Call for Design Contest Projects, VLSID 2024

GENERAL GUIDELINES

Eligibility

The Design Contest is open for engineering students pursuing undergraduate/postgraduate/doctoral degrees.

Theme of the Contest

The theme of the contest is Artificial Intelligence on the Edge. The participants are invited to develop new AI models for STM32 platform in the field of Robotics, Healthcare, Agriculture, Battery Management, Digital Power, and Renewable Energy Management Systems.

Hardware Platform

The hardware platform is B-L475E-IOT01A Discovery Kit for IoT. It allows users to develop applications with direct connection to cloud servers.

For more information, please refer to the link: https://www.st.com/en/evaluation-tools/b-l475e-iot01a.html

Orientation Session

- An Orientation Session is planned to share more details about the design contest, usage of tools & technologies, and answer any queries from the participants. Two such sessions are planned on 21st August and 23rd August (6:30 pm to 7:30 pm)
- Link: Click here

Stage 1: Idea Submission

- Your idea submission should cover a description of the idea along with a block diagram of the idea (refer template)
- Examples / Use-case of the application
- Benefits and value addition of your solution
- Your team description along with your contact information with mailing address

Steps for submission

- Download the template available on the conference website.
- Fill the details with minimum font size 10pt, times new roman, max two pages including table, diagram, references (if any).
- Covert it to pdf format.
- Submit the pdf using the weblink available on conference website.
- Following the first round of screening, selected teams will be shortlisted to convert their ideas into application solutions using the B-L475E-IOT01A Discovery Kit for IoT. Hardware will be shipped to the selected teams.

Stage 2: Implementation

- Selected project will be implemented by the teams on the B-L475E-IOT01A Discovery Kit for IoT from STMicroelectronics. Team size: 2-5 members (Minimum:2 members and Maximum:5 members)
- Experts from the Conference and STMicroelectronics will guide and mentor the teams during the implementation phase.

Stage 3: Project Submission

- The project submission by the selected teams should include
  - AI model (H5, tflite, or .onnx)
  - Training datasets.
  - Workspace source file of running application on STM32 platform.
  - Video of running application.
  - Power point presentation (max 5 slides) about the application.
  - Any references etc.
- Best 5 teams will be announced on 12th December 2023. These teams will be invited for demonstration during the conference on 9th Jan 2024.
- Cash awards and certificates for the winners of the Design Contest.

Figure 1: Timeline of Design Contest

IDEA SUBMISSION TEMPLATE

Overview of the idea
Minimum font size: 10pt, Times New Roman font. **Maximum two pages** including tables, diagram, references (if any).

Example of its application
Describe an example consisting of potential application/Future application. This will enable usage model towards its market acceptance), **Maximum one page.**

Benefits and Value addition
Explain what the key benefits of your idea/implementation are. You should describe key value addition of your idea as this will explain why your idea has value in presence of other competitor(s) OR Players. In a way it will show uniqueness/Unique selling point/key differentiator). **Maximum half a page.**

Miscellaneous
List your team members' names, branch, affiliation, and contact emails here. Include the name of your university/college and your shipping address.

EXAMPLE IDEA SUBMISSION

- **Overview of the idea**

(Minimum font size: 10pt, Times New Roman font. Max two pages including tables, diagram, references (if any):

AI model for Human activity recognition

The idea is to create an AI model to detect human activity such as walking, running and being at stationary position. The AI model will take motion sensors data such as accelerometer, gyroscope, etc to capture motion data. The AI model should be able to detect and categorise the motion as walking, running and stationary position. Steps

- Create an AI model for human activity recognition keeping in mind low footprint micro-controller
- Train the model with the data set to classify the different activities.
- Generate C-code using the STM32CubeMX tool by giving input as the AI model in H5, .tflite or .onnx format supported by STM32CubeMX tool
- Validate the size of the C code generated based on the AI model created using the STM32CubeMX tool
- Validate of AI model with the correct classification of human activity

References:

- Data Sets sources
- AI Model sources
- Tool used to create the AI Model
- Paper references

- **Example of its application (Describe an example consisting of potential application/Future application. This will enable usage model towards its market acceptance)**

  The AI Model will help to classify the motion of person who are employed in material movement activities. In a typical Industrial IOT for example in a big warehouse, material movement is a routine activity. A battery-based electronic system having AI to classify the movement of the object on dashboard with following sign / legend will be helpful in tracking.

  Red: Stationary
  Yellow: Walking / Slow Movement
  Green: Running / Fast movement

- **Benefits and Value addition (Explain what the key benefits of your idea/implementation are. You should describe key value addition of your idea as this will explain why your idea has value in presence of other competitor(s) OR Players. In a way it will show uniqueness/Unique selling point/key differentiator)**

  The electronic system is based on micro-controller sensors and battery based that consumes very less power. Beyond the classification of the movement, it can also help in classifying the speed of moving objects beyond the classifying stationary, walking, and running.

- **List your team members' names, branch, and affiliations & contact emails here. Include the name of university/college and your shipping address.**