

Project School Certificate



Title : FALSE DATA INJECTION ATTACK

Faculty Incharge : Raju

Session Duration : 10/09/2022 – 23/12/2022

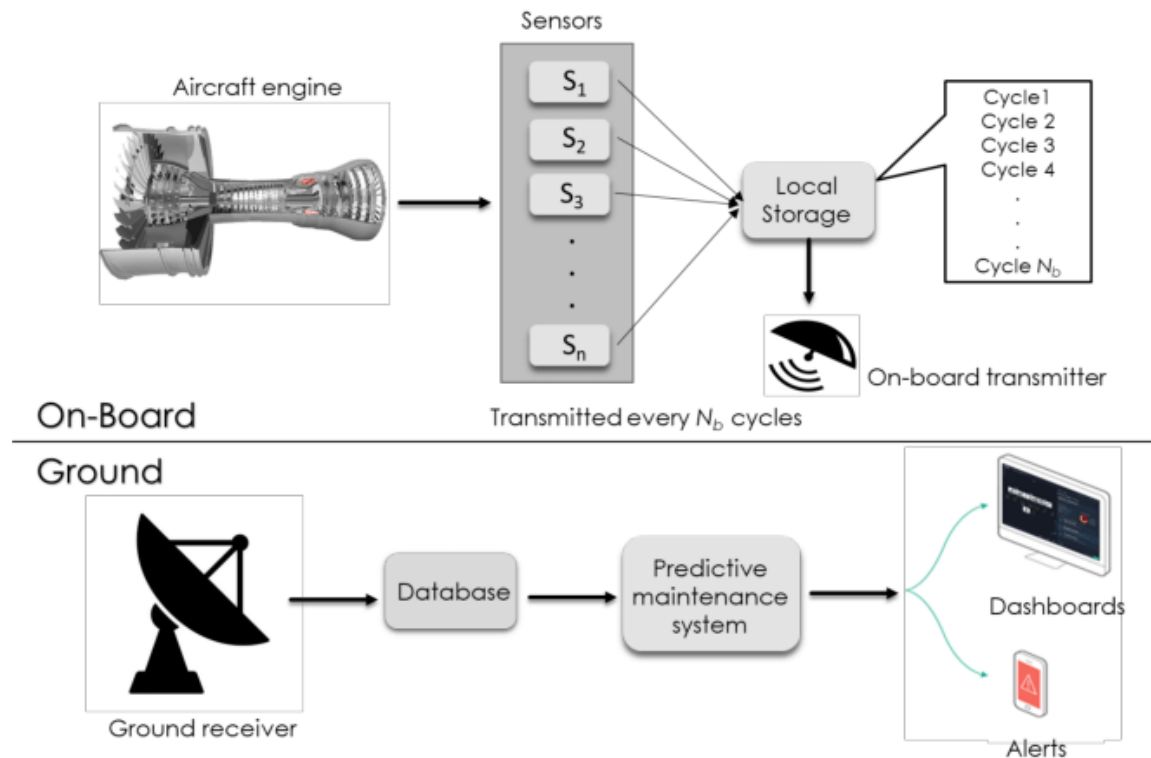
Name : G.saidatta

Roll Number : 20BD1A050Q

Class : CSE-A

Signature of faculty

Signature of student



Domain : deep learning, false data injection attack, LSTM,GRU, CNN, industry 4.0, Internet of things, machine learning.

Project Description : False Data Injection encompasses a class of malicious data attacks that target critical infrastructures controlled by Cyber-Physical Information Systems. FDIA strategies involve the attacker compromising sensor readings, so undetected corrupt data is included in calculating values and variables used to define the system state.

Technical Description :

1. we use three state-of-the-art DL algorithms, specifically, Long Short-Term Memory (LSTM), Gated Recurrent Unit (GRU), and Convolutional Neural Network (CNN) for predicting the Remaining Useful Life (RUL) of a turbofan engine using NASA's C-MAPSS dataset.

2. The obtained results show that the GRU-based PdM model outperforms some of the recent literature on RUL prediction using the C-MAPSS dataset.

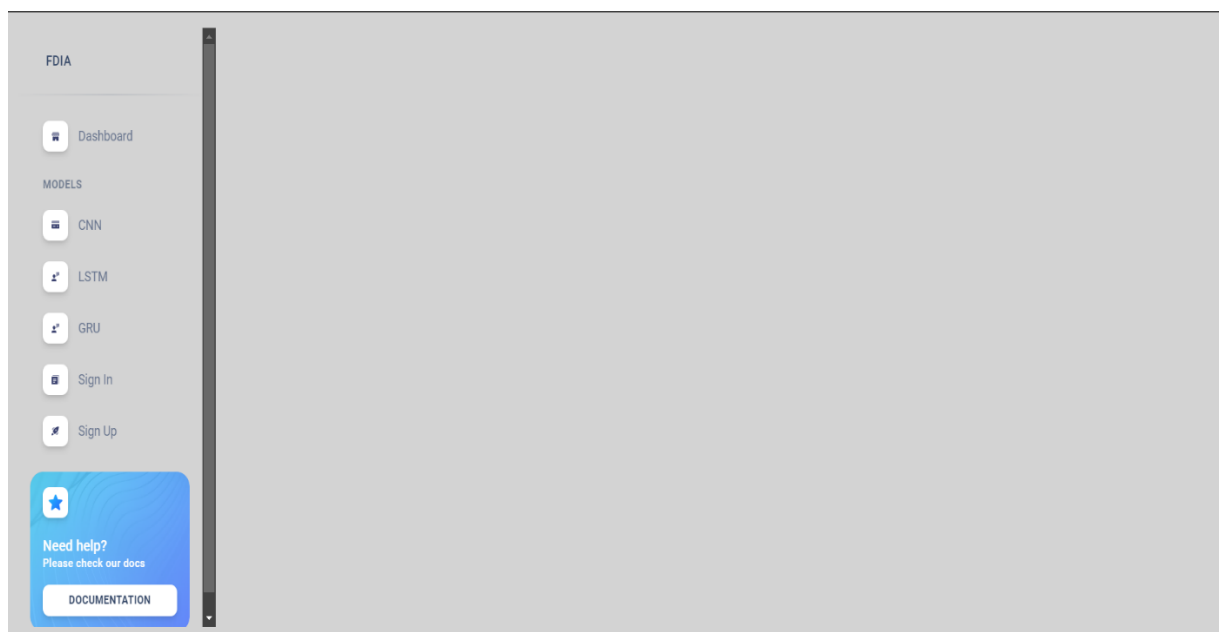
3. Afterward, we model two different types of false data injection attacks (FDIA) on turbofan engine sensor data and evaluate their impact on CNN, LSTM, and GRU-based PdM systems.

4. The obtained results demonstrate that FDI attacks on even a few IoT sensors can strongly defect the RUL prediction.

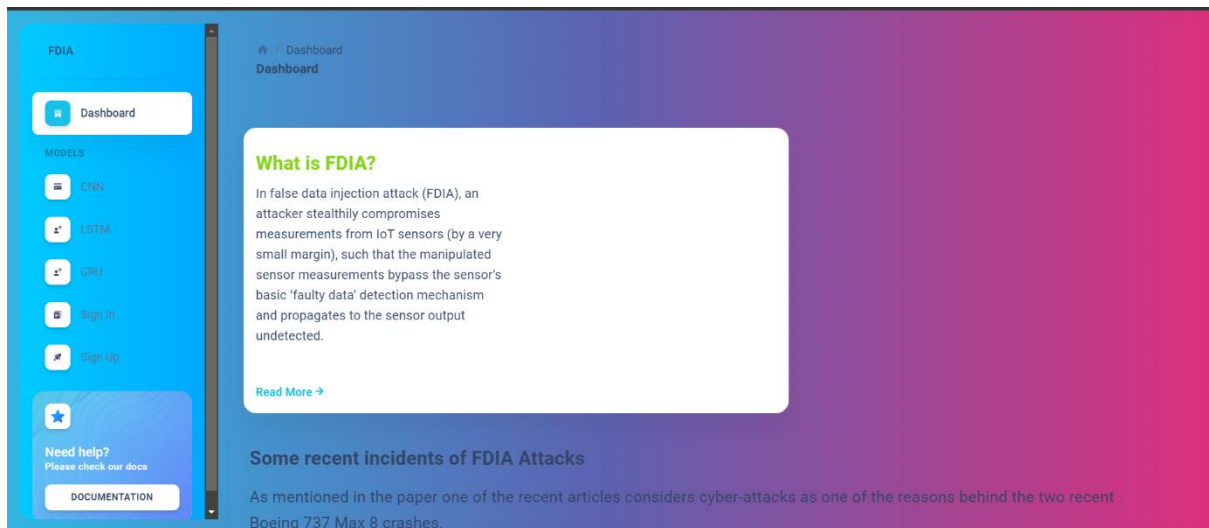
5. Our experiments reveal an interesting relationship between the accuracy, resiliency and sequence length for the GRU-based PdM models.

Implementation

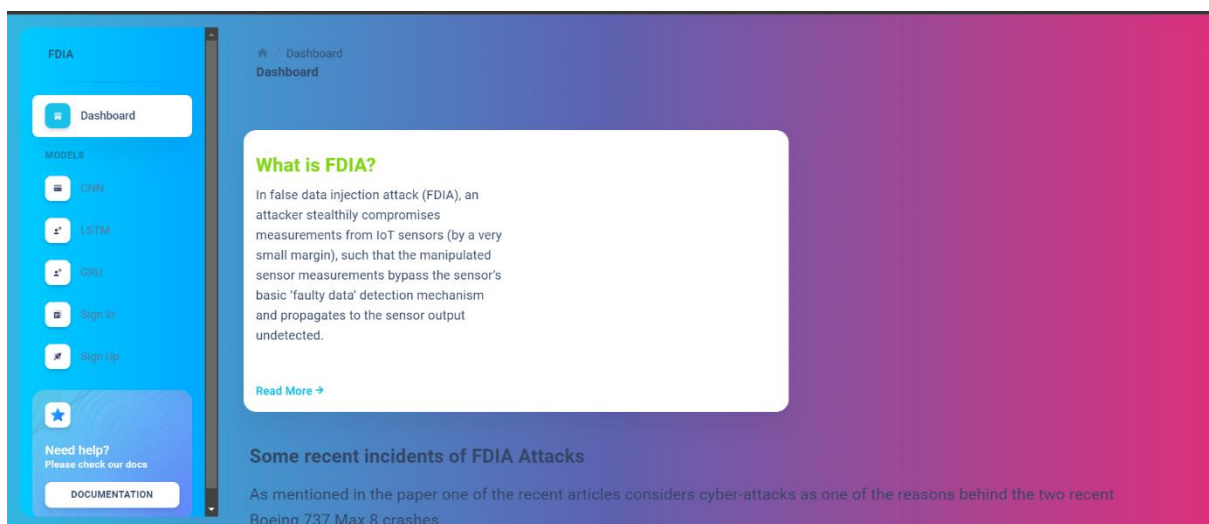
1 . **Home Screen** : Starting page of the web app look as follows :



2 . **Dashboard** :it describes what is FDIA and some exmaples of fdia and a refernce paper..



3 .**Models**: we see what type of models are like CNN,LSTM,GRU.



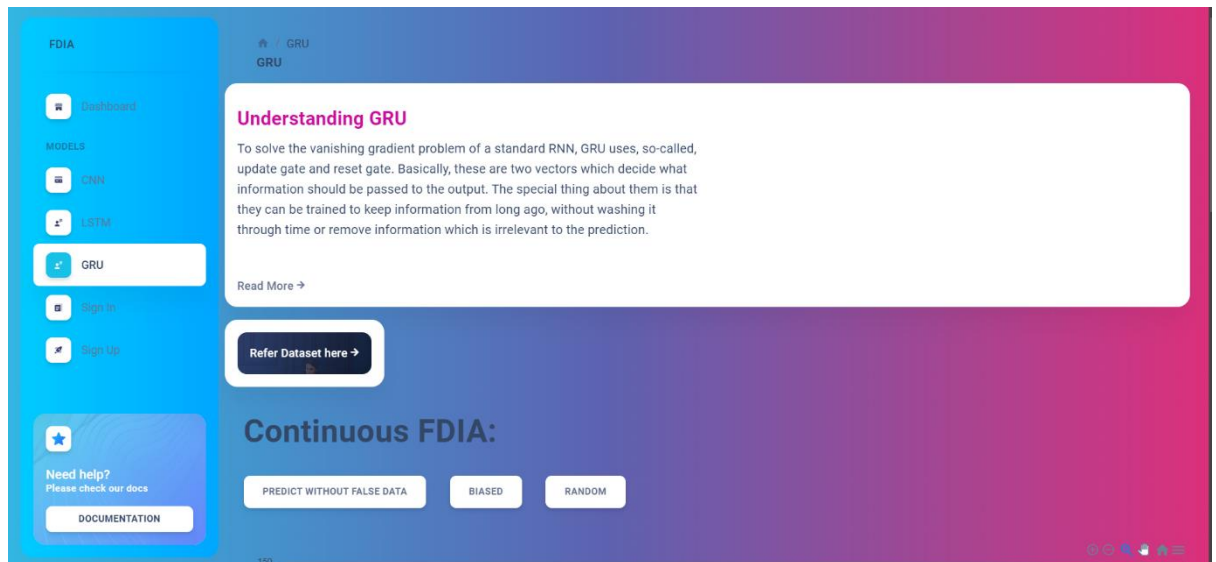
4 . **CNN** : User need to insert a image of leaf captured here to get to know about the disease of that particular leaf.

The screenshot shows the FDIA application interface for the CNN model. On the left is a blue sidebar with navigation links: Dashboard, CNN (selected), LSTM, GRU, Sign in, and Sign Up. Below these is a 'Need help? Please check our docs' section with a 'DOCUMENTATION' button. The main content area has a header 'CNN' and a title 'Understanding CNN'. The text explains that CNNs are biologically inspired feed-forward ANNs and are more sensitive to FDIA than LSTM and GRU. A 'Read More' link is provided. Below the text is a diagram of a 1D CNN architecture: Input Image (28x28, R, G, B) -> Conv. layer (24x24) -> Sub-samp. layer (12x12) -> Conv. layer (8x8) -> Sub-samp. layer (4x4) -> MLP layers -> Output (class vectors). The diagram is captioned 'Figure 4: Overview of a simple 1D CNN'.

5 . **LSTM**:

The screenshot shows the FDIA application interface for the LSTM model. The sidebar is identical to the previous screenshot, with 'LSTM' selected in the 'MODELS' section. The main content area has a header 'LSTM' and a title 'Understanding LSTM'. The text explains that learning to store information over extended time intervals by recurrent backpropagation takes a very long time due to insufficient, decaying error backflow, and introduces the Long Short-Term Memory (LSTM) method. A 'Refer Dataset here' button is located below the text. At the bottom, there is a section titled 'Continuous FDIA:' with three buttons: 'PREDICT WITHOUT FALSE DATA', 'BIASED', and 'RANDOM'.

GRU :



CNN with Prediction graph :



- **truth - Blue - true value**
- **predict - Green - without false data**
- **biased - Yellow - with False Data**
- **random - Red - with false data**

LSTM with Predicted Graph:



- **truth - Blue - true value**
- **predict - Green - without false data**
- **biased - Yellow - with False Data**
- **random - Red - with false data**

GRU with Predicted Graph:



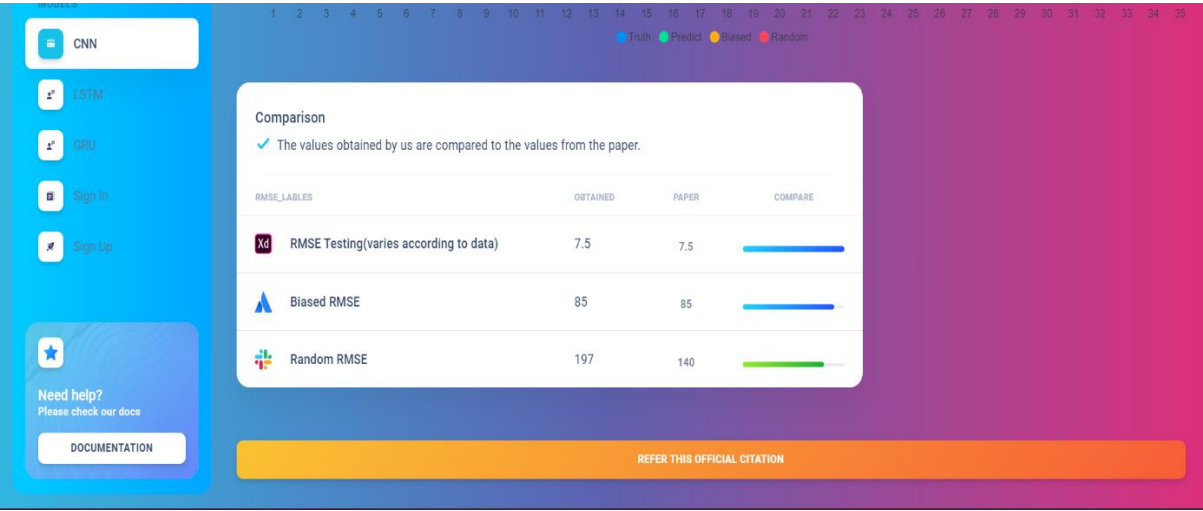
→ truth - Blue - true value

→ predict - Green - without false data

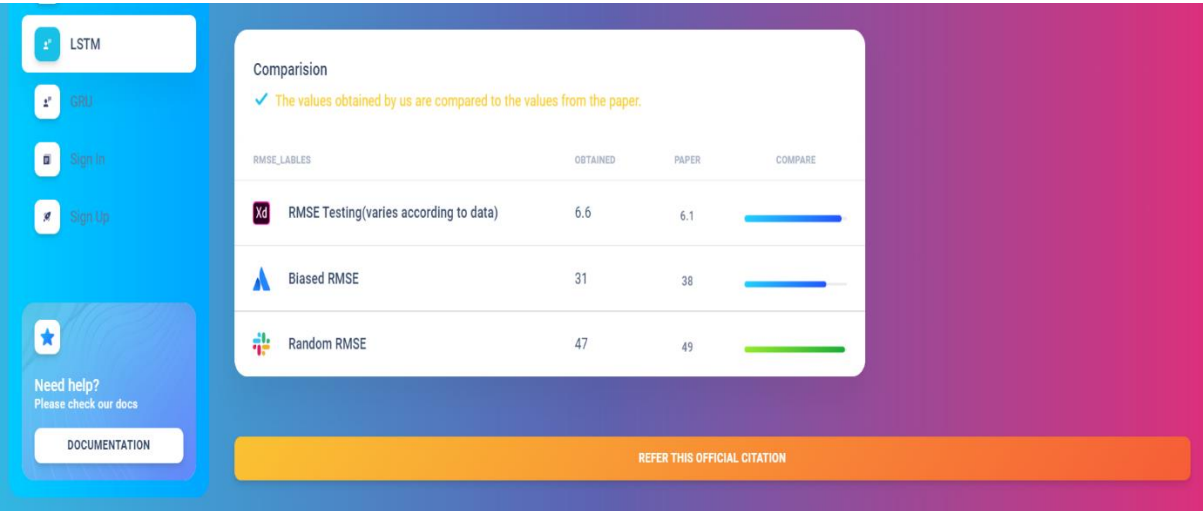
→ biased - Yellow - with False Data

→ random - Red - with false data

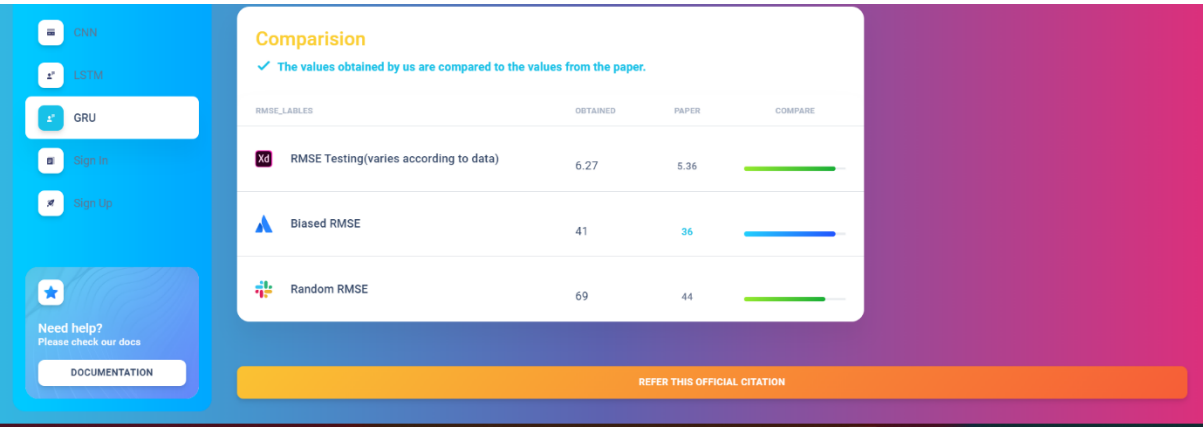
CNN Comparison table :



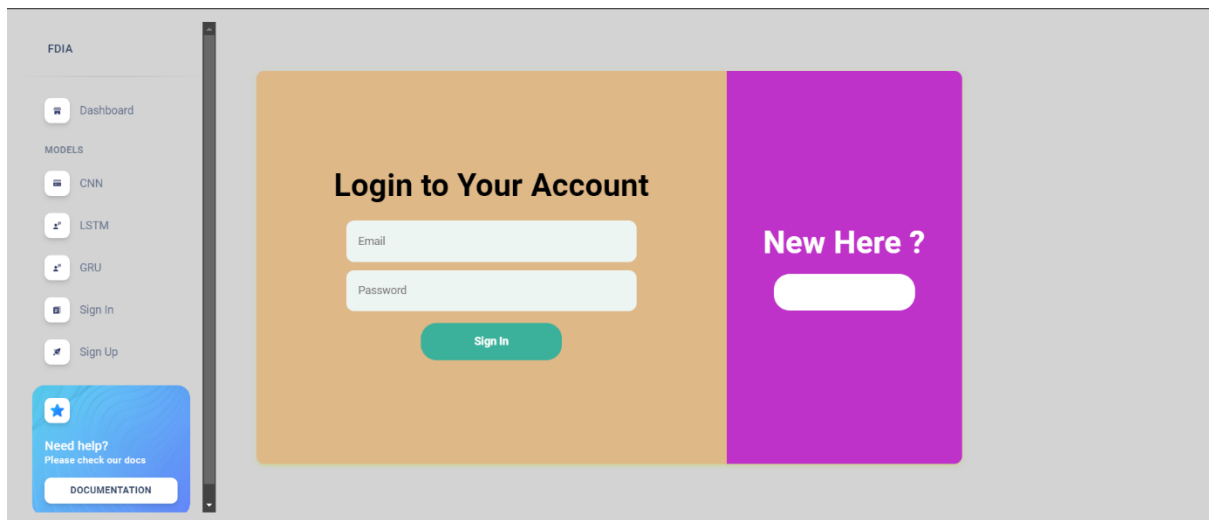
LSTM Comparison Table:



GRU Comparison Table:



Sign in: Given an access to login



The image shows a web application interface for logging in. On the left is a sidebar with the 'FDIA' logo and a menu containing 'Dashboard', 'MODELS' (with sub-items 'CNN', 'LSTM', 'GRU'), 'Sign In', and 'Sign Up'. Below the menu is a blue box with a star icon, the text 'Need help? Please check our docs', and a 'DOCUMENTATION' button. The main content area has a light gray background. It features a large orange rectangle on the left with the title 'Login to Your Account' and a green 'Sign In' button. To its right is a purple rectangle with the text 'New Here ?' and a white button.

FDIA

Dashboard

MODELS

CNN

LSTM

GRU

Sign In

Sign Up

Need help?
Please check our docs

DOCUMENTATION

Login to Your Account

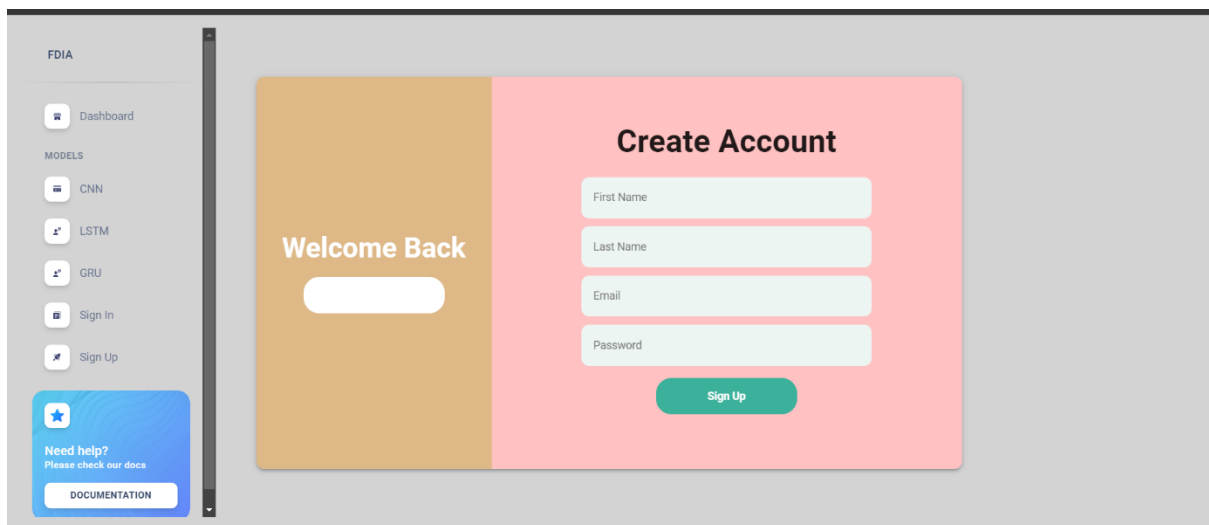
Email

Password

Sign In

New Here ?

Sign out: Given an access to create account data .



The image shows the same web application interface as the previous one, but for account creation. The sidebar is identical. The main content area features a large orange rectangle on the left with the text 'Welcome Back' and a white button. To its right is a pink rectangle with the title 'Create Account' and a green 'Sign Up' button. The form fields for 'First Name', 'Last Name', 'Email', and 'Password' are located within the pink rectangle.

FDIA

Dashboard

MODELS

CNN

LSTM

GRU

Sign In

Sign Up

Need help?
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DOCUMENTATION

Welcome Back

Create Account

First Name

Last Name

Email

Password

Sign Up

