**استمارة تقييم التدريب الصيفى بكلية الحاسبات و علوم البيانات**

**عن الفصل الدارسى الصيفى للعام الجامعى 2023 - 2024**

|  |  |
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| **: أحمد يسري علي محمد** | **إسم الطالب** |
| **: 2103108** | **الرقم الجامعى** |
| **: النظم الذكية** | **البرنامج** |
| **: الرابع** | **المستوى** |
| |  |  |  |  | | --- | --- | --- | --- | | **02-24-01307 :** | **كود المقرر** | **Field Training 2 :** | **إسم المقرر** | | |
| **My communication (online) :** | **مكان التدريب** |

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|  | **تقييم جهة التدريب (إن وجدت)** |

**Training Title**

**--------------------------------------------------------------------**

**يقوم الطالب بعمل تقرير باللغه الإنجليزيه عن التدريب الذى استكمله على ان يكون هذا التقرير متضمنا البنود التاليه بالترتيب الموضح:**

1. **Introduction**

* **Objective of the Training: Practical Applications on AI/ML/DL to be prepared for work.**
* **Duration and Location: 2-3 Hours, every Wednesday (Online).**
* **Participants: Approx. 40 for Group 2.**
* **Field of training: Employing AI/ML for Analysis.**

**2. Training Content**

* **Topics Covered:**
  + Introduction to AI + Data Science
  + Regression ML Algorithms
  + Classification ML Algorithms
  + Advanced ML Algorithms + Clustering Algorithms
  + Introduction to Deep Learning
  + Optimization in Deep Learning
  + CNN and Image preprocessing
  + Segmentation and Labeling
  + RNN and Speech Recognition
  + Introduction to NLP + Deployment of ML algorithms
* **Training Methods:**
  + **Lectures: 10**
  + **Workshops:**
  + **Hands-on:**

**3. Training Schedule**

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| --- | --- | --- | --- |
| **Date** | **Time** | **Topic** | **Trainer** |
| **24/07/2024** | **6:00 PM – 10:00 PM** | Introduction to AI + Data Science | **Khaled Naguib** |
| **31/07/2024** | **6:00 PM – 10:00 PM** | Regression ML Algorithms | **Khaled Naguib** |
| **21/08/2024** | **6:00 PM – 10:00 PM** | Classification ML Algorithms | **Khaled Naguib** |
| **24/08/2024** | **6:00 PM – 10:00 PM** | Advanced ML Algorithms + Clustering Algorithms | **Khaled Naguib** |
| **05/09/2024** | **6:00 PM – 10:00 PM** | Introduction to Deep Learning | **Khaled Naguib** |
| **07/09/2024** | **6:00 PM – 10:00 PM** | Optimization in Deep Learning | **Khaled Naguib** |
|  | **6:00 PM – 10:00 PM** | CNN and Image preprocessing | **Khaled Naguib** |
|  | **6:00 PM – 10:00 PM** | Segmentation and Labeling | **Khaled Naguib** |
|  | **6:00 PM – 10:00 PM** | RNN and Speech Recognition | **Khaled Naguib** |
|  | **6:00 PM – 10:00 PM** | Introduction to NLP + Deployment of ML algorithms | **Khaled Naguib** |

1. **Field Training.**

**Session 1: Introduction to AI + Data Science**

This session covers the foundational concepts of Artificial Intelligence (AI) and Data Science. It introduces the basic principles that govern AI, including its history, key milestones, and current applications in various fields such as healthcare, finance, and autonomous systems. The Data Science segment dives into the data-driven approach to problem-solving, explaining the lifecycle of data from collection and cleaning to exploration and analysis. This session also introduces tools and techniques like Python, NumPy, and Pandas , which are essential for data manipulation and analysis.

**Key topics:**

* AI and its history
* Data Science lifecycle and processes
* Introduction to data handling tools: Python, NumPy, Pandas

**Session 2: Regression ML Algorithms**

In this session, participants are introduced to Machine Learning (ML), specifically focusing on regression algorithms. Regression is a supervised learning technique used to model and analyze relationships between variables. This session covers linear regression, multiple regression, and polynomial regression. Key concepts such as overfitting, underfitting, and cross-validation are discussed to help students understand how to build robust models.

**Key topics:**

* Supervised learning overview
* Linear, multiple, and polynomial regression
* Model evaluation: MSE, R-squared, and regularization techniques

**Session 3: Classification ML Techniques**

Classification is a crucial type of supervised learning where the goal is to predict categorical labels. This session dives into classification algorithms like Logistic Regression, Decision Trees, Support Vector Machines (SVMs), and k-Nearest Neighbors (k-NN). It emphasizes the importance of metrics like accuracy, precision, recall, and F1-score for model evaluation. The session also covers techniques such as confusion matrices and ROC curves.

**Key topics:**

* Classification tasks and techniques
* Logistic Regression, Decision Trees, SVM, k-NN
* Model performance metrics: precision, recall, and F1-score

**Session 4: Advanced ML Algorithms + Clustering Algorithms**

This session builds upon the previous concepts by introducing more advanced ML algorithms and unsupervised learning techniques like clustering. Students are introduced to Ensemble Methods (such as Random Forests and Gradient Boosting), which improve prediction accuracy by combining multiple models. In the clustering section, key algorithms like k-Means, DBSCAN, and Hierarchical Clustering are explored. These algorithms are used to find patterns and group similar data points without labeled outputs.

**Key topics:**

* Ensemble methods: Random Forest, Gradient Boosting
* Unsupervised learning overview
* Clustering algorithms: k-Means, DBSCAN, Hierarchical Clustering

**Session 5: Introduction to Deep Learning**

This session introduces Deep Learning, a subset of machine learning that uses neural networks with multiple layers (deep neural networks) to model complex patterns in data. The session covers the basics of Artificial Neural Networks (ANNs), activation functions, and how deep learning models learn through backpropagation and gradient descent. Examples of applications in image processing and natural language processing (NLP) are explored to demonstrate the power of deep learning.

**Key topics:**

* Deep learning and neural networks
* Activation functions (ReLU, sigmoid, tanh)
* Backpropagation and optimization techniques

**Session 6: Optimization in Deep Learning**

This session focuses on optimization techniques that are critical for training deep learning models. It covers various methods of gradient descent, including stochastic gradient descent (SGD), mini-batch gradient descent , and momentum-based techniques . Additionally, regularization techniques such as dropout and L2 regularization are introduced to combat overfitting. The session also touches on advanced optimizers like Adam and RMSProp , which improve the efficiency of training deep neural networks.

**Key topics:**

* Optimization techniques: SGD, momentum, Adam, RMSProp
* Regularization techniques: dropout, L2 regularization
* Preventing overfitting in deep learning models

**Session 7: Convolutional Neural Networks (CNN) and Image Preprocessing**

This session introduces Convolutional Neural Networks (CNNs), which are highly effective for tasks involving images. The session explores the architecture of CNNs, including concepts like convolutional layers, pooling layers, and fully connected layers. It also covers techniques for image preprocessing, such as normalization, rescaling, augmentation, and denoising. Applications of CNNs in fields like computer vision, facial recognition, and object detection are demonstrated.

**Key topics:**

* CNN architecture: convolutional and pooling layers
* Image preprocessing techniques
* Applications in computer vision

**Session 8: Segmentation and Labeling**

In this session, students dive deeper into image processing by learning about image segmentation and labeling techniques. These techniques involve breaking down images into meaningful regions or objects, which is crucial for fields like medical imaging, autonomous driving, and robotics. The session covers algorithms like U-Net, Mask R-CNN, and Region-based CNN (R-CNN), which are commonly used for segmentation tasks. It also introduces the concept of pixel-level labeling.

**Key topics:**

* Image segmentation algorithms: U-Net, Mask R-CNN
* Labeling techniques for images.
* Real-world applications of segmentation.

**Session 9: Recurrent Neural Networks (RNN) and Speech Recognition**

This session focuses on Recurrent Neural Networks (RNNs), which are specifically designed for sequential data, such as time series or text. RNNs are particularly useful in speech recognition and natural language processing (NLP) tasks. This session introduces the architecture of RNNs, Long Short-Term Memory (LSTM) networks, and Gated Recurrent Units (GRUs). It also demonstrates how these models are applied to speech-to-text conversion and voice-controlled applications.

**Key topics:**

* RNN architecture and variations (LSTM, GRU)
* Applications in speech recognition
* Handling sequential data with neural networks

**Session 10: Introduction to NLP + Deployment of ML Algorithms**

The final session introduces Natural Language Processing (NLP) , which focuses on enabling machines to understand and generate human language. The session covers key NLP techniques like tokenization , word embeddings , TF-IDF , and transformers (e.g., BERT ). Additionally, it addresses the practical aspects of deploying ML models in production environments, including model serving, versioning, and monitoring in real-world applications.

**Key topics:**

* NLP techniques: tokenization, embeddings, transformers
* Model deployment strategies: serving, versioning, monitoring
* Use cases in conversational AI and chatbots

**Notes:**

**The students must watch out for the following points:**

* **They should use their language as much as possible. Copying from manuals or books is not acceptable.**
* **Spell check before submitting the report.**
* **Avoid repetition.**
* **The student may include tables, figures, pictures and technical drawings as needed.**
* **Figures and tables should be numbered with captions, and they should be referred to in the text.**
* **Use of the same font type of 12 point size, double spaced all over the report.**
* **The pages should be numbered.**

1. **Key Learnings**

* **Summary of Important Points:**
  + Foundations of AI and Machine Learning
  + Deep Learning and Advanced Techniques
  + Sequence Models
* **Skills Acquired:**
  + Building and Optimizing ML Models
  + Handling Image and Text Data

1. **Feedback**

* **Participant Feedback:**

**Not a bad training needs more time, time-management, and more organizing.**

* **Trainer Feedback:**

**Not bad.**

* **IS this training recommended to another students?**

**Yes.**

* **Recommendation and Evaluation about Training:**

**Training Location: Online (Good)**

**Value of the training: Good for anyone who isn’t in AI to get AI knowledge**

**Trainer: Not very good because he didn’t have time-management**

1. **Conclusion**

* **Overall Assessment: 7/10**
* **Future Training Recommendations: Need more time, time-management, and more organizing.**

1. **Appendices**

* **Additional Materials (Handouts, Presentations)**

برجاء استكمال الاستبيان عن التطبيقات المستخدمه داخل الكليه حتى نتمكن من مساعدتك للوصول الى افضل تطبيق يمكن ان يساعدك خذ فى الاعتبار ان درجات التقييم لكل بند من 1 الى 10 (اختيار رقم 1 معناها اقل ما يمكن و 10 افضل ما يمكن):

|  |  |  |
| --- | --- | --- |
| **New App**  **كلية الحاسبات و علوم البيانات**  **Prof. Dr. Adel El-Zoghabi** | **ابن الهيثم** | **الخاصية** |
| **8** | **6** | سرعه الاستجابه |
| **5** | **9** | طريقه العرض داخل البرنامج |
| **7** | **7** | مشاكل سحب المواد او اضافه مواد غير مطلوبه |
| **8** | **8** | مشاكل الرصد |
| **نعم** |  | هل استخدمت منظومه الشكاوى فى نظام جامعه الاسكندريه؟ (نعم أو لا) |
|  |  | إختار النظام الذى تفضل الاستمرار فيه مع ذكر السبب |
| **Write your opinion neutrally to compare Ibn Al-Haytham program with Alexandria University program?**  اكتب رايك بحياده للمقارنه بين برنامج ابن الهيثم و بين برنامج جامعة الاسكندريه | | |