Depth Images Using Convolutional Neural Networks, Transfer Learning and Model Ensembling Techniques. Special Issue "Deep Learning Techniques for Agronomy Applications", Agronomy (2019)
- Body condition estimation on cows from depth images using convolutional neural networks. Computers and Electronics in Agriculture (2018)
- Review and analysis of computational techniques and methods for body condition score estimation on cows. SADIO Electronic Journal of Informatics and Operation Research (2018).
- Advances in automatic detection of body condition score of cows: A mini review. Journal of Dairy, Veterinary & Animal Research (2017).
- Extending JASAG with data processing techniques for speeding up agricultural simulation applications: A case study with Simugan. Information Processing in Agriculture (2016).
- JASAG: a gridification tool for agricultural simulation applications. Concurrency and Computation: Practice and Experience (2015).

PATENT

- *AR117138A1*: An automatic and mobile monitoring system of the degree of completion (GT) in breeding cows, body condition (CC) in both dairy and meat production cows and the probability of pregnancy (PP) in dairy production. (Jul 2021).

COURSES AND CERTIFICATIONS

- Machine Learning. *Stanford University / Coursera.*
- Course Specialization - Deep Learning. *deeplearning.ai / Coursera.*
  - Convolutional Neural Networks. *deeplearning.ai / Coursera.*
  - Sequences, Time Series and Prediction. *deeplearning.ai / Coursera.*
  - Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization. *deeplearning.ai / Coursera.*
  - Structuring Machine Learning Projects. *deeplearning.ai / Coursera.*
  - Neural Networks and Deep Learning. *deeplearning.ai / Coursera.*
- Professional Certificate - DeepLearning.AI TensorFlow Developer. *deeplearning.ai / Coursera.*
  - Introduction to TensorFlow for Artificial Intelligence, Machine Learning, and Deep Learning. *deeplearning.ai / Coursera.*

    - Convolutional Neural Networks in TensorFlow. *deeplearning.ai / Coursera.*
    - Natural Language Processing in Tensorflow. *deeplearning.ai / Coursera.*
    - Sequences, Time Series and Prediction. *deeplearning.ai / Coursera.*
- Course Specialization - Machine Learning Engineering for Production (MLOps). *deeplearning.ai / Coursera.*
    - Introduction to Machine Learning in Production. *deeplearning.ai / Coursera.*
    - Machine Learning Data Lifecycle in Production. *deeplearning.ai / Coursera.*
    - Machine Learning Modeling Pipelines in Production. *deeplearning.ai / Coursera.*
- Production Machine Learning Systems. *Google / Coursera.*
- Inferential Statistical Analysis with Python. *University of Michigan / Coursera.*
- Understanding and Visualizing Data with Python. *University of Michigan / Coursera.*
- Introduction to Data Science in Python. *University of Michigan / Coursera.*
- Hadoop Platform and Application Framework. *University of California San Diego / Coursera.*