



# DRDO Young Scientist Laboratory Artificial Intelligence

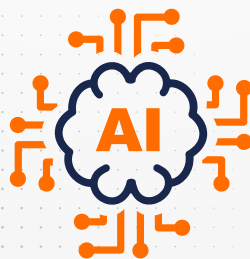


# About the Lab

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**DRDO Young Scientist Laboratory, Artificial Intelligence (DYSL-AI)** was commissioned on 1st of April 2019 and was dedicated to the Nation by the Hon. Prime Minister of India Shri Narendra Modi on 2nd of January 2020. The laboratory is located in Bangalore. Since its commissioning the laboratory has been involved with solving various problems pertaining to Indian Defence using Artificial Intelligence. The lab consists of a group of young and dedicated scientists, including Director, all below 35 years of age. Presently the lab is working towards building AI capabilities for Biometric Research, Situational Awareness, Data Analysis and Strategy building. DYSL-AI is committed to emerge as a centre of excellence in the field of Artificial Intelligence in India for the years to come.

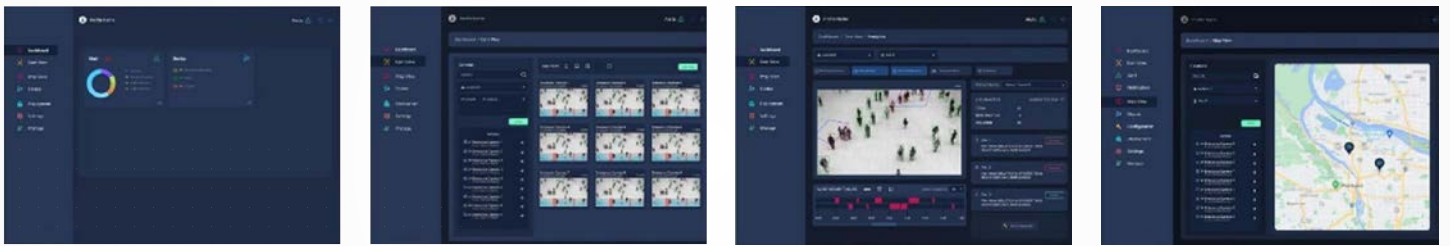


# Product / Technology

## Achievement

### Face Recognition System under Disguise (FRSD)

'Face recognition in the wild' on surveillance camera feeds is a difficult problem to solve due to the low resolution of the images captured from the cameras. This problem becomes even more challenging to solve with the added complexity of various facial disguises, crowd occlusions and varied illuminations. FRSD: Face recognition system under disguise aims to solve these challenges.



The objective of Face Recognition System under Disguise (FRSD) is to develop a face recognition system which can be used to identify anti-social elements with or without disguise in the low-resolution surveillance camera feeds. The algorithm has been trained in such a way that the face recognition system is robust to several disguises like face-masks, beard, moustache, wigs, sunglasses, head-scarves, monkey-caps, hats, etc.

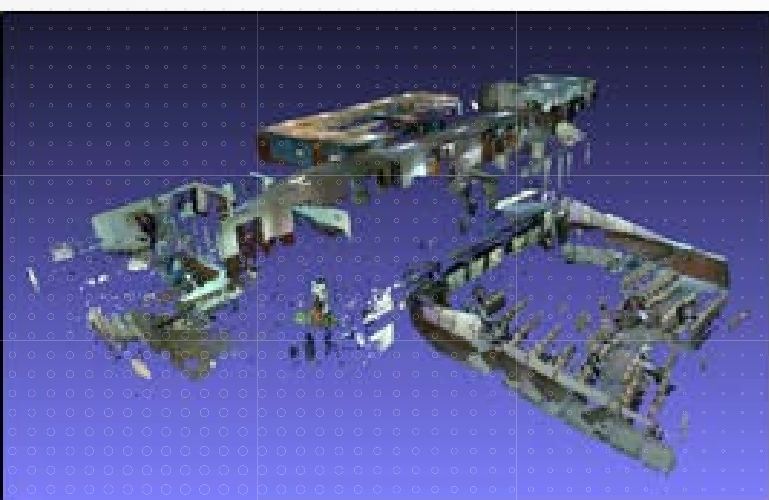


## Internet of Battle Field Things: **Smart Helmet** (To be exhibited)



The urban combat scenario is always challenging given the constrained space of operation and the unknowns of the area of operation. Hence any form of real time situational awareness increases the chances of success. To address this need for real time situational awareness especially for urban low intensity operations the “Smart Helmet” can capture the 3D information of any unknown environment in real time and assist in planning and decision making.

The “**Smart Helmet**” comprises of a sensor suite mounted on the helmet of an active combat soldier which in turn are connected to a wearable backpack compute of small form factor. The sensors capture the 3D information of the environment in real time and the software (running on the compute) using an Artificial Intelligence algorithms suite generates a 3D map of the same environment.



The generated **3D map** can serve as a “Local Positioning System” for conflicted and remote areas where we might have “No GPS” or “Low GPS” scenario. With the help of the “Smart Helmet”, members of a combat team or search and rescue team can precisely determine their own 3D positions in real time. This positioning system has good

positional accuracy and has no dependency on external positional system like GPS

# Speech to Speech Translation Technology

DYSL-AI is working on building products for speech-to-speech translation without the requirement of any internet connectivity, thus alleviating the dependence on any third-party API's or cloud services. High quality speech to speech translation devices without cloud connectivity are barely available, if any. The product differentiates itself by being capable of performing good quality Speech to text generation for Indian accents and also generates natural Hindi speech.

Speech is the most natural mechanism for communication and cuts across the literacy barrier and is the default choice during situations of high cognitive load. Given the rich linguistic diversity of India, and the geopolitical interest of the country the language technology is critical for both communications and potential intelligence needs.

The screenshot displays the 'DYSL-AI TRANSLATOR' interface. At the top, three main features are listed: 'SPEECH TO SPEECH FOR REAL TIME TRANSLATION OF SPEECH', 'TEXT TO TEXT FOR TEXT TO TEXT TRANSLATION', and 'LANGUAGE SUPPORT Support for different languages'. Below this, the 'SPEECH TO SPEECH TRANSLATION' section is active, showing a language selection dropdown set to 'English To Hindi'. A red 'HOLD AND SPEAK' button is visible. A progress bar indicates the translation is complete, with the text 'SUCCESSFULLY Translated'. The transcript of the original speech is 'IT'S HARD TO BUILD A GOOD MACHINE TRANSLATION SYSTEM BUT WE 'RE TRYING OUR BEST', and the translated Hindi text is 'एक अच्छा मशीन अनुवाद प्रणाली बनाना मुश्किल है लेकिन हम उसका सबसे बेस्ट काम कर रहे हैं'.



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